spot

0.7.1

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Contents

1 Main Page

1.1 The Spot Library

Spot is a model-checking library. It provides algorithms and data structures to implement the automata-theoretic approach to model-checking.

See `spot.lip6.fr` for more information about this project.

1.2 This Document

This document describes all the public data structures and functions of Spot. This aims to be a reference manual, not a tutorial.

If you are new to this manual, start with `the module page`. This is what looks the closest to a table of contents.

1.3 Handy starting points

- spot::ltl::formula Base class for an LTL formulae.
- spot::ltl::parse Parsing a text string into a spot::ltl::formula.
- spot::tgba Base class for Transition-based Generalized Büchi Automaton.
- spot::ltl_to_tgba_fm Convert a spot::ltl::formula into a spot::tgba.
- spot::tgba_product On-the-fly product of two spot::tgba.
- spot::emptiness_check Base class for all emptiness-check algorithms (see also module Emptiness-checks)

2 Deprecated List

Member spot::ltl::clone(const formula $*$f) Use f->clone() instead.

Member spot::ltl::destroy(const formula $*$f) Use f->destroy() instead.

Member spot::state::∼state() Client code should now call `s->destroy();` instead of `delete s;`.

3 Bug List

Member spot::explicit_magic_search(const tgba $*$a, option_map o=option_map()) The name is misleading. Magic-search is the algorithm from `godefroid.93.pstv`, not `courcoubetis.92.fmsd`.

Member spot::get_delayed_relation_simulation(const tgba $*$a, std::ostream &os, int opt=-1) Does not work for generalized automata.

4 Module Documentation

4.1 LTL formulae

Modules

- Essential LTL types
- LTL Abstract Syntax Tree
- LTL environments
- Algorithms for LTL formulae

4.1.1 Detailed Description

This module gathers types and definitions related to LTL formulae.

4.2 SABA (State-based Alternating Büchi Automata)

Classes

- class spot::saba_complement_tgba

  Complement a TGBA and produce a SABA.
  The original TGBA is transformed into a States-based Büchi Automaton.

Modules

- Essential SABA types

4.2.1 Detailed Description

Spot was centered around non-deterministic TGBA (Transition-based Generalized Büchi Automata). Alternating automata are an extension to non-deterministic automata, and are presented with spot::saba. This type and its cousins are listed here. This is an abstract interface.

4.3 TGBA (Transition-based Generalized Büchi Automata)

Classes

- class spot::future_conditions_collector

  Wrap a tgba to offer information about upcoming conditions.
  This class is a spot::tgba wrapper that simply add a new method, future_conditions(), to any spot::tgba.

- class spot::tgba_scc

  Wrap a tgba to offer information about strongly connected components.
  This class is a spot::tgba wrapper that simply add a new method scc_of_state() to retrieve the number of a SCC a state belongs to.

Modules

- Kripke Structures
- Essential TGBA types
- TGBA representations
- TGBA algorithms

4.3.1 Detailed Description

Spot is centered around the spot::tgba type. This type and its cousins are listed here. This is an abstract interface. Its implementations are either concrete representations, or on-the-fly algorithms. Other algorithms that work on spot::tgba are listed separately.

4.4 Emptiness-check algorithms for SSP

Functions

- couvreur99_check ∗ spot::couvreur99_check_ssp_semi (const tgba ∗ssp_automata)
- couvreur99_check ∗ spot::couvreur99_check_ssp_shy_semi (const tgba ∗ssp_automata)
- couvreur99_check ∗ spot::couvreur99_check_ssp_shy (const tgba ∗ssp_automata, bool stack_inclusion=true, bool double_inclusion=false, bool reversed_double_inclusion=false, bool no_decomp=false)

4.4.1 Function Documentation

4.4.1.1 couvreur99_check∗ spot::couvreur99_check_ssp_semi (const tgba ∗ *ssp_automata*)

4.4.1.2 couvreur99_check∗ spot::couvreur99_check_ssp_shy (const tgba ∗ *ssp_automata*, bool *stack_inclusion* = `true`, bool *double_inclusion* = `false`, bool *reversed_double_inclusion* = `false`, bool *no_decomp* = `false`)

4.4.1.3 couvreur99_check∗ spot::couvreur99_check_ssp_shy_semi (const tgba ∗ *ssp_automata*)

4.5 Input/Output of LTL formulae

Classes

- class spot::ltl::ltl_file

  Read LTL formulae from a file, one by one.

- class spot::ltl::random_ltl

  Generate random LTL formulae.
  This class recursively construct LTL formulae of a given size. The formulae will use the use atomic propositions from the set of proposition passed to the constructor, in addition to the constant and all LTL operators supported by Spot.

Typedefs

- typedef std::pair< std::string, std::string > spot::eltl::spair
- typedef std::pair< eltlyy::location, spair > spot::eltl::parse_error

  A parse diagnostic <location, <file, message>>.

- typedef std::list< parse_error > spot::eltl::parse_error_list

  A list of parser diagnostics, as filled by parse.

- typedef std::pair< ltlyy::location, std::string > spot::ltl::parse_error

  A parse diagnostic with its location.

- typedef std::list< parse_error > spot::ltl::parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- formula ∗ spot::eltl::parse_file (const std::string &filename, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from a text file.

- formula ∗ spot::eltl::parse_string (const std::string &eltl_string, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from an ELTL string.

- bool spot::eltl::format_parse_errors (std::ostream &os, parse_error_list &error_list)

  Format diagnostics produced by spot::eltl::parse.

- formula ∗ spot::ltl::parse (const std::string &ltl_string, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from an LTL string.

- bool spot::ltl::format_parse_errors (std::ostream &os, const std::string &ltl_string, parse_error_list &error_list)

  Format diagnostics produced by spot::ltl::parse.

- std::ostream & spot::ltl::dotty (std::ostream &os, const formula ∗f)

  Write a formula tree using dot's syntax.

- std::ostream & spot::ltl::dump (std::ostream &os, const formula ∗f)

  Dump a formula tree.

- std::ostream & spot::ltl::to_string (const formula ∗f, std::ostream &os, bool full_parent=false)

  Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

- std::string spot::ltl::to_string (const formula ∗f, bool full_parent=false)

  Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

- std::ostream & spot::ltl::to_spin_string (const formula ∗f, std::ostream &os, bool full_parent=false)

  Output a formula as a (parsable by Spin) string.

- std::string spot::ltl::to_spin_string (const formula ∗f, bool full_parent=false)

  Convert a formula into a (parsable by Spin) string.

4.5.1 Typedef Documentation

4.5.1.1 typedef std::pair<eltlyy::location, spair> spot::eltl::parse_error

A parse diagnostic <location, <file, message>>.

4.5.1.2 typedef std::pair<ltlyy::location, std::string> spot::ltl::parse_error

A parse diagnostic with its location.

4.5.1.3 typedef std::list<parse_error> spot::ltl::parse_error_list

A list of parser diagnostics, as filled by parse.

4.5.1.4 typedef std::list<parse_error> spot::eltl::parse_error_list

A list of parser diagnostics, as filled by parse.

4.5.1.5 typedef std::pair<std::string, std::string> spot::eltl::spair

4.5.2 Function Documentation

4.5.2.1 std::ostream& spot::ltl::dotty (std::ostream & *os,* const formula ∗ *f*)

Write a formula tree using dot's syntax.

Parameters

- ***os*** The stream where it should be output.
- ***f*** The formula to translate.

`dot` is part of the GraphViz package `http://www.research.att.com/sw/tools/graphviz/`

4.5.2.2 std::ostream& spot::ltl::dump (std::ostream & *os,* const formula ∗ *f*)

Dump a formula tree.

Parameters

os The stream where it should be output.

f The formula to dump.

This is useful to display a formula when debugging.

4.5.2.3 bool spot::ltl::format_parse_errors (std::ostream & *os,* const std::string & *ltl_string,* parse_error_list & *error_list*)

Format diagnostics produced by spot::ltl::parse.

Parameters

os Where diagnostics should be output.

ltl_string The string that were parsed.

error_list The error list filled by spot::ltl::parse while parsing *ltl_string*.

Returns

`true` iff any diagnostic was output.

4.5.2.4 bool spot::eltl::format_parse_errors (std::ostream & *os,* parse_error_list & *error_list*)

Format diagnostics produced by spot::eltl::parse.

Parameters

os Where diagnostics should be output.

error_list The error list filled by spot::eltl::parse while parsing *eltl_string*.

Returns

`true` iff any diagnostic was output.

4.5.2.5 formula$*$ spot::ltl::parse (const std::string & *ltl_string,* parse_error_list & *error_list,* environment & *env* = `default_environment::instance()`, bool *debug* = `false`)

Build a formula from an LTL string.

Parameters

ltl_string The string to parse.

error_list A list that will be filled with parse errors that occured during parsing.

env The environment into which parsing should take place.

debug When true, causes the parser to trace its execution.

Returns

A pointer to the formula built from *ltl_string*, or 0 if the input was unparsable.

Note that the parser usually tries to recover from errors. It can return an non zero value even if it encountered error during the parsing of *ltl_string*. If you want to make sure *ltl_string* was parsed succesfully, check *error_list* for emptiness.

Warning

This function is not reentrant.

4.5.2.6 formula∗ spot::eltl::parse_file (const std::string & *filename,* parse_error_list & *error_list,* environment & *env* = `default_environment::instance()`, bool *debug* = `false`)

Build a formula from a text file.

Parameters

filename The name of the file to parse.

error_list A list that will be filled with parse errors that occured during parsing.

env The environment into which parsing should take place.

debug When true, causes the parser to trace its execution.

Returns

A pointer to the tgba built from *filename*, or 0 if the file could not be opened.

Warning

This function is not reentrant.

4.5.2.7 formula∗ spot::eltl::parse_string (const std::string & *eltl_string,* parse_error_list & *error_list,* environment & *env* = `default_environment::instance()`, bool *debug* = `false`)

Build a formula from an ELTL string.

Parameters

eltl_string The string to parse.

error_list A list that will be filled with parse errors that occured during parsing.

env The environment into which parsing should take place.

debug When true, causes the parser to trace its execution.

Returns

A pointer to the formula built from *eltl_string*, or 0 if the input was unparsable.

Warning

This function is not reentrant.

4.5.2.8 std::ostream& spot::ltl::to_spin_string (const formula ∗ *f*, std::ostream & *os*, bool *full_parent* = `false`)

Output a formula as a (parsable by Spin) string.

Parameters

f The formula to translate.

os The stream where it should be output.

full_parent Whether or not the string should by fully parenthesized.

4.5.2.9 std::string spot::ltl::to_spin_string (const formula ∗ *f*, bool *full_parent* = `false`)

Convert a formula into a (parsable by Spin) string.

Parameters

f The formula to translate.

full_parent Whether or not the string should by fully parenthesized.

4.5.2.10 std::ostream& spot::ltl::to_string (const formula ∗ *f*, std::ostream & *os*, bool *full_parent* = `false`)

Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

Parameters

f The formula to translate.

os The stream where it should be output.

full_parent Whether or not the string should by fully parenthesized.

4.5.2.11 std::string spot::ltl::to_string (const formula ∗ *f*, bool *full_parent* = `false`)

Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

Parameters

f The formula to translate.

full_parent Whether or not the string should by fully parenthesized.

4.6 Kripke Structures

Classes

- class spot::fair_kripke_succ_iterator

  Iterator code for a Fair Kripke structure.
  This iterator can be used to simplify the writing of an iterator on a Fair Kripke structure (or lookalike).

- class spot::fair_kripke

  Interface for a Fair Kripke structure.
  A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition, and a set of acceptance conditions.

- class spot::kripke_succ_iterator

  Iterator code for Kripke structure
  This iterator can be used to simplify the writing of an iterator on a Kripke structure (or lookalike).

- class spot::kripke

  Interface for a Kripke structure
  A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition.

4.7 Essential LTL types

Classes

- class spot::ltl::formula

  An LTL formula.
  The only way you can work with a formula is to build a spot::ltl::visitor or spot::ltl::const_visitor.

- struct spot::ltl::visitor

  Formula visitor that can modify the formula.
  Writing visitors is the prefered way to traverse a formula, since it doesn't involve any cast.

- class spot::ltl::environment

  An environment that describes atomic propositions.

Functions

- formula ∗ spot::ltl::clone (const formula ∗f)

  Clone a formula.

- void spot::ltl::destroy (const formula ∗f)

  Destroys a formula.

4.7.1 Function Documentation

4.7.1.1 formula$*$ spot::ltl::clone (const formula $*$ f)

Clone a formula.

Deprecated

Use f->clone() instead.

4.7.1.2 void spot::ltl::destroy (const formula $*$ f)

Destroys a formula.

Deprecated

Use f->destroy() instead.

4.8 LTL Abstract Syntax Tree

Classes

- class spot::ltl::atomic_prop

  Atomic propositions.

- class spot::ltl::binop

  Binary operator.

- class spot::ltl::constant

  A constant (True or False).

- class spot::ltl::formula

  An LTL formula.
  The only way you can work with a formula is to build a spot::ltl::visitor or spot::ltl::const_visitor.

- class spot::ltl::multop

  Multi-operand operators.
  These operators are considered commutative and associative.

- class spot::ltl::ref_formula

  A reference-counted LTL formula.

- class spot::ltl::unop

  Unary operators.

4.9 LTL environments

Classes

- class spot::ltl::declarative_environment

  A declarative environment.
  This environment recognizes all atomic propositions that have been previously declared. It will reject other.

- class spot::ltl::default_environment

  A laxist environment.
  This environment recognizes all atomic propositions.

4.9.1 Detailed Description

LTL environment implementations.

4.10 Algorithms for LTL formulae

Modules

- Input/Output of LTL formulae
- Derivable visitors
- Rewriting LTL formulae
- Miscellaneous algorithms for LTL formulae

4.11 Derivable visitors

Classes

- class spot::ltl::clone_visitor

  Clone a formula.
  This visitor is public, because it's convenient to derive from it and override part of its methods. But if you just want the functionality, consider using spot::ltl::formula::clone instead, it is way faster.

- class spot::ltl::unabbreviate_logic_visitor

  Clone and rewrite a formula to remove most of the abbreviated logical operators.
  This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

- class spot::ltl::postfix_visitor

  Apply an algorithm on each node of an AST, during a postfix traversal.
  Override one or more of the postifix_visitor::doit methods with the algorithm to apply.

- class spot::ltl::simplify_f_g_visitor

  Replace `true U f` and `false R g` by `F f` and `G g`.

- class spot::ltl::unabbreviate_ltl_visitor

  Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.
  The rewriting performed on logical operator is the same as the one done by spot::ltl::unabbreviate_logic_visitor.

4.12 Rewriting LTL formulae

Enumerations

- enum spot::ltl::reduce_options {
  spot::ltl::Reduce_None = 0, spot::ltl::Reduce_Basics = 1, spot::ltl::Reduce_Syntactic_Implications = 2, spot::ltl::Reduce_Eventuality_And_Universality = 4,
  spot::ltl::Reduce_Containment_Checks = 8, spot::ltl::Reduce_Containment_Checks_Stronger = 16, spot::ltl::Reduce_All = -1U }

  Options for spot::ltl::reduce.

Functions

- formula ∗ spot::ltl::basic_reduce (const formula ∗f)

  Basic rewritings.

- formula ∗ spot::ltl::unabbreviate_logic (const formula ∗f)

  Clone and rewrite a formula to remove most of the abbreviated logical operators.
  This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

- formula ∗ spot::ltl::negative_normal_form (const formula ∗f, bool negated=false)

  Build the negative normal form of f.
  All negations of the formula are pushed in front of the atomic propositions.

- formula ∗ spot::ltl::reduce (const formula ∗f, int opt=Reduce_All)

  Reduce a formula f.

- formula ∗ spot::ltl::simplify_f_g (const formula ∗f)

  Replace `true U f` *and* `false R g` *by* `F f` *and* `G g`.

4.12.1 Enumeration Type Documentation

4.12.1.1 enum spot::ltl::reduce_options

Options for spot::ltl::reduce.

Enumerator:

Reduce_None No reduction.

Reduce_Basics Basic reductions.

Reduce_Syntactic_Implications Somenzi & Bloem syntactic implication.

Reduce_Eventuality_And_Universality Etessami & Holzmann eventuality and universality reductions.

Reduce_Containment_Checks Tauriainen containment checks.

Reduce_Containment_Checks_Stronger Tauriainen containment checks (stronger version).

Reduce_All All reductions.

4.12.2 Function Documentation

4.12.2.1 formula∗ spot::ltl::basic_reduce (const formula ∗ *f*)

Basic rewritings.

4.12.2.2 formula∗ spot::ltl::negative_normal_form (const formula ∗ *f*, bool *negated* = `false`)

Build the negative normal form of *f*.

All negations of the formula are pushed in front of the atomic propositions.

Parameters

f The formula to normalize.

negated If `true`, return the negative normal form of `!f`

Note that this will not remove abbreviated operators. If you want to remove abbreviations, call spot::ltl::unabbreviate_logic or spot::ltl::unabbreviate_ltl first. (Calling these functions after spot::ltl::negative_normal_form would likely produce a formula which is not in negative normal form.)

4.12.2.3 formula∗ spot::ltl::reduce (const formula ∗ *f*, int *opt* = `Reduce_All`)

Reduce a formula *f*.

Parameters

f the formula to reduce

opt a conjonction of spot::ltl::reduce_options specifying which optimizations to apply.

Returns

the reduced formula

4.12.2.4 formula∗ spot::ltl::simplify_f_g (const formula ∗ *f*)

Replace `true U f` and `false R g` by `F f` and `G g`.

Perform the following rewriting (from left to right):

- true U a = F a
- a M true = F a
- false R a = G a
- a W false = G a

4.12.2.5 formula∗ spot::ltl::unabbreviate_logic (const formula ∗ *f*)

Clone and rewrite a formula to remove most of the abbreviated logical operators.

This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

4.13 Miscellaneous algorithms for LTL formulae

Typedefs

- typedef std::set< atomic_prop ∗, formula_ptr_less_than > spot::ltl::atomic_prop_set

  Set of atomic propositions.

Functions

- atomic_prop_set ∗ spot::ltl::atomic_prop_collect (const formula ∗f, atomic_prop_set ∗s=0)

  Return the set of atomic propositions occurring in a formula.

- bool spot::ltl::is_GF (const formula ∗f)

  Whether a formula starts with GF.

- bool spot::ltl::is_FG (const formula ∗f)

  Whether a formula starts with FG.

- int spot::ltl::length (const formula ∗f)

  Compute the length of a formula.
  The length of a formula is the number of atomic properties, constants, and operators (logical and temporal) occurring in the formula. spot::ltl::multops count only for 1, even if they have more than two operands (e.g. `a | b | c` *has length 4, because | is represented once internally).*

- bool spot::ltl::is_eventual (const formula ∗f)

  Check whether a formula is a pure eventuality.
  Pure eventuality formulae are defined in.

- bool spot::ltl::is_universal (const formula ∗f)

  Check whether a formula is purely universal.
  Purely universal formulae are defined in.

- bool spot::ltl::syntactic_implication (const formula ∗f1, const formula ∗f2)

  Syntactic implication.
  This comes from.

- bool spot::ltl::syntactic_implication_neg (const formula ∗f1, const formula ∗f2, bool right)

  Syntactic implication.
  If right==false, true if !f1 < f2, false otherwise. If right==true, true if f1 < !f2, false otherwise.

4.13.1 Typedef Documentation

4.13.1.1 typedef std::set<atomic_prop∗, formula_ptr_less_than> spot::ltl::atomic_prop_set

Set of atomic propositions.

4.13.2 Function Documentation

4.13.2.1 atomic_prop_set∗ spot::ltl::atomic_prop_collect (const formula ∗ *f*, atomic_prop_set ∗ *s* = *0*)

Return the set of atomic propositions occurring in a formula.

Parameters

f the formula to inspect

s an existing set to fill with atomic_propositions discovered, or 0 if the set should be allocated by the function.

Returns

A pointer to the supplied set, `s`, augmented with atomic propositions occurring in `f`; or a newly allocated set containing all these atomic propositions if `s` is 0.

4.13.2.2 bool spot::ltl::is_eventual (const formula ∗ *f*)

Check whether a formula is a pure eventuality.

Pure eventuality formulae are defined in.

```
/// @InProceedings{   etessami.00.concur,
/// author   = {Kousha Etessami and Gerard J. Holzmann},
/// title = {Optimizing {B\"u}chi Automata},
/// booktitle = {Proceedings of the 11th International Conference on
///    Concurrency Theory (Concur'2000)},
/// pages = {153--167},
/// year = {2000},
/// editor   = {C. Palamidessi},
/// volume   = {1877},
/// series   = {Lecture Notes in Computer Science},
/// publisher = {Springer-Verlag}
/// }
///
```

A word that satisfies a pure eventuality can be prefixed by anything and still satisfies the formula.

4.13.2.3 bool spot::ltl::is_FG (const formula ∗ *f*)

Whether a formula starts with FG.

4.13.2.4 bool spot::ltl::is_GF (const formula ∗ *f*)

Whether a formula starts with GF.

4.13.2.5 bool spot::ltl::is_universal (const formula ∗ *f*)

Check whether a formula is purely universal.

Purely universal formulae are defined in.

```
/// @InProceedings{   etessami.00.concur,
/// author   = {Kousha Etessami and Gerard J. Holzmann},
/// title = {Optimizing {B\"u}chi Automata},
/// booktitle = {Proceedings of the 11th International Conference on
///    Concurrency Theory (Concur'2000)},
/// pages = {153--167},
/// year = {2000},
/// editor   = {C. Palamidessi},
/// volume   = {1877},
/// series   = {Lecture Notes in Computer Science},
/// publisher = {Springer-Verlag}
/// }
///
```

Any (non-empty) suffix of a word that satisfies if purely universal formula also satisfies the formula.

4.13.2.6 int spot::ltl::length (const formula ∗ *f*)

Compute the length of a formula.

The length of a formula is the number of atomic properties, constants, and operators (logical and temporal) occurring in the formula. spot::ltl::multops count only for 1, even if they have more than two operands (e.g. `a | b | c` has length 4, because | is represented once internally).

4.13.2.7 bool spot::ltl::syntactic_implication (const formula ∗ *f1*, const formula ∗ *f2*)

Syntactic implication.

This comes from.

```
/// @InProceedings{   somenzi.00.cav,
/// author   = {Fabio Somenzi and Roderick Bloem},
/// title = {Efficient {B\"u}chi Automata for {LTL} Formulae},
/// booktitle = {Proceedings of the 12th International Conference on
///    Computer Aided Verification (CAV'00)},
/// pages = {247--263},
/// year = {2000},
/// volume   = {1855},
/// series   = {Lecture Notes in Computer Science},
/// publisher = {Springer-Verlag}
/// }
///
```

4.13.2.8 bool spot::ltl::syntactic_implication_neg (const formula ∗ *f1*, const formula ∗ *f2*, bool *right*)

Syntactic implication.

If right==false, true if !f1 < f2, false otherwise. If right==true, true if f1 < !f2, false otherwise.

See also

syntactic_implication

4.14 Miscellaneous helper algorithms

Whether a word is bare.

Classes

- class spot::bdd_allocator

  Manage ranges of variables.
- struct spot::bdd_less_than

  Comparison functor for BDDs.
- class spot::free_list

  Manage list of free integers.
- struct spot::char_ptr_less_than

  Strict Weak Ordering for `char*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `const char*`*.*
- class spot::minato_isop

  Generate an irredundant sum-of-products (ISOP) form of a BDD function.
  This algorithm implements a derecursived version the Minato-Morreale algorithm presented in the following paper.
- class spot::loopless_modular_mixed_radix_gray_code

  Loopless modular mixed radix Gray code iteration.
  This class is based on the loopless modular mixed radix gray code algorithm described in exercise 77 of "The Art of Computer Programming", Pre-Fascicle 2A (Draft of section 7.2.1.1: generating all n-tuples) by Donald E. Knuth.
- class spot::option_map

  Manage a map of options.
  Each option is defined by a string and is associated to an integer value.
- struct spot::time_info

  A structure to record elapsed time in clock ticks.
- class spot::timer

  A timekeeper that accumulate interval of time.

- class spot::timer_map

  A map of timer, where each timer has a name.

Modules

- Hashing functions
- Random functions

Functions

- bool spot::is_bare_word (const char ∗str)
- std::string spot::quote_unless_bare_word (const std::string &str)

  Double-quote words that are not bare.

- std::ostream & spot::escape_str (std::ostream &os, const std::string &str)

  Escape " and \ characters in str.

- std::string spot::escape_str (const std::string &str)

  Escape " and \ characters in str.

- const char ∗ spot::version ()

  Return Spot's version.

4.14.1 Detailed Description

Whether a word is bare. Bare words should start with a letter or an underscore, and consist solely of alphanumeric characters and underscores.

4.14.2 Function Documentation

4.14.2.1 std::ostream& spot::escape_str (std::ostream & *os*, const std::string & *str*)

Escape " and \ characters in *str*.

4.14.2.2 std::string spot::escape_str (const std::string & *str*)

Escape " and \ characters in *str*.

4.14.2.3 bool spot::is_bare_word (const char ∗ *str*)

4.14.2.4 std::string spot::quote_unless_bare_word (const std::string & *str*)

Double-quote words that are not bare.

See also

is_bare_word

4.14.2.5 const char∗ spot::version ( )

Return Spot's version.

4.15 Hashing functions

Classes

- struct spot::ltl::formula_ptr_hash

  Hash Function for `const formula*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `const formula*`*.*

- struct spot::ptr_hash< T >

  A hash function for pointers.

- struct spot::string_hash

  A hash function for strings.

- struct spot::identity_hash< T >

  A hash function that returns identity.

- struct spot::saba_state_ptr_hash

  Hash Function for `saba_state*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `saba_state*`*.*

- struct spot::saba_state_shared_ptr_hash

  Hash Function for `shared_saba_state` *(shared_ptr<const saba_state∗>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_saba_state`*.*

- struct spot::state_ptr_hash

  Hash Function for `state*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `state*`*.*

- struct spot::state_shared_ptr_hash

  Hash Function for `shared_state` *(shared_ptr<const state∗>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_state`*.*

Functions

- size_t spot::wang32_hash (size_t key)

  Thomas Wang's 32 bit hash function.

- size_t spot::knuth32_hash (size_t key)

  Knuth's Multiplicative hash function.

4.15.1 Function Documentation

4.15.1.1 size_t spot::knuth32_hash (size_t *key*) `[inline]`

Knuth's Multiplicative hash function.

This function is suitable for hashing values whose high order bits do not vary much (ex. addresses of memory objects). Prefer spot::wang32_hash() otherwise. `http://www.concentric.net/~Ttwang/tech/addrhash.htm`

Referenced by spot::ptr_hash< T >::operator()().

4.15.1.2 size_t spot::wang32_hash (size_t *key*) `[inline]`

Thomas Wang's 32 bit hash function.

Hash an integer amongst the integers. `http://www.concentric.net/~Ttwang/tech/inthash.htm`

4.16 Random functions

Classes

- class spot::barand< gen >

  Compute pseudo-random integer value between 0 and n included, following a binomial distribution for probability p.

Functions

- void spot::srand (unsigned int seed)

  Reset the seed of the pseudo-random number generator.

- int spot::rrand (int min, int max)

  Compute a pseudo-random integer value between min and max included.

- int spot::mrand (int max)

  Compute a pseudo-random integer value between 0 and max-1 included.

- double spot::drand ()

  Compute a pseudo-random double value between 0.0 and 1.0 (1.0 excluded).
- double spot::nrand ()

  Compute a pseudo-random double value following a standard normal distribution. (Odeh & Evans).
- double spot::bmrand ()

  Compute a pseudo-random double value following a standard normal distribution. (Box-Muller).
- int spot::prand (double p)

  Return a pseudo-random positive integer value following a Poisson distribution with parameter p.

4.16.1 Function Documentation

4.16.1.1 double spot::bmrand ( )

Compute a pseudo-random double value following a standard normal distribution. (Box-Muller).

This uses the polar form of the Box-Muller transform to generate random values.

4.16.1.2 double spot::drand ( )

Compute a pseudo-random double value between 0.0 and 1.0 (1.0 excluded).

See also

mrand, rrand, srand

4.16.1.3 int spot::mrand (int *max*)

Compute a pseudo-random integer value between 0 and *max-1* included.

See also

drand, rrand, srand

4.16.1.4 double spot::nrand ( )

Compute a pseudo-random double value following a standard normal distribution. (Odeh & Evans).

This uses a polynomial approximation of the inverse cumulated density function from Odeh & Evans, Journal of Applied Statistics, 1974, vol 23, pp 96-97.

4.16.1.5 int spot::prand (double *p*)

Return a pseudo-random positive integer value following a Poisson distribution with parameter *p*.

Precondition

`p > 0`

4.16.1.6 int spot::rrand (int *min*, int *max*)

Compute a pseudo-random integer value between *min* and *max* included.

See also

drand, mrand, srand

4.16.1.7 void spot::srand (unsigned int *seed*)

Reset the seed of the pseudo-random number generator.

See also

drand, mrand, rrand

4.17 Input/Output of TGBA

Modules

- Decorating the dot output

Typedefs

- typedef std::pair< neverclaimyy::location, std::string > spot::neverclaim_parse_error

  A parse diagnostic with its location.

- typedef std::list< neverclaim_parse_error > spot::neverclaim_parse_error_list

  A list of parser diagnostics, as filled by parse.

- typedef std::pair< tgbayy::location, std::string > spot::tgba_parse_error

  A parse diagnostic with its location.

- typedef std::list< tgba_parse_error > spot::tgba_parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- tgba_explicit_string ∗ spot::neverclaim_parse (const std::string &filename, neverclaim_parse_error_list &error_list, bdd_dict ∗dict, ltl::environment &env=ltl::default_environment::instance(), bool debug=false)

  Build a spot::tgba_explicit from a Spin never claim file.

- bool spot::format_neverclaim_parse_errors (std::ostream &os, const std::string &filename, neverclaim_parse_error_list &error_list)

  Format diagnostics produced by spot::neverclaim_parse.

- std::ostream & spot::dotty_reachable (std::ostream &os, const tgba ∗g, dotty_decorator ∗dd=dotty_decorator::instance())

  Print reachable states in dot format.
  The dd argument allows to customize the output in various ways. See this page for a list of available decorators.

- std::ostream & spot::lbtt_reachable (std::ostream &os, const tgba ∗g)

  Print reachable states in LBTT format.

- std::ostream & spot::never_claim_reachable (std::ostream &os, const tgba_sba_proxy ∗g, const ltl::formula ∗f=0, bool comments=false)

  Print reachable states in Spin never claim format.

- std::ostream & spot::tgba_save_reachable (std::ostream &os, const tgba ∗g)

  Save reachable states in text format.

- tgba_explicit_string ∗ spot::tgba_parse (const std::string &filename, tgba_parse_error_list &error_list, bdd_dict ∗dict, ltl::environment &env=ltl::default_environment::instance(), ltl::environment &envacc=ltl::default_environment::instance(), bool debug=false)

  Build a spot::tgba_explicit from a text file.

- bool spot::format_tgba_parse_errors (std::ostream &os, const std::string &filename, tgba_parse_error_list &error_list)

  Format diagnostics produced by spot::tgba_parse.

4.17.1 Typedef Documentation

4.17.1.1 typedef std::pair<neverclaimyy::location, std::string> spot::neverclaim_parse_error

A parse diagnostic with its location.

4.17.1.2 typedef std::list<neverclaim_parse_error> spot::neverclaim_parse_error_list

A list of parser diagnostics, as filled by parse.

4.17.1.3 typedef std::pair<tgbayy::location, std::string> spot::tgba_parse_error

A parse diagnostic with its location.

4.17.1.4 typedef std::list<tgba_parse_error> spot::tgba_parse_error_list

A list of parser diagnostics, as filled by parse.

4.17.2 Function Documentation

4.17.2.1 std::ostream& spot::dotty_reachable (std::ostream & *os*, const tgba ∗ *g*, dotty_decorator ∗ *dd* = `dotty_decorator::instance()`)

Print reachable states in dot format.

The *dd* argument allows to customize the output in various ways. See this page for a list of available decorators.

4.17.2.2 bool spot::format_neverclaim_parse_errors (std::ostream & *os*, const std::string & *filename*, neverclaim_parse_error_list & *error_list*)

Format diagnostics produced by spot::neverclaim_parse.

Parameters

os Where diagnostics should be output.

filename The filename that should appear in the diagnostics.

error_list The error list filled by spot::ltl::parse while parsing *ltl_string*.

Returns

`true` iff any diagnostic was output.

4.17.2.3 bool spot::format_tgba_parse_errors (std::ostream & *os*, const std::string & *filename*, tgba_parse_error_list & *error_list*)

Format diagnostics produced by spot::tgba_parse.

Parameters

os Where diagnostics should be output.

filename The filename that should appear in the diagnostics.

error_list The error list filled by spot::ltl::parse while parsing *ltl_string*.

Returns

`true` iff any diagnostic was output.

4.17.2.4 std::ostream& spot::lbtt_reachable (std::ostream & *os*, const tgba ∗ *g*)

Print reachable states in LBTT format.

Parameters

g The automata to print.

os Where to print.

4.17.2.5 std::ostream& spot::never_claim_reachable (std::ostream & *os*, const tgba_sba_proxy ∗ *g*, const ltl::formula ∗ *f* = *0*, bool *comments* = `false`)

Print reachable states in Spin never claim format.

Parameters

os The output stream to print on.

g The degeneralized automaton to output.

f The (optional) formula associated to the automaton. If given it will be output as a comment.

comments Whether to comment each state of the never clause with the label of the *g* automaton.

4.17.2.6 tgba_explicit_string∗ spot::neverclaim_parse (const std::string & *filename*, neverclaim_parse_error_list & *error_list*, bdd_dict ∗ *dict*, ltl::environment & *env* = `ltl::default_environment::instance()`, bool *debug* = `false`)

Build a spot::tgba_explicit from a Spin never claim file.

Parameters

filename The name of the file to parse.

error_list A list that will be filled with parse errors that occured during parsing.

dict The BDD dictionary where to use.

env The environment of atomic proposition into which parsing should take place.

debug When true, causes the parser to trace its execution.

Returns

A pointer to the tgba built from *filename*, or 0 if the file could not be opened.

Note that the parser usually tries to recover from errors. It can return an non zero value even if it encountered error during the parsing of *filename*. If you want to make sure *filename* was parsed succesfully, check *error_list* for emptiness.

Warning

This function is not reentrant.

4.17.2.7 tgba_explicit_string∗ spot::tgba_parse (const std::string & *filename*, tgba_parse_error_list & *error_list*, bdd_dict ∗ *dict*, ltl::environment & *env* = `ltl::default_environment::instance()`, ltl::environment & *envacc* = `ltl::default_environment::instance()`, bool *debug* = `false`)

Build a spot::tgba_explicit from a text file.

Parameters

filename The name of the file to parse.

error_list A list that will be filled with parse errors that occured during parsing.

dict The BDD dictionary where to use.

env The environment of atomic proposition into which parsing should take place.

envacc The environment of acceptance conditions into which parsing should take place.

debug When true, causes the parser to trace its execution.

Returns

A pointer to the tgba built from *filename*, or 0 if the file could not be opened.

Note that the parser usually tries to recover from errors. It can return an non zero value even if it encountered error during the parsing of *filename*. If you want to make sure *filename* was parsed succesfully, check *error_list* for emptiness.

Warning

This function is not reentrant.

4.17.2.8 std::ostream& spot::tgba_save_reachable (std::ostream & *os*, const tgba ∗ *g*)

Save reachable states in text format.

4.18 Essential SABA types

Classes

- class spot::explicit_state_conjunction

  Basic implementation of saba_state_conjunction.
  This class provides a basic implementation to iterate over a conjunction of states of a saba.

- class spot::saba

A State-based Alternating (Generalized) Büchi Automaton.
Browsing such automaton can be achieved using two functions: `get_init_state`*, and* `succ_iter`*. The former returns the initial state while the latter lists the successor states of any state.*

- class spot::saba_state

  Abstract class for saba states.

- struct spot::saba_state_ptr_less_than

  Strict Weak Ordering for `saba_state*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `saba_state*`*.*

- struct spot::saba_state_ptr_equal

  An Equivalence Relation for `saba_state*`*.*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `saba_state*`*.*

- struct spot::saba_state_ptr_hash

  Hash Function for `saba_state*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `saba_state*`*.*

- struct spot::saba_state_shared_ptr_less_than

  Strict Weak Ordering for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `shared_saba_state`*.*

- struct spot::saba_state_shared_ptr_equal

  An Equivalence Relation for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `shared_saba_state`*.*

- struct spot::saba_state_shared_ptr_hash

  Hash Function for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_saba_state`*.*

- class spot::saba_state_conjunction

  Iterate over a conjunction of saba_state.
  This class provides the basic functionalities required to iterate over a conjunction of states of a saba.

- class spot::saba_succ_iterator

  Iterate over the successors of a saba_state.
  This class provides the basic functionalities required to iterate over the successors of a state of a saba. Since transitions of an alternating automaton are defined as a boolean function with conjunctions (universal) and disjunctions (non-deterministic),.

4.19 Essential TGBA types

Classes

- class spot::bdd_dict
- class spot::state

  Abstract class for states.

- struct spot::state_ptr_less_than

  Strict Weak Ordering for `state*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `state*`*.*

- struct spot::state_ptr_equal

  An Equivalence Relation for `state*`*.*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `state*`*.*

- struct spot::state_ptr_hash

  Hash Function for `state*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `state*`*.*

- struct spot::state_shared_ptr_less_than

  Strict Weak Ordering for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `shared_state`*.*

- struct spot::state_shared_ptr_equal

  An Equivalence Relation for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `shared_state`*.*

- struct spot::state_shared_ptr_hash

  Hash Function for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_state`*.*

- class spot::tgba_succ_iterator

  Iterate over the successors of a state.
  This class provides the basic functionalities required to iterate over the successors of a state, as well as querying transition labels. Because transitions are never explicitely encoded, labels (conditions and acceptance conditions) can only be queried while iterating over the successors.

- class spot::tgba

  A Transition-based Generalized Büchi Automaton.
  The acronym TGBA (Transition-based Generalized Büchi Automaton) was coined by Dimitra Giannakopoulou and Flavio Lerda in "From States to Transitions: Improving Translation of LTL Formulae to Büchi Automata". (FORTE'02).

4.20 TGBA representations

Classes

- class spot::state_bdd
- class spot::tgba_succ_iterator_concrete
- class spot::tgba_bdd_concrete

  A concrete spot::tgba implemented using BDDs.

- class spot::tgba_explicit
- class spot::state_explicit
- class spot::tgba_explicit_succ_iterator
- class spot::tgba_reduc

4.21 TGBA algorithms

Modules

- TGBA on-the-fly algorithms
- Input/Output of TGBA
- Translating LTL formulae into TGBA
- Algorithm patterns
- TGBA simplifications
- Miscellaneous algorithms on TGBA
- Emptiness-checks

Functions

- tgba_bdd_concrete ∗ spot::product (const tgba_bdd_concrete ∗left, const tgba_bdd_concrete ∗right)

  Multiplies two spot::tgba_bdd_concrete automata.
  This function builds the resulting product as another spot::tgba_bdd_concrete automaton.

4.21.1 Function Documentation

4.21.1.1 tgba_bdd_concrete∗ spot::product (const tgba_bdd_concrete ∗ *left*, const tgba_bdd_concrete ∗ *right*)

Multiplies two spot::tgba_bdd_concrete automata.

This function builds the resulting product as another spot::tgba_bdd_concrete automaton.

4.22 TGBA on-the-fly algorithms

Classes

- class spot::tgba_kv_complement

  Build a complemented automaton.
  The construction comes from:

- class spot::state_product

  A state for spot::tgba_product.
  This state is in fact a pair of state: the state from the left automaton and that of the right.

- class spot::tgba_safra_complement

  Build a complemented automaton.
  It creates an automaton that recognizes the negated language of aut.

- class spot::tgba_sgba_proxy

  Change the labeling-mode of spot::tgba on the fly, producing a state-based generalized Büchi automaton.
  This class acts as a proxy in front of a spot::tgba, that should label on states on-the-fly. The result is still a spot::tgba, but acceptances conditions are also on states.

- class spot::tgba_tba_proxy

  Degeneralize a spot::tgba on the fly, producing a TBA.
  This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly. The result is still a spot::tgba, but it will always have exactly one acceptance condition so it could be called TBA (without the G).

- class spot::tgba_sba_proxy

  Degeneralize a spot::tgba on the fly, producing an SBA.
  This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly.

- class spot::state_union

  A state for spot::tgba_union.
  This state is in fact a pair. If the first member equals 0 and the second is different from 0, the state belongs to the left automaton. If the first member is different from 0 and the second is 0, the state belongs to the right automaton. If both members are 0, the state is the initial state.

Functions

- tgba ∗ spot::wdba_complement (const tgba ∗aut)

  Complement a weak deterministic Büchi automaton.

4.22.1 Function Documentation

4.22.1.1 tgba∗ spot::wdba_complement (const tgba ∗ *aut*)

Complement a weak deterministic Büchi automaton.

Parameters

aut a weak deterministic Büchi automaton to complement

Returns

a new automaton that recognizes the complement language

4.23 Translating LTL formulae into TGBA

Functions

- tgba_bdd_concrete ∗ spot::eltl_to_tgba_lacim (const ltl::formula ∗f, bdd_dict ∗dict)

  Build a spot::tgba_bdd_concrete from an ELTL formula.
  This is based on the following paper.

- taa_tgba ∗ spot::ltl_to_taa (const ltl::formula ∗f, bdd_dict ∗dict, bool refined_rules=false)

  Build a spot::taa∗ from an LTL formula.
  This is based on the following.

- tgba_explicit ∗ spot::ltl_to_tgba_fm (const ltl::formula ∗f, bdd_dict ∗dict, bool exprop=false, bool symb_merge=true, bool branching_postponement=false, bool fair_loop_approx=false, const ltl::atomic_prop_set ∗unobs=0, int reduce_ltl=ltl::Reduce_None)

  Build a spot::tgba_explicit∗ from an LTL formula.
  This is based on the following paper.

- tgba_bdd_concrete ∗ spot::ltl_to_tgba_lacim (const ltl::formula ∗f, bdd_dict ∗dict)

  Build a spot::tgba_bdd_concrete from an LTL formula.
  This is based on the following paper.

4.23.1 Function Documentation

4.23.1.1 tgba_bdd_concrete∗ spot::eltl_to_tgba_lacim (const ltl::formula ∗ *f*, bdd_dict ∗ *dict*)

Build a spot::tgba_bdd_concrete from an ELTL formula.

This is based on the following paper.

```
/// @InProceedings{   couvreur.00.lacim,
///   author         = {Jean-Michel Couvreur},
///   title          = {Un point de vue symbolique sur la logique temporelle
///                    lin{\'e}aire},
///   booktitle      = {Actes du Colloque LaCIM 2000},
///   month          = {August},
///   year           = {2000},
///   pages          = {131--140},
///   volume         = {27},
///   series         = {Publications du LaCIM},
///   publisher      = {Universit{\'e} du Qu{\'e}bec {\`a} Montr{\'e}al},
///   editor         = {Pierre Leroux}
/// }
///
```

Parameters

f The formula to translate into an automaton.

dict The spot::bdd_dict the constructed automata should use.

Returns

A spot::tgba_bdd_concrete that recognizes the language of *f*.

4.23.1.2 taa_tgba∗ spot::ltl_to_taa (const ltl::formula ∗ *f*, bdd_dict ∗ *dict*, bool *refined_rules* = `false`)

Build a spot::taa∗ from an LTL formula.

This is based on the following.

```
/// @techreport{HUT-TCS-A104,
///     address = {Espoo, Finland},
///     author  = {Heikki Tauriainen},
///     month    = {September},
///     note     = {Doctoral dissertation},
///     number   = {A104},
///     pages    = {xii+229},
///     title    = {Automata and Linear Temporal Logic: Translations
///                 with Transition-Based Acceptance},
///     type     = {Research Report},
///     year     = {2006}
/// }
///
```

Parameters

f The formula to translate into an automaton.

dict The spot::bdd_dict the constructed automata should use.

refined_rules If this parameter is set, refined rules are used.

Returns

A spot::taa that recognizes the language of *f*.

4.23.1.3 tgba_explicit∗ spot::ltl_to_tgba_fm (const ltl::formula ∗ *f*, bdd_dict ∗ *dict*, bool *exprop* = `false`, bool *symb_merge* = `true`, bool *branching_postponement* = `false`, bool *fair_loop_approx* = `false`, const ltl::atomic_prop_set ∗ *unobs* = *0*, int *reduce_ltl* = `ltl::Reduce_None`)

Build a spot::tgba_explicit∗ from an LTL formula.

This is based on the following paper.

```
/// @InProceedings{couvreur.99.fm,
///   author    = {Jean-Michel Couvreur},
///   title     = {On-the-fly Verification of Temporal Logic},
///   pages     = {253--271},
///   editor    = {Jeannette M. Wing and Jim Woodcock and Jim Davies},
///   booktitle = {Proceedings of the World Congress on Formal Methods in the
///       Development of Computing Systems (FM'99)},
///   publisher = {Springer-Verlag},
///   series    = {Lecture Notes in Computer Science},
///   volume    = {1708},
///   year      = {1999},
///   address   = {Toulouse, France},
///   month     = {September},
///   isbn      = {3-540-66587-0}
/// }
///
```

Parameters

f The formula to translate into an automaton.

dict The spot::bdd_dict the constructed automata should use.

exprop When set, the algorithm will consider all properties combinations possible on each state, in an attempt to reduce the non-determinism. The automaton will have the same size as without this option, but because the transition will be more deterministic, the product automaton will be smaller (or, at worse, equal).

symb_merge When false, states with the same symbolic representation (these are equivalent formulae) will not be merged.

branching_postponement When set, several transitions leaving from the same state with the same label (i.e., condition + acceptance conditions) will be merged. This correspond to an optimization described in the following paper.

```
/// @InProceedings{   sebastiani.03.charme,
///   author    = {Roberto Sebastiani and Stefano Tonetta},
///   title    = {"More Deterministic" vs. "Smaller" B{\"u}chi Automata for
///       Efficient LTL Model Checking},
///   booktitle = {Proceedings for the 12th Advanced Research Working
///       Conference on Correct Hardware Design and Verification
///       Methods (CHARME'03)},
///   pages     = {126--140},
///   year      = {2003},
///   editor    = {G. Goos and J. Hartmanis and J. van Leeuwen},
///   volume    = {2860},
///   series    = {Lectures Notes in Computer Science},
///   month     = {October},
///   publisher = {Springer-Verlag}
/// }
///
```

fair_loop_approx When set, a really simple characterization of unstable state is used to suppress all acceptance conditions from incoming transitions.

unobs When non-zero, the atomic propositions in the LTL formula are interpreted as events that exclude each other. The events in the formula are observable events, and `unobs` can be filled with additional unobservable events.

reduce_ltl If this parameter is set, the LTL formulae representing each state of the automaton will be simplified using spot::ltl::reduce() before computing the successor. *reduce_ltl* should specify the type of reduction to apply as documented for spot::ltl::reduce(). This idea is taken from the following paper.

```
/// @InProceedings{   thirioux.02.fmics,
///   author    = {Xavier Thirioux},
///   title     = {Simple and Efficient Translation from {LTL} Formulas to
///      {B\"u}chi Automata},
///   booktitle = {Proceedings of the 7th International ERCIM Workshop in
///       Formal Methods for Industrial Critical Systems (FMICS'02)},
///   series    = {Electronic Notes in Theoretical Computer Science},
///   volume    = {66(2)},
///   publisher = {Elsevier},
///   editor    = {Rance Cleaveland and Hubert Garavel},
///   year      = {2002},
///   month     = jul,
///   address   = {M{\'a}laga, Spain}
/// }
///
```

Returns

A spot::tgba_explicit that recognizes the language of *f*.

4.23.1.4 tgba_bdd_concrete∗ spot::ltl_to_tgba_lacim (const ltl::formula ∗ *f*, bdd_dict ∗ *dict*)

Build a spot::tgba_bdd_concrete from an LTL formula.

This is based on the following paper.

```
/// @InProceedings{   couvreur.00.lacim,
///   author         = {Jean-Michel Couvreur},
///   title          = {Un point de vue symbolique sur la logique temporelle
///                    lin{\'e}aire},
///   booktitle      = {Actes du Colloque LaCIM 2000},
///   month          = {August},
///   year           = {2000},
///   pages          = {131--140},
///   volume         = {27},
///   series         = {Publications du LaCIM},
///   publisher      = {Universit{\'e} du Qu{\'e}bec {\`a} Montr{\'e}al},
///   editor         = {Pierre Leroux}
/// }
///
```

Parameters

f The formula to translate into an automaton.

dict The spot::bdd_dict the constructed automata should use.

Returns

A spot::tgba_bdd_concrete that recognizes the language of f.

4.24 Algorithm patterns

Classes

- class spot::tgba_reachable_iterator

  Iterate over all reachable states of a spot::tgba.

- class spot::tgba_reachable_iterator_depth_first

  An implementation of spot::tgba_reachable_iterator that browses states depth first.

- class spot::tgba_reachable_iterator_breadth_first

  An implementation of spot::tgba_reachable_iterator that browses states breadth first.

4.25 TGBA simplifications

Classes

- class spot::parity_game_graph

  Parity game graph which compute a simulation relation.

- class spot::spoiler_node

  Spoiler node of parity game graph.

- class spot::duplicator_node

  Duplicator node of parity game graph.

- class spot::parity_game_graph_direct

  Parity game graph which compute the direct simulation relation.

- class spot::spoiler_node_delayed

  Spoiler node of parity game graph for delayed simulation.

- class spot::duplicator_node_delayed

  Duplicator node of parity game graph for delayed simulation.

- class spot::parity_game_graph_delayed

Typedefs

- typedef std::vector< spoiler_node ∗ > spot::sn_v
- typedef std::vector< duplicator_node ∗ > spot::dn_v
- typedef std::vector< const state ∗ > spot::s_v

Enumerations

- enum spot::reduce_tgba_options {

  spot::Reduce_None = 0, spot::Reduce_quotient_Dir_Sim = 1, spot::Reduce_transition_Dir_Sim = 2, spot::Reduce_quotient_Del_Sim = 4,

  spot::Reduce_transition_Del_Sim = 8, spot::Reduce_Scc = 16, spot::Reduce_All = -1U }

  Options for reduce.

Functions

- tgba_explicit_number ∗ spot::minimize_monitor (const tgba ∗a)

  Construct a minimal deterministic monitor.

- tgba_explicit_number ∗ spot::minimize_wdba (const tgba ∗a)

  Minimize a Büchi automaton in the WDBA class.

- const tgba ∗ spot::minimize_obligation (const tgba ∗aut_f, const ltl::formula ∗f=0, const tgba ∗aut_neg_f=0)

  Minimize an automaton if it represents an obligation property.

- const tgba ∗ spot::reduc_tgba_sim (const tgba ∗a, int opt=Reduce_All)

  Remove some node of the automata using a simulation relation.

- direct_simulation_relation ∗ spot::get_direct_relation_simulation (const tgba ∗a, std::ostream &os, int opt=-1)

  Compute a direct simulation relation on state of tgba f.

- delayed_simulation_relation ∗ spot::get_delayed_relation_simulation (const tgba ∗a, std::ostream &os, int opt=-1)
- void spot::free_relation_simulation (direct_simulation_relation ∗rel)

  To free a simulation relation.

- void spot::free_relation_simulation (delayed_simulation_relation ∗rel)

  To free a simulation relation.

4.25.1 Typedef Documentation

4.25.1.1 typedef std::vector<duplicator_node∗> spot::dn_v

4.25.1.2 typedef std::vector<const state∗> spot::s_v

4.25.1.3 typedef std::vector<spoiler_node∗> spot::sn_v

4.25.2 Enumeration Type Documentation

4.25.2.1 enum spot::reduce_tgba_options

Options for reduce.

Enumerator:

- ***Reduce_None*** No reduction.
- ***Reduce_quotient_Dir_Sim*** Reduction of state using direct simulation relation.
- ***Reduce_transition_Dir_Sim*** Reduction of transitions using direct simulation relation.
- ***Reduce_quotient_Del_Sim*** Reduction of state using delayed simulation relation.
- ***Reduce_transition_Del_Sim*** Reduction of transition using delayed simulation relation.
- ***Reduce_Scc*** Reduction using SCC.
- ***Reduce_All*** All reductions.

4.25.3 Function Documentation

4.25.3.1 void spot::free_relation_simulation (direct_simulation_relation ∗ *rel*)

To free a simulation relation.

4.25.3.2 void spot::free_relation_simulation (delayed_simulation_relation ∗ *rel*)

To free a simulation relation.

4.25.3.3 delayed_simulation_relation∗ spot::get_delayed_relation_simulation (const tgba ∗ *a*, std::ostream & *os*, int *opt* = `-1`)

Compute a delayed simulation relation on state of tgba *f*.

Bug

Does not work for generalized automata.

4.25.3.4 direct_simulation_relation∗ spot::get_direct_relation_simulation (const tgba ∗ *a*, std::ostream & *os*, int *opt* = `-1`)

Compute a direct simulation relation on state of tgba *f*.

4.25.3.5 tgba_explicit_number∗ spot::minimize_monitor (const tgba ∗ *a*)

Construct a minimal deterministic monitor.

The automaton will be converted into minimal deterministic monitor. All useless SCCs should have been previously removed (using scc_filter() for instance). Then the automaton will be determinized and minimized using the standard DFA construction as if all states where accepting states.

For more detail about monitors, see the following paper:

```
/// @InProceedings{   tabakov.10.rv,
///   author    = {Deian Tabakov and Moshe Y. Vardi},
///   title    = {Optimized Temporal Monitors for SystemC{$^*$}},
///   booktitle = {Proceedings of the 10th International Conferance
///      on Runtime Verification},
///   pages    = {436--451},
///   year    = 2010,
///   volume    = {6418},
///   series    = {Lecture Notes in Computer Science},
///   month    = nov,
///   publisher = {Spring-Verlag}
/// }
///
```

(Note: although the above paper uses Spot, this function did not exist in Spot at that time.)

Parameters

a the automaton to convert into a minimal deterministic monitor

Precondition

Dead SCCs should have been removed from *a* before calling this function.

4.25.3.6 const tgba∗ spot::minimize_obligation (const tgba ∗ *aut_f*, const ltl::formula ∗ *f* = `0`, const tgba ∗ *aut_neg_f* = `0`)

Minimize an automaton if it represents an obligation property.

This function attempts to minimize the automaton *aut_f* using the algorithm implemented in the minimize_wdba() function, and presented by the following paper:

```
/// @InProceedings{   dax.07.atva,
///   author    = {Christian Dax and Jochen Eisinger and Felix Klaedtke},
///   title     = {Mechanizing the Powerset Construction for Restricted
///       Classes of {$\omega$}-Automata},
///   year      = 2007,
///   series    = {Lecture Notes in Computer Science},
///   publisher = {Springer-Verlag},
///   volume    = 4762,
///   booktitle = {Proceedings of the 5th International Symposium on
///       Automated Technology for Verification and Analysis
///       (ATVA'07)},
///   editor    = {Kedar S. Namjoshi and Tomohiro Yoneda and Teruo Higashino
///       and Yoshio Okamura},
///   month     = oct
/// }
///
```

Because it is hard to determine if an automaton corresponds to an obligation property, you should supply either the formula *f* expressed by the automaton *aut_f*, or *aut_neg_f* the negation of the automaton *aut_neg_f*.

Parameters

aut_f the automaton to minimize

f the LTL formula represented by the automaton *aut_f*

aut_neg_f an automaton representing the negation of *aut_f*

Returns

a new tgba if the automaton could be minimized, aut_f if the automaton cannot be minimized, 0 if we do not if if the minimization is correct because neither *f* nor *aut_neg_f* were supplied.

The function proceeds as follows. If the formula *f* or the automaton *aut* can easily be proved to represent an obligation formula, then the result of `minimize(aut)` is returned. Otherwise, if *aut_neg_f* was not supplied but *f* was, *aut_neg_f* is built from the negation of *f*. Then we check that `product(aut,!minimize(aut_f))` and `product(aut_neg_f,minize(aut))` are both empty. If they are, the the minimization was sound. (See the paper for full details.)

4.25.3.7 tgba_explicit_number∗ spot::minimize_wdba (const tgba ∗ *a*)

Minimize a Büchi automaton in the WDBA class.

This takes a TGBA whose language is representable by a Weak Deterministic Büchi Automaton, and construct a minimal WDBA for this language.

If the input automaton does not represent a WDBA language, the resulting automaton is still a WDBA, but it will not be equivalent to the original automaton. Use the minimize_obligation() function if you are not sure whether it is safe to call this function.

Please see the following paper for a discussion of this technique.

```
/// @InProceedings{   dax.07.atva,
///   author    = {Christian Dax and Jochen Eisinger and Felix Klaedtke},
///   title     = {Mechanizing the Powerset Construction for Restricted
///       Classes of {$\omega$}-Automata},
///   year      = 2007,
///   series    = {Lecture Notes in Computer Science},
///   publisher = {Springer-Verlag},
///   volume    = 4762,
///   booktitle = {Proceedings of the 5th International Symposium on
///       Automated Technology for Verification and Analysis
///       (ATVA'07)},
///   editor    = {Kedar S. Namjoshi and Tomohiro Yoneda and Teruo Higashino
///       and Yoshio Okamura},
///   month     = oct
/// }
///
```

4.25.3.8 const tgba∗ spot::reduc_tgba_sim (const tgba ∗ *a*, int *opt* = `Reduce_All`)

Remove some node of the automata using a simulation relation.

Parameters

a the automata to reduce.

opt a conjonction of spot::reduce_tgba_options specifying which optimizations to apply.

Returns

the reduced automata.

4.26 Miscellaneous algorithms on TGBA

Classes

- class spot::bfs_steps

  Make a BFS in a spot::tgba to compute a tgba_run::steps.
  This class should be used to compute the shortest path between a state of a spot::tgba and the first transition or state that matches some conditions.

- struct spot::tgba_statistics
- struct spot::tgba_sub_statistics

Functions

- tgba_explicit ∗ spot::tgba_dupexp_bfs (const tgba ∗aut)

  Build an explicit automata from all states of aut, numbering states in bread first order as they are processed.

- tgba_explicit ∗ spot::tgba_dupexp_dfs (const tgba ∗aut)

  Build an explicit automata from all states of aut, numbering states in depth first order as they are processed.

- tgba ∗ spot::random_graph (int n, float d, const ltl::atomic_prop_set ∗ap, bdd_dict ∗dict, int n_acc=0, float a=0.1, float t=0.5, ltl::environment ∗env=&ltl::default_environment::instance())

Construct a tgba randomly.

- tgba_statistics spot::stats_reachable (const tgba ∗g)

  Compute statistics for an automaton.

- tgba_sub_statistics spot::sub_stats_reachable (const tgba ∗g)

  Compute subended statistics for an automaton.

- tgba_explicit_number ∗ spot::tgba_powerset (const tgba ∗aut, power_map &pm)

  Build a deterministic automaton, ignoring acceptance conditions.
  This create a deterministic automaton that recognizes the same language as aut would if its acceptance conditions were ignored. This is the classical powerset algorithm.

- tgba_explicit_number ∗ spot::tgba_powerset (const tgba ∗aut)

4.26.1 Function Documentation

4.26.1.1 tgba∗ spot::random_graph (int *n*, float *d*, const ltl::atomic_prop_set ∗ *ap*, bdd_dict ∗ *dict*, int *n_acc* = *0*, float *a* = `0.1`, float *t* = `0.5`, ltl::environment ∗ *env* = `&ltl::default_environment::instance()`)

Construct a tgba randomly.

Parameters

n The number of states wanted in the automata (>0). All states will be connected, and there will be no dead state.

d The density of the automata. This is the probability (between 0.0 and 1.0), to add a transition between two states. All states have at least one outgoing transition, so *d* is considered only when adding the remaining transition. A density of 1 means all states will be connected to each other.

ap The list of atomic property that should label the transition.

dict The bdd_dict to used for this automata.

n_acc The number of acceptance sets to use.

a The probability (between 0.0 and 1.0) that a transition belongs to an acceptance set.

t The probability (between 0.0 and 1.0) that an atomic proposition is true.

env The environment in which to declare the acceptance conditions.

This algorithms is adapted from the one in Fig 6.2 page 48 of

```
/// @TechReport{   tauriainen.00.a66,
///   author = {Heikki Tauriainen},
///   title   = {Automated Testing of {B\"u}chi Automata Translators for
///    {L}inear {T}emporal {L}ogic},
///   address = {Espoo, Finland},
///   institution = {Helsinki University of Technology, Laboratory for
///    Theoretical Computer Science},
///   number = {A66},
///   year = {2000},
///   url = {http://citeseer.nj.nec.com/tauriainen00automated.html},
///   type = {Research Report},
///   note = {Reprint of Master's thesis}
/// }
///
```

Although the intent is similar, there are some differences with between the above published algorithm and this implementation . First labels are on transitions, and acceptance conditions are generated too. Second, the number of successors of a node is chosen in $[1, n]$ following a normal distribution with mean $1+(n-1)d$ and variance $(n-1)d(1-d)$. (This is less accurate, but faster than considering all possible *n* successors one by one.)

4.26.1.2 tgba_statistics spot::stats_reachable (const tgba $*$ *g*)

Compute statistics for an automaton.

4.26.1.3 tgba_sub_statistics spot::sub_stats_reachable (const tgba $*$ *g*)

Compute subended statistics for an automaton.

4.26.1.4 tgba_explicit$*$ spot::tgba_dupexp_bfs (const tgba $*$ *aut*)

Build an explicit automata from all states of *aut*, numbering states in bread first order as they are processed.

4.26.1.5 tgba_explicit$*$ spot::tgba_dupexp_dfs (const tgba $*$ *aut*)

Build an explicit automata from all states of *aut*, numbering states in depth first order as they are processed.

4.26.1.6 tgba_explicit_number$*$ spot::tgba_powerset (const tgba $*$ *aut,* power_map & *pm*)

Build a deterministic automaton, ignoring acceptance conditions.

This create a deterministic automaton that recognizes the same language as *aut* would if its acceptance conditions were ignored. This is the classical powerset algorithm.

If *pm* is supplied it will be filled with the set of original states associated to each state of the deterministic automaton.

4.26.1.7 tgba_explicit_number$*$ spot::tgba_powerset (const tgba $*$ *aut*)

4.27 Decorating the dot output

Classes

- class spot::dotty_decorator

  Choose state and link styles for spot::dotty_reachable.

- class spot::tgba_run_dotty_decorator

  Highlight a spot::tgba_run on a spot::tgba.
  An instance of this class can be passed to spot::dotty_reachable.

4.28 Emptiness-checks

Classes

- class spot::emptiness_check_result

  The result of an emptiness check.

- class spot::emptiness_check

  Common interface to emptiness check algorithms.

- class spot::emptiness_check_instantiator

Modules

- Emptiness-check algorithms for SSP
- Emptiness-check algorithms
- TGBA runs and supporting functions
- Emptiness-check statistics

4.28.1 Detailed Description

All emptiness-check algorithms follow the same interface. Basically once you have constructed an instance of spot::emptiness_check (by instantiating a subclass, or calling a functions construct such instance; see this list), you should call spot::emptiness_check::check() to check the automaton.

If spot::emptiness_check::check() returns 0, then the automaton was found empty. Otherwise the automaton accepts some run. (Beware that some algorithms---those using bit-state hashing---may found the automaton to be empty even if it is not actually empty.)

When spot::emptiness_check::check() does not return 0, it returns an instance of spot::emptiness_check_result. You can try to call spot::emptiness_check_result::accepting_run() to obtain an accepting run. For some emptiness-check algorithms, spot::emptiness_check_result::accepting_run() will require some extra computation. Most emptiness-check algorithms are able to return such an accepting run, however this is not mandatory and spot::emptiness_check_result::accepting_run() can return 0 (this does not means by anyway that no accepting run exist).

The acceptance run returned by spot::emptiness_check_result::accepting_run(), if any, is of type spot::tgba_run. This page gathers existing operations on these objects.

4.29 Emptiness-check algorithms

Classes

- class spot::couvreur99_check

  An implementation of the Couvreur99 emptiness-check algorithm.

- class spot::couvreur99_check_shy

  A version of spot::couvreur99_check that tries to visit known states first.

Functions

- emptiness_check ∗ spot::couvreur99 (const tgba ∗a, option_map options=option_map(), const numbered_state_heap_factory ∗nshf=numbered_state_heap_hash_map_factory::instance())

  Check whether the language of an automate is empty.

- emptiness_check ∗ spot::explicit_gv04_check (const tgba ∗a, option_map o=option_map())

  Emptiness check based on Geldenhuys and Valmari's TACAS'04 paper.

- emptiness_check ∗ spot::explicit_magic_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ spot::bit_state_hashing_magic_search (const tgba ∗a, size_t size, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ spot::magic_search (const tgba ∗a, option_map o=option_map())

  Wrapper for the two magic_search implementations.

- emptiness_check ∗ spot::explicit_se05_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness check on the spot::tgba automaton a.

- emptiness_check ∗ spot::bit_state_hashing_se05_search (const tgba ∗a, size_t size, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ spot::se05 (const tgba ∗a, option_map o)

  Wrapper for the two se05 implementations.

- emptiness_check ∗ spot::explicit_tau03_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ spot::explicit_tau03_opt_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

4.29.1 Function Documentation

4.29.1.1 emptiness_check∗ spot::bit_state_hashing_magic_search (const tgba ∗ *a*, size_t *size*, option_map *o* = `option_map()`)

Returns an emptiness checker on the spot::tgba automaton *a*.

Precondition

The automaton *a* must have at most one acceptance condition (i.e. it is a TBA).

During the visit of *a*, the returned checker does not store explicitely the traversed states but uses the bit-state hashing technic presented in:

```
/// @book{Holzmann91,
///    author = {G.J. Holzmann},
///    title = {Design and Validation of Computer Protocols},
///    publisher = {Prentice-Hall},
///    address = {Englewood Cliffs, New Jersey},
///    year = {1991}
/// }
///
```

Consequently, the detection of an acceptence cycle is not ensured.

The size of the heap is limited to

size bytes.

The implemented algorithm is the same as the one of spot::explicit_magic_search.

See also

spot::explicit_magic_search

4.29.1.2 emptiness_check∗ spot::bit_state_hashing_se05_search (const tgba ∗ *a*, size_t *size*, option_map *o* = `option_map()`)

Returns an emptiness checker on the spot::tgba automaton *a*.

Precondition

The automaton *a* must have at most one acceptance condition (i.e. it is a TBA).

During the visit of *a*, the returned checker does not store explicitely the traversed states but uses the bit-state hashing technic presented in:

```
/// @book{Holzmann91,
///    author = {G.J. Holzmann},
///    title = {Design and Validation of Computer Protocols},
///    publisher = {Prentice-Hall},
///    address = {Englewood Cliffs, New Jersey},
///    year = {1991}
/// }
///
```

Consequently, the detection of an acceptence cycle is not ensured.

The size of the heap is limited to

size bytes.

The implemented algorithm is the same as the one of spot::explicit_se05_search.

See also

spot::explicit_se05_search

4.29.1.3 emptiness_check∗ spot::couvreur99 (const tgba ∗ *a*, option_map *options* = `option_map()`, const numbered_state_heap_factory ∗ *nshf* = `numbered_state_heap_hash_map_factory::instance()`)

Check whether the language of an automate is empty.

This is based on the following paper.

```
/// @InProceedings{couvreur.99.fm,
///   author    = {Jean-Michel Couvreur},
///   title     = {On-the-fly Verification of Temporal Logic},
///   pages     = {253--271},
///   editor    = {Jeannette M. Wing and Jim Woodcock and Jim Davies},
///   booktitle = {Proceedings of the World Congress on Formal Methods in
///                the Development of Computing Systems (FM'99)},
///   publisher = {Springer-Verlag},
///   series    = {Lecture Notes in Computer Science},
///   volume    = {1708},
///   year      = {1999},
///   address   = {Toulouse, France},
///   month     = {September},
///   isbn      = {3-540-66587-0}
/// }
///
```

A recursive definition of the algorithm would look as follows, but the implementation is of course not recursive. (`<Sigma, Q, delta, q, F>` is the automaton to check, H is an associative array mapping each state to its positive DFS order or 0 if it is dead, SCC is and ACC are two stacks.)

```
/// check(<Sigma, Q, delta, q, F>, H, SCC, ACC)
///   if q is not in H   // new state
///       H[q] = H.size + 1
///       SCC.push(<H[q], {}>)
///       forall <a, s> : <q, _, a, s> in delta
///           ACC.push(a)
///           res = check(<Sigma, Q, delta, s, F>, H, SCC, ACC)
///           if res
///               return res
///       <n, _> = SCC.top()
///       if n = H[q]
///           SCC.pop()
///           mark_reachable_states_as_dead(<Sigma, Q, delta, q, F>, H$)
///       return 0
///   else
///       if H[q] = 0 // dead state
///           ACC.pop()
///           return true
///       else // state in stack: merge SCC
///           all = {}
///          do
///              <n, a> = SCC.pop()
///              all = all union a union { ACC.pop() }
///          until n <= H[q]
///          SCC.push(<n, all>)
///          if all != F
///              return 0
///          return new emptiness_check_result(necessary data)
///
```

check() returns 0 iff the automaton's language is empty. It returns an instance of emptiness_check_result. If the automaton accept a word. (Use emptiness_check_result::accepting_run() to extract an accepting run.)

There are two variants of this algorithm: spot::couvreur99_check and spot::couvreur99_check_shy. They differ in their memory usage, the number for successors computed before they are used and the way the depth first search is directed.

spot::couvreur99_check performs a straightforward depth first search. The DFS stacks store tgba_succ_iterators, so that only the iterators which really are explored are computed.

spot::couvreur99_check_shy tries to explore successors which are visited states first. this helps to merge SCCs and generally helps to produce shorter counter-examples. However this algorithm cannot stores unprocessed successors as tgba_succ_iterators: it must compute all successors of a state at once in order to decide which to explore first, and must keep a list of all unexplored successors in its DFS stack.

The couvreur99() function is a wrapper around these two flavors of the algorithm. *options* is an option map that specifies which algorithms should be used, and how.

The following options are available.

- `"shy"` : if non zero, then spot::couvreur99_check_shy is used, otherwise (and by default) spot::couvreur99_check is used.
- `"poprem"` : specifies how the algorithm should handle the destruction of non-accepting maximal strongly connected components. If `poprem` is non null, the algorithm will keep a list of all states of a SCC that are fully processed and should be removed once the MSCC is popped. If `poprem` is null (the default), the MSCC will be traversed again (i.e. generating the successors of the root recursively) for deletion. This is a choice between memory and speed.
- `"group"` : this options is used only by spot::couvreur99_check_shy. If non null (the default), the successors of all the states that belong to the same SCC will be considered when choosing a successor. Otherwise, only the successor of the topmost state on the DFS stack are considered.

4.29.1.4 emptiness_check∗ spot::explicit_gv04_check (const tgba ∗ *a*, option_map *o* = *`option_map()`*)

Emptiness check based on Geldenhuys and Valmari's TACAS'04 paper.

Precondition

The automaton *a* must have at most one acceptance condition.

The original algorithm, coming from the following paper, has only been slightly modified to work on transition-based automata.

```
/// @InProceedings{geldenhuys.04.tacas,
///   author  = {Jaco Geldenhuys and Antti Valmari},
///   title   = {Tarjan's Algorithm Makes On-the-Fly {LTL} Verification
///              More Efficient},
///   booktitle = {Proceedings of the 10th International Conference on Tools
///              and Algorithms for the Construction and Analysis of Systems
///              (TACAS'04)},
///   editor  = {Kurt Jensen and Andreas Podelski},
///   pages   = {205--219},
///   year    = {2004},
///   publisher = {Springer-Verlag},
///   series  = {Lecture Notes in Computer Science},
///   volume  = {2988},
///   isbn    = {3-540-21299-X}
/// }
///
```

4.29.1.5 emptiness_check∗ spot::explicit_magic_search (const tgba ∗ *a*, option_map *o* = `option_map()`)

Returns an emptiness checker on the spot::tgba automaton *a*.

Precondition

The automaton *a* must have at most one acceptance condition (i.e. it is a TBA).

During the visit of *a*, the returned checker stores explicitely all the traversed states. The method *check()* of the checker can be called several times (until it returns a null pointer) to enumerate all the visited acceptance paths. The implemented algorithm is the following:

```
/// procedure check ()
/// begin
///   call dfs_blue(s0);
/// end;
///
/// procedure dfs_blue (s)
/// begin
///   s.color = blue;
///   for all t in post(s) do
///     if t.color == white then
///       call dfs_blue(t);
///     end if;
///     if (the edge (s,t) is accepting) then
///       target = s;
///       call dfs_red(t);
///     end if;
///   end for;
/// end;
///
/// procedure dfs_red(s)
/// begin
///   s.color = red;
///   if s == target then
///     report cycle
///   end if;
///   for all t in post(s) do
///     if t.color == blue then
///       call dfs_red(t);
///     end if;
///   end for;
/// end;
///
```

This algorithm is an adaptation to TBA of the one (which deals with accepting states) presented in

```
///  Article{         courcoubetis.92.fmsd,
///    author        = {Costas Courcoubetis and Moshe Y. Vardi and Pierre
///                     Wolper and Mihalis Yannakakis},
///    title         = {Memory-Efficient Algorithm for the Verification of
///                     Temporal Properties},
///    journal       = {Formal Methods in System Design},
///    pages         = {275--288},
///    year          = {1992},
///    volume        = {1}
///  }
///
```

Bug

The name is misleading. Magic-search is the algorithm from `godefroid.93.pstv`, not `courcoubetis.92.fmsd`.

4.29.1.6 emptiness_check∗ spot::explicit_se05_search (const tgba ∗ *a*, option_map *o* = *option_map()*)

Returns an emptiness check on the spot::tgba automaton *a*.

Precondition

The automaton *a* must have at most one acceptance condition (i.e. it is a TBA).

During the visit of *a*, the returned checker stores explicitely all the traversed states. The method *check()* of the checker can be called several times (until it returns a null pointer) to enumerate all the visited accepting paths. The implemented algorithm is an optimization of spot::explicit_magic_search and is the following:

```
/// procedure check ()
/// begin
///   call dfs_blue(s0);
/// end;
///
/// procedure dfs_blue (s)
/// begin
///   s.color = cyan;
///   for all t in post(s) do
///     if t.color == white then
///       call dfs_blue(t);
///     else if t.color == cyan and
///             (the edge (s,t) is accepting or
///              (it exists a predecessor p of s in st_blue and s != t and
///              the arc between p and s is accepting)) then
///       report cycle;
///     end if;
///     if the edge (s,t) is accepting then
///       call dfs_red(t);
///     end if;
///   end for;
///   s.color = blue;
/// end;
```

```
///
/// procedure dfs_red(s)
/// begin
///   if s.color == cyan then
///     report cycle;
///   end if;
///   s.color = red;
///   for all t in post(s) do
///     if t.color == blue then
///       call dfs_red(t);
///     end if;
///   end for;
/// end;
///
```

It is an adaptation to TBA of the one presented in

```
///  @techreport{SE04,
///    author = {Stefan Schwoon and Javier Esparza},
///    institution = {Universit{\"a}t Stuttgart, Fakult\"at Informatik,
///    Elektrotechnik und Informationstechnik},
///    month = {November},
///    number = {2004/06},
///    title = {A Note on On-The-Fly Verification Algorithms},
///    year = {2004},
///    url =
///{http://www.fmi.uni-stuttgart.de/szs/publications/info/schwoosn.SE04.shtml}
///  }
///
```

See also

spot::explicit_magic_search

4.29.1.7 emptiness_check∗ spot::explicit_tau03_opt_search (const tgba ∗ *a*, option_map *o* = *option_map()*)

Returns an emptiness checker on the spot::tgba automaton *a*.

Precondition

The automaton *a* must have at least one acceptance condition.

During the visit of *a*, the returned checker stores explicitely all the traversed states. The implemented algorithm is the following:

```
/// procedure check ()
/// begin
///   weight = 0; // the null vector
///   call dfs_blue(s0);
/// end;
///
/// procedure dfs_blue (s)
/// begin
///   s.color = cyan;
///   s.acc = emptyset;
///   s.weight = weight;
///   for all t in post(s) do
///     let (s, l, a, t) be the edge from s to t;
///     if t.color == white then
///       for all b in a do
///         weight[b] = weight[b] + 1;
///       end for;
///       call dfs_blue(t);
///       for all b in a do
///         weight[b] = weight[b] - 1;
///       end for;
///     end if;
///     Acc = s.acc U a;
///     if t.color == cyan &&
///               (Acc U support(weight - t.weight) U t.acc) == all_acc then
///       report a cycle;
///     else if Acc not included in t.acc then
///       t.acc := t.acc U Acc;
///       call dfs_red(t, Acc);
///     end if;
///   end for;
///   s.color = blue;
/// end;
///
/// procedure dfs_red(s, Acc)
/// begin
///   for all t in post(s) do
///     let (s, l, a, t) be the edge from s to t;
///     if t.color == cyan &&
///                 (Acc U support(weight - t.weight) U t.acc) == all_acc then
///       report a cycle;
///     else if t.color != white and Acc not included in t.acc then
///       t.acc := t.acc U Acc;
///       call dfs_red(t, Acc);
///     end if;
///   end for;
/// end;
///
```

This algorithm is a generalisation to TGBA of the one implemented in spot::explicit_se05_search. It is based on the acceptance set labelling of states used in spot::explicit_tau03_search. Moreover, it introduce a slight optimisation based on vectors of integers counting for each acceptance condition how many time the condition has been visited in the path stored in the blue stack. Such a vector is associated to each state of this stack.

4.29.1.8 emptiness_check∗ spot::explicit_tau03_search (const tgba ∗ *a*, option_map *o* = *option_map()*)

Returns an emptiness checker on the spot::tgba automaton *a*.

Precondition

The automaton *a* must have at least one acceptance condition.

During the visit of *a*, the returned checker stores explicitely all the traversed states. The implemented algorithm is the following:

```
/// procedure check ()
/// begin
///   call dfs_blue(s0);
/// end;
///
```

```
/// procedure dfs_blue (s)
/// begin
///   s.color = blue;
///   s.acc = emptyset;
///   for all t in post(s) do
///     if t.color == white then
///       call dfs_blue(t);
///     end if;
///   end for;
///   for all t in post(s) do
///     let (s, l, a, t) be the edge from s to t;
///     if s.acc U a not included in t.acc then
///       call dfs_red(t, a U s.acc);
///     end if;
///   end for;
///   if s.acc == all_acc then
///     report a cycle;
///   end if;
/// end;
///
/// procedure dfs_red(s, A)
/// begin
///   s.acc = s.acc U A;
///   for all t in post(s) do
///     if t.color != white and A not included in t.acc then
///       call dfs_red(t, A);
///     end if;
///   end for;
/// end;
///
```

This algorithm is the one presented in

```
/// @techreport{HUT-TCS-A83,
///    address = {Espoo, Finland},
///    author = {Heikki Tauriainen},
///    institution = {Helsinki University of Technology, Laboratory for
///    Theoretical Computer Science},
///    month = {December},
///    number = {A83},
///    pages = {132},
///    title = {On Translating Linear Temporal Logic into Alternating and
///    Nondeterministic Automata},
///    type = {Research Report},
///    year = {2003},
///    url = {http://www.tcs.hut.fi/Publications/info/bibdb.HUT-TCS-A83.shtml}
/// }
///
```

4.29.1.9 emptiness_check∗ spot::magic_search (const tgba ∗ *a*, option_map *o* = `option_map()`)

Wrapper for the two magic_search implementations.

This wrapper calls explicit_magic_search_search() or bit_state_hashing_magic_search() according to the `"bsh"` option in the `option_map`. If `"bsh"` is set and non null, its value is used as the size of the hash map.

4.29.1.10 emptiness_check∗ spot::se05 (const tgba ∗ *a*, option_map *o*)

Wrapper for the two se05 implementations.

This wrapper calls explicit_se05_search() or bit_state_hashing_se05_search() according to the `"bsh"` option in the `option_map`. If `"bsh"` is set and non null, its value is used as the size of the hash map.

4.30 TGBA runs and supporting functions

Classes

- struct spot::tgba_run

  An accepted run, for a tgba.

Functions

- std::ostream & spot::print_tgba_run (std::ostream &os, const tgba ∗a, const tgba_run ∗run)

  Display a tgba_run.

- tgba ∗ spot::tgba_run_to_tgba (const tgba ∗a, const tgba_run ∗run)

  Return an explicit_tgba corresponding to run (i.e. comparable states are merged).

- tgba_run ∗ spot::project_tgba_run (const tgba ∗a_run, const tgba ∗a_proj, const tgba_run ∗run)

  Project a tgba_run on a tgba.
  If a tgba_run has been generated on a product, or any other on-the-fly algorithm with tgba operands,.

- tgba_run ∗ spot::reduce_run (const tgba ∗a, const tgba_run ∗org)

  Reduce an accepting run.
  Return a run which is accepting for and that is no longer that org.

- bool spot::replay_tgba_run (std::ostream &os, const tgba ∗a, const tgba_run ∗run, bool debug=false)

  Replay a tgba_run on a tgba.
  This is similar to print_tgba_run(), except that the run is actually replayed on the automaton while it is printed. Doing so makes it possible to display transition annotations (returned by spot::tgba::transition_annotation()). The output will stop if the run cannot be completed.

4.30.1 Function Documentation

4.30.1.1 std::ostream& spot::print_tgba_run (std::ostream & *os*, const tgba ∗ *a*, const tgba_run ∗ *run*)

Display a tgba_run.

Output the prefix and cycle of the tgba_run *run*, even if it does not corresponds to an actual run of the automaton *a*. This is unlike replay_tgba_run(), which will ensure the run actually exist in the automaton (and will display any transition annotation).

(*a* is used here only to format states and transitions.)

Output the prefix and cycle of the tgba_run *run*, even if it does not corresponds to an actual run of the automaton *a*. This is unlike replay_tgba_run(), which will ensure the run actually exist in the automaton (and will display any transition annotation).

4.30.1.2 tgba_run∗ spot::project_tgba_run (const tgba ∗ *a_run*, const tgba ∗ *a_proj*, const tgba_run ∗ *run*)

Project a tgba_run on a tgba.

If a tgba_run has been generated on a product, or any other on-the-fly algorithm with tgba operands,.

Parameters

run the run to replay

a_run the automata on which the run was generated

a_proj the automata on which to project the run

Returns

true iff the run could be completed

4.30.1.3 tgba_run∗ spot::reduce_run (const tgba ∗ *a*, const tgba_run ∗ *org*)

Reduce an accepting run.

Return a run which is accepting for *and* that is no longer that *org*.

4.30.1.4 bool spot::replay_tgba_run (std::ostream & *os*, const tgba ∗ *a*, const tgba_run ∗ *run*, bool *debug* = `false`)

Replay a tgba_run on a tgba.

This is similar to print_tgba_run(), except that the run is actually replayed on the automaton while it is printed. Doing so makes it possible to display transition annotations (returned by spot::tgba::transition_annotation()). The output will stop if the run cannot be completed.

Parameters

run the run to replay

a the automata on which to replay that run

os the stream on which the replay should be traced

debug if set the output will be more verbose and extra debugging informations will be output on failure

Returns

true iff the run could be completed

4.30.1.5 tgba∗ spot::tgba_run_to_tgba (const tgba ∗ *a*, const tgba_run ∗ *run*)

Return an explicit_tgba corresponding to *run* (i.e. comparable states are merged).

Precondition

run must correspond to an actual run of the automaton *a*.

4.31 Emptiness-check statistics

Classes

- struct spot::unsigned_statistics
- class spot::unsigned_statistics_copy

  comparable statistics

- class spot::ec_statistics

  Emptiness-check statistics.

- class spot::ars_statistics

  Accepting Run Search statistics.

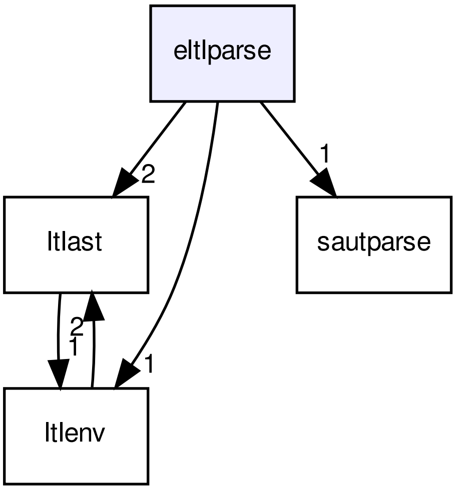
- class spot::acss_statistics

  Accepting Cycle Search Space statistics.

5 Directory Documentation

5.1 eltlparse/ Directory Reference

Directory dependency graph for eltlparse/:

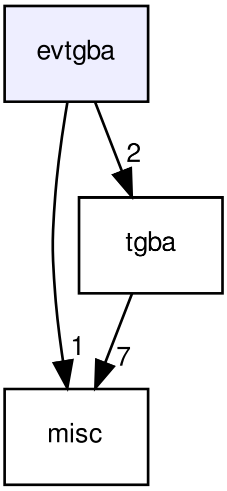


Files

- file location.hh
- file position.hh
- file public.hh
- file stack.hh

5.2 evtgba/ Directory Reference

Directory dependency graph for evtgba/:

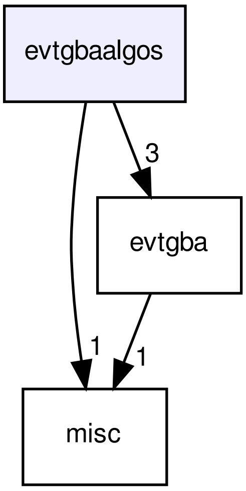


Files

- file evtgba.hh
- file evtgbaiter.hh
- file explicit.hh
- file product.hh
- file symbol.hh

5.3 evtgbaalgos/ Directory Reference

Directory dependency graph for evtgbaalgos/:

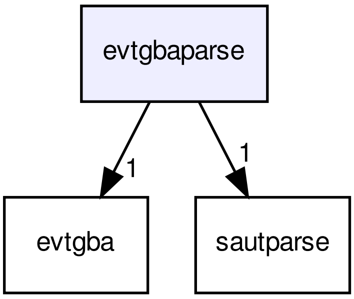


Files

- file dotty.hh
- file reachiter.hh
- file save.hh
- file tgba2evtgba.hh

5.4 evtgbaparse/ Directory Reference

Directory dependency graph for evtgbaparse/:

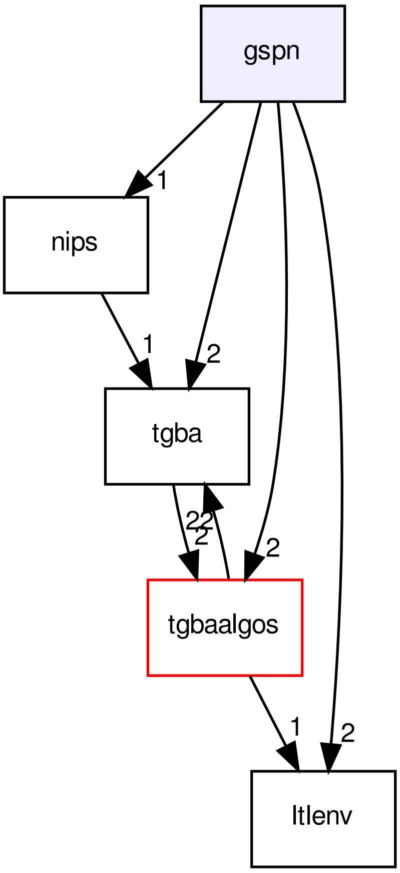


Files

- file public.hh

5.5 gspn/ Directory Reference

Directory dependency graph for gspn/:

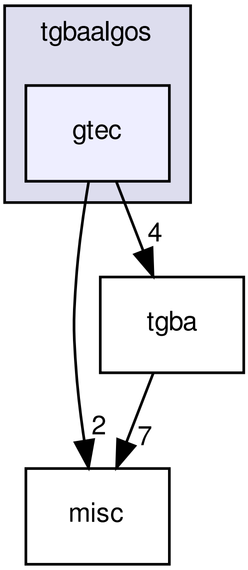


Files

- file common.hh
- file gspn.hh
- file ssp.hh

5.6 tgbaalgos/gtec/ Directory Reference

Directory dependency graph for tgbaalgos/gtec/:

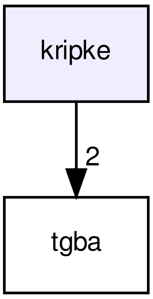


Files

- file ce.hh
- file explscc.hh
- file gtec.hh
- file nsheap.hh
- file sccstack.hh
- file status.hh

5.7 kripke/ Directory Reference

Directory dependency graph for kripke/:

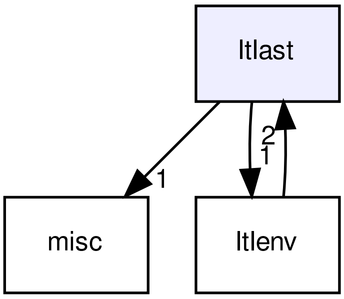


Files

- file fairkripke.hh
- file kripke.hh

5.8 ltlast/ Directory Reference

Directory dependency graph for ltlast/:



Files

- file allnodes.hh

Define all LTL node types.

- file atomic_prop.hh

  LTL atomic propositions.

- file automatop.hh

  ELTL automaton operators.

- file binop.hh

  LTL binary operators.

- file constant.hh

  LTL constants.

- file formula.hh

  LTL formula interface.

- file formula_tree.hh

  Trees representing formulae where atomic propositions are unknown.

- file multop.hh

  LTL multi-operand operators.

- file nfa.hh

  NFA interface used by automatop.

- file predecl.hh

  Predeclare all LTL node types.

- file refformula.hh

  Reference-counted LTL formulae.

- file unop.hh

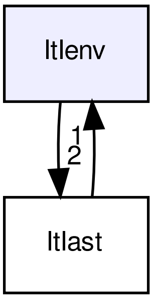
  LTL unary operators.

- file visitor.hh

  LTL visitor interface.

5.9 ltlenv/ Directory Reference

Directory dependency graph for ltlenv/:

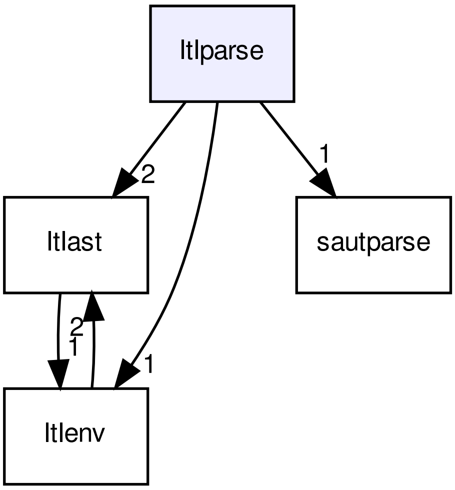


Files

- file declenv.hh
- file defaultenv.hh
- file environment.hh

5.10 ltlparse/ Directory Reference

Directory dependency graph for ltlparse/:

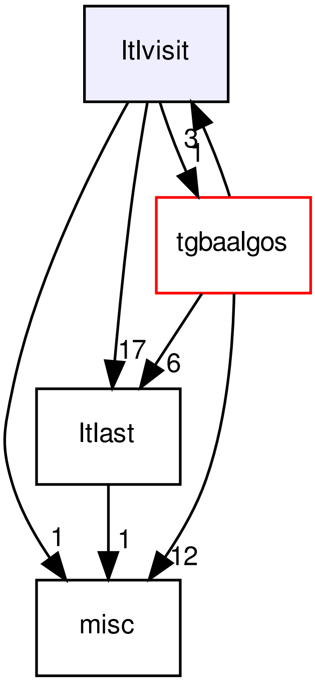


Files

- file location.hh
- file ltlfile.hh
- file position.hh
- file public.hh
- file stack.hh

5.11 ltlvisit/ Directory Reference

Directory dependency graph for ltlvisit/:

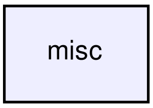


Files

- file apcollect.hh
- file basicreduce.hh
- file clone.hh
- file contain.hh
- file destroy.hh
- file dotty.hh
- file dump.hh
- file length.hh
- file lunabbrev.hh
- file nenoform.hh
- file postfix.hh
- file randomltl.hh
- file reduce.hh
- file simpfg.hh
- file syntimpl.hh
- file tostring.hh
- file tunabbrev.hh

5.12 misc/ Directory Reference

Directory dependency graph for misc/:

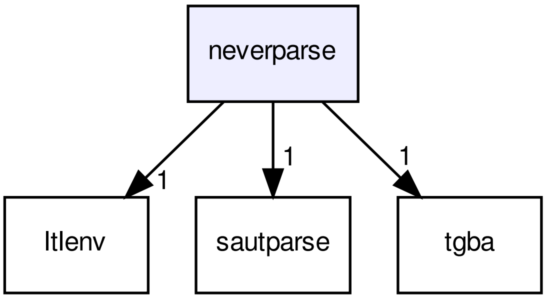


Files

- file bareword.hh
- file bddalloc.hh
- file bddlt.hh
- file bddop.hh
- file escape.hh
- file freelist.hh
- file hash.hh
- file hashfunc.hh
- file ltstr.hh
- file memusage.hh
- file minato.hh
- file modgray.hh
- file optionmap.hh
- file random.hh
- file timer.hh
- file version.hh

5.13 neverparse/ Directory Reference

Directory dependency graph for neverparse/:

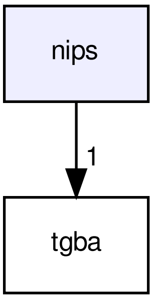


Files

- file location.hh
- file position.hh
- file public.hh
- file stack.hh

5.14 nips/ Directory Reference

Directory dependency graph for nips/:

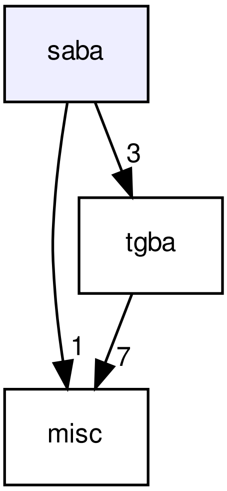


Files

- file common.hh
- file nips.hh

5.15 saba/ Directory Reference

Directory dependency graph for saba/:

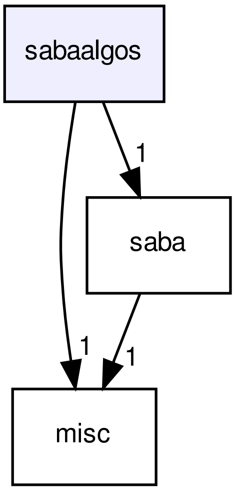


Files

- file explicitstateconjunction.hh
- file saba.hh
- file sabacomplementtgba.hh
- file sabastate.hh
- file sabasucciter.hh

5.16 sabaalgos/ Directory Reference

Directory dependency graph for sabaalgos/:

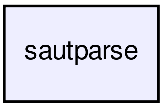


Files

- file sabadotty.hh
- file sabareachiter.hh

5.17 sautparse/ Directory Reference

Directory dependency graph for sautparse/:



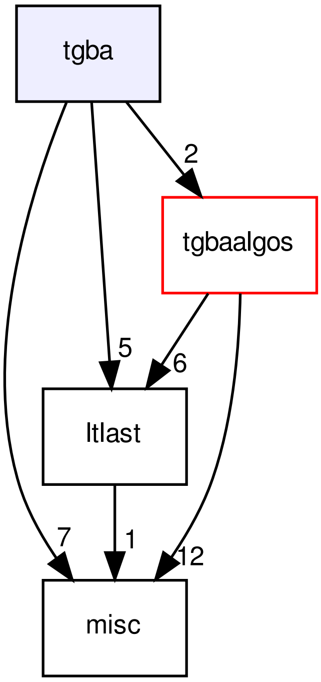
Files

- file location.hh

- file position.hh
- file stack.hh

5.18 tgba/ Directory Reference

Directory dependency graph for tgba/:



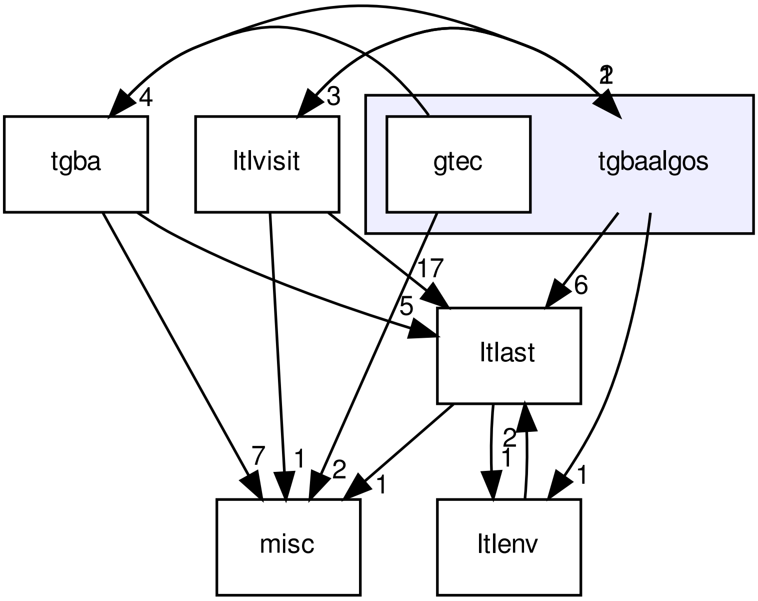
Files

- file bdddict.hh
- file bddprint.hh
- file formula2bdd.hh
- file futurecondcol.hh
- file public.hh
- file state.hh
- file statebdd.hh
- file succiter.hh
- file succiterconcrete.hh
- file taatgba.hh
- file tgba.hh
- file tgbabddconcrete.hh
- file tgbabddconcretefactory.hh

- file tgbabddconcreteproduct.hh
- file tgbabddcoredata.hh
- file tgbabddfactory.hh
- file tgbaexplicit.hh
- file tgbakvcomplement.hh
- file tgbaproduct.hh
- file tgbareduc.hh
- file tgbasafracomplement.hh
- file tgbascc.hh
- file tgbasgba.hh
- file tgbatba.hh
- file tgbaunion.hh
- file wdbacomp.hh

5.19 tgbaalgos/ Directory Reference

Directory dependency graph for tgbaalgos/:



Directories

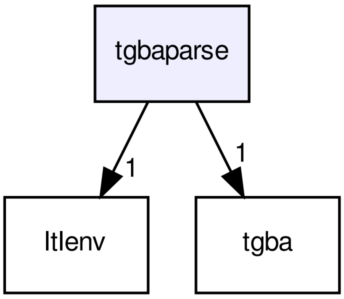
- directory gtec

Files

- file bfssteps.hh
- file cutscc.hh
- file dotty.hh
- file dottydec.hh
- file dupexp.hh
- file eltl2tgba_lacim.hh
- file emptiness.hh
- file emptiness_stats.hh
- file gv04.hh
- file lbtt.hh
- file ltl2taa.hh
- file ltl2tgba_fm.hh
- file ltl2tgba_lacim.hh
- file magic.hh
- file minimize.hh
- file neverclaim.hh
- file powerset.hh
- file projrun.hh
- file randomgraph.hh
- file reachiter.hh
- file reducerun.hh
- file reductgba_sim.hh
- file replayrun.hh
- file rundotdec.hh
- file safety.hh
- file save.hh
- file scc.hh
- file sccfilter.hh
- file se05.hh
- file stats.hh
- file tau03.hh
- file tau03opt.hh
- file weight.hh

5.20 tgbaparse/ Directory Reference

Directory dependency graph for tgbaparse/:



Files

- file public.hh

6 Namespace Documentation

6.1 eltlyy Namespace Reference

Classes

- class location

  Abstract a location.

- class position

  Abstract a position.

- class stack
- class slice

  Present a slice of the top of a stack.

Functions

- const location operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & operator+= (location &res, unsigned int width)

  Add and assign a location.
- bool operator== (const location &loc1, const location &loc2)

  Compare two location objects.
- bool operator!= (const location &loc1, const location &loc2)

  Compare two location objects.
- std::ostream & operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.
- const position & operator+= (position &res, const int width)

  Add and assign a position.
- const position operator+ (const position &begin, const int width)

  Add two position objects.
- const position & operator-= (position &res, const int width)

  Add and assign a position.
- const position operator- (const position &begin, const int width)

  Add two position objects.
- bool operator== (const position &pos1, const position &pos2)

  Compare two position objects.
- bool operator!= (const position &pos1, const position &pos2)

  Compare two position objects.
- std::ostream & operator<< (std::ostream &ostr, const position &pos)

  Intercept output stream redirection.

6.1.1 Function Documentation

6.1.1.1 bool eltlyy::operator!= (const location & *loc1*, const location & *loc2*) `[inline]`

Compare two location objects.

6.1.1.2 bool eltlyy::operator!= (const position & *pos1*, const position & *pos2*) `[inline]`

Compare two position objects.

6.1.1.3 const location eltlyy::operator+ (const location & *begin*, const location & *end*) `[inline]`

Join two location objects to create a location.

References eltlyy::location::end.

6.1.1.4 const position eltlyy::operator+ (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.1.1.5 const location eltlyy::operator+ (const location & *begin*, unsigned int *width*) `[inline]`

Add two location objects.

References eltlyy::location::columns().

6.1.1.6 location& eltlyy::operator+= (location & *res*, unsigned int *width*) `[inline]`

Add and assign a location.

References eltlyy::location::columns().

6.1.1.7 const position& eltlyy::operator+= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

References eltlyy::position::columns().

6.1.1.8 const position eltlyy::operator- (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.1.1.9 const position& eltlyy::operator-= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

6.1.1.10 std::ostream& eltlyy::operator<< (std::ostream & *ostr*, const location & *loc*) `[inline]`

Intercept output stream redirection.

Parameters

ostr the destination output stream
loc a reference to the location to redirect

Avoid duplicate information.

6.1.1.11 std::ostream& eltlyy::operator<< (std::ostream & *ostr*, const position & *pos*) `[inline]`

Intercept output stream redirection.

Parameters

ostr the destination output stream
pos a reference to the position to redirect

References eltlyy::position::column, eltlyy::position::filename, and eltlyy::position::line.

6.1.1.12 bool eltlyy::operator== (const location & *loc1*, const location & *loc2*) `[inline]`

Compare two location objects.

6.1.1.13 bool eltlyy::operator== (const position & *pos1*, const position & *pos2*) `[inline]`

Compare two position objects.

References eltlyy::position::column, eltlyy::position::filename, and eltlyy::position::line.

6.2 ltlyy Namespace Reference

Classes

- class location

  Abstract a location.

- class position

  Abstract a position.

- class stack
- class slice

  Present a slice of the top of a stack.

Functions

- const location operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & operator+= (location &res, unsigned int width)

  Add and assign a location.

- bool operator== (const location &loc1, const location &loc2)

  Compare two location objects.

- bool operator!= (const location &loc1, const location &loc2)

  Compare two location objects.

- std::ostream & operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.

- const position & operator+= (position &res, const int width)

  Add and assign a position.

- const position operator+ (const position &begin, const int width)

  Add two position objects.

- const position & operator-= (position &res, const int width)

  Add and assign a position.

- const position operator- (const position &begin, const int width)

  Add two position objects.

- bool operator== (const position &pos1, const position &pos2)

  Compare two position objects.

- bool operator!= (const position &pos1, const position &pos2)

  Compare two position objects.

- std::ostream & operator<< (std::ostream &ostr, const position &pos)

  Intercept output stream redirection.

6.2.1 Function Documentation

6.2.1.1 bool ltlyy::operator!= (const location & *loc1*, const location & *loc2*) `[inline]`

Compare two location objects.

6.2.1.2 bool ltlyy::operator!= (const position & *pos1*, const position & *pos2*) `[inline]`

Compare two position objects.

6.2.1.3 const location ltlyy::operator+ (const location & *begin*, const location & *end*) `[inline]`

Join two location objects to create a location.

References ltlyy::location::end.

6.2.1.4 const position ltlyy::operator+ (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.2.1.5 const location ltlyy::operator+ (const location & *begin*, unsigned int *width*) `[inline]`

Add two location objects.

References ltlyy::location::columns().

6.2.1.6 location& ltlyy::operator+= (location & *res*, unsigned int *width*) `[inline]`

Add and assign a location.

References ltlyy::location::columns().

6.2.1.7 const position& ltlyy::operator+= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

References ltlyy::position::columns().

6.2.1.8 const position ltlyy::operator- (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.2.1.9 const position& ltlyy::operator-= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

6.2.1.10 std::ostream& ltlyy::operator<< (std::ostream & *ostr*, const location & *loc*) `[inline]`

Intercept output stream redirection.

Parameters

ostr the destination output stream

loc a reference to the location to redirect

Avoid duplicate information.

6.2.1.11 std::ostream& ltlyy::operator<< (std::ostream & *ostr*, const position & *pos*) `[inline]`

Intercept output stream redirection.

Parameters

ostr the destination output stream

pos a reference to the position to redirect

References ltlyy::position::column, ltlyy::position::filename, and ltlyy::position::line.

6.2.1.12 bool ltlyy::operator== (const location & *loc1*, const location & *loc2*) `[inline]`

Compare two location objects.

6.2.1.13 bool ltlyy::operator== (const position & *pos1*, const position & *pos2*) `[inline]`

Compare two position objects.

References ltlyy::position::column, ltlyy::position::filename, and ltlyy::position::line.

6.3 neverclaimyy Namespace Reference

Classes

- class location

  Abstract a location.

- class position

  Abstract a position.

- class stack
- class slice

  Present a slice of the top of a stack.

Functions

- const location operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & operator+= (location &res, unsigned int width)

  Add and assign a location.

- bool operator== (const location &loc1, const location &loc2)

  Compare two location objects.

- bool operator!= (const location &loc1, const location &loc2)

  Compare two location objects.

- std::ostream & operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.

- const position & operator+= (position &res, const int width)

  Add and assign a position.

- const position operator+ (const position &begin, const int width)

  Add two position objects.

- const position & operator-= (position &res, const int width)

  Add and assign a position.

- const position operator- (const position &begin, const int width)

  Add two position objects.

- bool operator== (const position &pos1, const position &pos2)

  Compare two position objects.

- bool operator!= (const position &pos1, const position &pos2)

  Compare two position objects.

- std::ostream & operator<< (std::ostream &ostr, const position &pos)

  Intercept output stream redirection.

6.3.1 Function Documentation

6.3.1.1 bool neverclaimyy::operator!= (const location & *loc1*, const location & *loc2*) `[inline]`

Compare two location objects.

6.3.1.2 bool neverclaimyy::operator!= (const position & *pos1*, const position & *pos2*) `[inline]`

Compare two position objects.

6.3.1.3 const location neverclaimyy::operator+ (const location & *begin*, const location & *end*) `[inline]`

Join two location objects to create a location.

References neverclaimyy::location::end.

6.3.1.4 const position neverclaimyy::operator+ (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.3.1.5 const location neverclaimyy::operator+ (const location & *begin*, unsigned int *width*) `[inline]`

Add two location objects.

References neverclaimyy::location::columns().

6.3.1.6 location& neverclaimyy::operator+= (location & *res*, unsigned int *width*) `[inline]`

Add and assign a location.

References neverclaimyy::location::columns().

6.3.1.7 const position& neverclaimyy::operator+= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

References neverclaimyy::position::columns().

6.3.1.8 const position neverclaimyy::operator- (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.3.1.9 const position& neverclaimyy::operator-= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

6.3.1.10 std::ostream& neverclaimyy::operator<< (std::ostream & *ostr*, const location & *loc*) `[inline]`

Intercept output stream redirection.

Parameters

ostr the destination output stream

loc a reference to the location to redirect

Avoid duplicate information.

6.3.1.11 std::ostream& neverclaimyy::operator<< (std::ostream & *ostr*, const position & *pos*) `[inline]`

Intercept output stream redirection.

Parameters

ostr the destination output stream

pos a reference to the position to redirect

References neverclaimyy::position::column, neverclaimyy::position::filename, and neverclaimyy::position::line.

6.3.1.12 bool neverclaimyy::operator== (const location & *loc1*, const location & *loc2*) `[inline]`

Compare two location objects.

6.3.1.13 bool neverclaimyy::operator== (const position & *pos1*, const position & *pos2*) `[inline]`

Compare two position objects.

References neverclaimyy::position::column, neverclaimyy::position::filename, and neverclaimyy::position::line.

6.4 sautyy Namespace Reference

Classes

- class location

  Abstract a location.

- class position

  Abstract a position.

- class stack
- class slice

  Present a slice of the top of a stack.

Functions

- const location operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & operator+= (location &res, unsigned int width)

  Add and assign a location.

- std::ostream & operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.

- const position & operator+= (position &res, const int width)

  Add and assign a position.

- const position operator+ (const position &begin, const int width)

  Add two position objects.

- const position & operator-= (position &res, const int width)

  Add and assign a position.
- const position operator- (const position &begin, const int width)

  Add two position objects.
- std::ostream & operator<< (std::ostream &ostr, const position &pos)

  Intercept output stream redirection.

6.4.1 Function Documentation

6.4.1.1 const location sautyy::operator+ (const location & *begin,* const location & *end*) `[inline]`

Join two location objects to create a location.

References sautyy::location::end.

6.4.1.2 const location sautyy::operator+ (const location & *begin,* unsigned int *width*) `[inline]`

Add two location objects.

References sautyy::location::columns().

6.4.1.3 const position sautyy::operator+ (const position & *begin,* const int *width*) `[inline]`

Add two position objects.

6.4.1.4 const position& sautyy::operator+= (position & *res,* const int *width*) `[inline]`

Add and assign a position.

References sautyy::position::columns().

6.4.1.5 location& sautyy::operator+= (location & *res,* unsigned int *width*) `[inline]`

Add and assign a location.

References sautyy::location::columns().

6.4.1.6 const position sautyy::operator- (const position & *begin*, const int *width*) `[inline]`

Add two position objects.

6.4.1.7 const position& sautyy::operator-= (position & *res*, const int *width*) `[inline]`

Add and assign a position.

6.4.1.8 std::ostream& sautyy::operator<< (std::ostream & *ostr*, const location & *loc*) `[inline]`

Intercept output stream redirection.

Parameters

ostr	the destination output stream
loc	a reference to the location to redirect

Avoid duplicate information.

6.4.1.9 std::ostream& sautyy::operator<< (std::ostream & *ostr*, const position & *pos*) `[inline]`

Intercept output stream redirection.

Parameters

ostr	the destination output stream
pos	a reference to the position to redirect

References sautyy::position::column, sautyy::position::filename, and sautyy::position::line.

6.5 spot Namespace Reference

Namespaces

- namespace eltl
- namespace ltl

Classes

- class evtgba
- class evtgba_iterator
- class evtgba_explicit

- class state_evtgba_explicit

  States used by spot::tgba_evtgba_explicit.

- class evtgba_product
- class symbol
- class rsymbol
- class evtgba_reachable_iterator

  Iterate over all reachable states of a spot::evtgba.

- class evtgba_reachable_iterator_depth_first

  An implementation of spot::evtgba_reachable_iterator that browses states depth first.

- class evtgba_reachable_iterator_breadth_first

  An implementation of spot::evtgba_reachable_iterator that browses states breadth first.

- class fair_kripke_succ_iterator

  Iterator code for a Fair Kripke structure.
  This iterator can be used to simplify the writing of an iterator on a Fair Kripke structure (or lookalike).

- class fair_kripke

  Interface for a Fair Kripke structure.
  A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition, and a set of acceptance conditions.

- class kripke_succ_iterator

  Iterator code for Kripke structure
  This iterator can be used to simplify the writing of an iterator on a Kripke structure (or lookalike).

- class kripke

  Interface for a Kripke structure
  A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition.

- class bdd_allocator

  Manage ranges of variables.

- struct bdd_less_than

  Comparison functor for BDDs.

- class free_list

  Manage list of free integers.

- struct ptr_hash

  A hash function for pointers.

- struct string_hash

  A hash function for strings.

- struct identity_hash

  A hash function that returns identity.

- struct char_ptr_less_than

Strict Weak Ordering for `char*`*.*
This is meant to be used as a comparison functor for STL `map` *whose key are of type* `const char*`*.*

- class minato_isop

  Generate an irredundant sum-of-products (ISOP) form of a BDD function.
  This algorithm implements a derecursived version the Minato-Morreale algorithm presented in the following paper.

- class loopless_modular_mixed_radix_gray_code

  Loopless modular mixed radix Gray code iteration.
  This class is based on the loopless modular mixed radix gray code algorithm described in exercise 77 of "The Art of Computer Programming", Pre-Fascicle 2A (Draft of section 7.2.1.1: generating all n-tuples) by Donald E. Knuth.

- class option_map

  Manage a map of options.
  Each option is defined by a string and is associated to an integer value.

- class barand

  Compute pseudo-random integer value between 0 and n included, following a binomial distribution for probability p.

- struct time_info

  A structure to record elapsed time in clock ticks.

- class timer

  A timekeeper that accumulate interval of time.

- class timer_map

  A map of timer, where each timer has a name.

- class explicit_state_conjunction

  Basic implementation of saba_state_conjunction.
  This class provides a basic implementation to iterate over a conjunction of states of a saba.

- class saba

  A State-based Alternating (Generalized) Büchi Automaton.
  Browsing such automaton can be achieved using two functions: `get_init_state`*, and* `succ_iter`*. The former returns the initial state while the latter lists the successor states of any state.*

- class saba_complement_tgba

  Complement a TGBA and produce a SABA.
  The original TGBA is transformed into a States-based Büchi Automaton.

- class saba_state

  Abstract class for saba states.

- struct saba_state_ptr_less_than

  Strict Weak Ordering for `saba_state*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `saba_state*`*.*

- struct saba_state_ptr_equal

An Equivalence Relation for `saba_state*`*.*
This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `saba_state*`*.*

- struct saba_state_ptr_hash

  Hash Function for `saba_state*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `saba_state*`*.*

- struct saba_state_shared_ptr_less_than

  Strict Weak Ordering for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `shared_saba_state`*.*

- struct saba_state_shared_ptr_equal

  An Equivalence Relation for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `shared_saba_state`*.*

- struct saba_state_shared_ptr_hash

  Hash Function for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_saba_state`*.*

- class saba_state_conjunction

  Iterate over a conjunction of saba_state.
  This class provides the basic functionalities required to iterate over a conjunction of states of a saba.

- class saba_succ_iterator

  Iterate over the successors of a saba_state.
  This class provides the basic functionalities required to iterate over the successors of a state of a saba. Since transitions of an alternating automaton are defined as a boolean function with conjunctions (universal) and disjunctions (non-deterministic),.

- class saba_reachable_iterator

  Iterate over all reachable states of a spot::saba.

- class saba_reachable_iterator_depth_first

  An implementation of spot::saba_reachable_iterator that browses states depth first.

- class saba_reachable_iterator_breadth_first

  An implementation of spot::saba_reachable_iterator that browses states breadth first.

- class bdd_dict
- class future_conditions_collector

  Wrap a tgba to offer information about upcoming conditions.
  This class is a spot::tgba wrapper that simply add a new method, future_conditions(), to any spot::tgba.

- class state

  Abstract class for states.

- struct state_ptr_less_than

  Strict Weak Ordering for `state*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `state*`*.*

- struct state_ptr_equal

  An Equivalence Relation for `state*`*.*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `state*`*.*

- struct state_ptr_hash

  Hash Function for `state*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `state*`*.*

- struct state_shared_ptr_less_than

  Strict Weak Ordering for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `shared_state`*.*

- struct state_shared_ptr_equal

  An Equivalence Relation for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `shared_state`*.*

- struct state_shared_ptr_hash

  Hash Function for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_state`*.*

- class state_bdd
- class tgba_succ_iterator

  Iterate over the successors of a state.
  This class provides the basic functionalities required to iterate over the successors of a state, as well as querying transition labels. Because transitions are never explicitely encoded, labels (conditions and acceptance conditions) can only be queried while iterating over the successors.

- class tgba_succ_iterator_concrete
- class taa_tgba

  A self-loop Transition-based Alternating Automaton (TAA) which is seen as a TGBA (abstract class, see below).

- class state_set

  Set of states deriving from spot::state.

- class taa_succ_iterator
- class taa_tgba_labelled
- class taa_tgba_string
- class taa_tgba_formula
- class tgba

  A Transition-based Generalized Büchi Automaton.
  The acronym TGBA (Transition-based Generalized Büchi Automaton) was coined by Dimitra Giannakopoulou and Flavio Lerda in "From States to Transitions: Improving Translation of LTL Formulae to Büchi Automata". (FORTE'02).

- class tgba_bdd_concrete

  A concrete spot::tgba implemented using BDDs.

- class tgba_bdd_concrete_factory

  Helper class to build a spot::tgba_bdd_concrete object.

- struct tgba_bdd_core_data

  Core data for a TGBA encoded using BDDs.

- class tgba_bdd_factory

  Abstract class for spot::tgba_bdd_concrete factories.

- class tgba_explicit
- class state_explicit
- class tgba_explicit_succ_iterator
- class tgba_explicit_labelled

  A tgba_explicit instance with states labeled by a given type.

- class tgba_explicit_string
- class tgba_explicit_formula
- class tgba_explicit_number
- class bdd_ordered
- class tgba_kv_complement

  Build a complemented automaton.
  The construction comes from:

- class state_product

  A state for spot::tgba_product.
  This state is in fact a pair of state: the state from the left automaton and that of the right.

- class tgba_succ_iterator_product

  Iterate over the successors of a product computed on the fly.

- class tgba_product

  A lazy product. (States are computed on the fly.).

- class tgba_product_init

  A lazy product with different initial states.

- class direct_simulation_relation
- class delayed_simulation_relation
- class tgba_reduc
- class tgba_safra_complement

  Build a complemented automaton.
  It creates an automaton that recognizes the negated language of aut.

- class tgba_scc

  Wrap a tgba to offer information about strongly connected components.
  This class is a spot::tgba wrapper that simply add a new method scc_of_state() to retrieve the number of a SCC a state belongs to.

- class tgba_sgba_proxy

  Change the labeling-mode of spot::tgba on the fly, producing a state-based generalized Büchi automaton.
  This class acts as a proxy in front of a spot::tgba, that should label on states on-the-fly. The result is still a spot::tgba, but acceptances conditions are also on states.

- class tgba_tba_proxy

  Degeneralize a spot::tgba on the fly, producing a TBA.
  This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly. The result is still a spot::tgba, but it will always have exactly one acceptance condition so it could be called TBA (without the G).

- class tgba_sba_proxy

  Degeneralize a spot::tgba on the fly, producing an SBA.
  This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly.

- class state_union

  A state for spot::tgba_union.
  This state is in fact a pair. If the first member equals 0 and the second is different from 0, the state belongs to the left automaton. If the first member is different from 0 and the second is 0, the state belongs to the right automaton. If both members are 0, the state is the initial state.

- class tgba_succ_iterator_union

  Iterate over the successors of an union computed on the fly.

- class tgba_union

  A lazy union. (States are computed on the fly.).

- class bfs_steps

  Make a BFS in a spot::tgba to compute a tgba_run::steps.
  This class should be used to compute the shortest path between a state of a spot::tgba and the first transition or state that matches some conditions.

- struct sccs_set
- class dotty_decorator

  Choose state and link styles for spot::dotty_reachable.

- class emptiness_check_result

  The result of an emptiness check.

- class emptiness_check

  Common interface to emptiness check algorithms.

- class emptiness_check_instantiator
- struct tgba_run

  An accepted run, for a tgba.

- struct unsigned_statistics
- class unsigned_statistics_copy

  comparable statistics

- class ec_statistics

  Emptiness-check statistics.

- class ars_statistics

  Accepting Run Search statistics.

- class acss_statistics

  Accepting Cycle Search Space statistics.

- class couvreur99_check_result

  Compute a counter example from a spot::couvreur99_check_status.

- class explicit_connected_component

  An SCC storing all its states explicitly.

- class connected_component_hash_set
- class explicit_connected_component_factory

  Abstract factory for explicit_connected_component.

- class connected_component_hash_set_factory

  Factory for connected_component_hash_set.

- class couvreur99_check

  An implementation of the Couvreur99 emptiness-check algorithm.

- class couvreur99_check_shy

  A version of spot::couvreur99_check that tries to visit known states first.

- class numbered_state_heap_const_iterator

  Iterator on numbered_state_heap objects.

- class numbered_state_heap

  Keep track of a large quantity of indexed states.

- class numbered_state_heap_factory

  Abstract factory for numbered_state_heap.

- class numbered_state_heap_hash_map

  A straightforward implementation of numbered_state_heap with a hash map.

- class numbered_state_heap_hash_map_factory

  Factory for numbered_state_heap_hash_map.

- class scc_stack
- class couvreur99_check_status

  The status of the emptiness-check on success.

- struct power_map
- class tgba_reachable_iterator

  Iterate over all reachable states of a spot::tgba.

- class tgba_reachable_iterator_depth_first

  An implementation of spot::tgba_reachable_iterator that browses states depth first.

- class tgba_reachable_iterator_breadth_first

  An implementation of spot::tgba_reachable_iterator that browses states breadth first.

- class parity_game_graph

  Parity game graph which compute a simulation relation.

- class spoiler_node

  Spoiler node of parity game graph.

- class duplicator_node

  Duplicator node of parity game graph.

- class parity_game_graph_direct

  Parity game graph which compute the direct simulation relation.

- class spoiler_node_delayed

  Spoiler node of parity game graph for delayed simulation.

- class duplicator_node_delayed

  Duplicator node of parity game graph for delayed simulation.

- class parity_game_graph_delayed
- class tgba_run_dotty_decorator

  Highlight a spot::tgba_run on a spot::tgba.
  An instance of this class can be passed to spot::dotty_reachable.

- struct scc_stats
- class scc_map

  Build a map of Strongly Connected components in in a TGBA.

- struct tgba_statistics
- struct tgba_sub_statistics
- class weight

  Manage for a given automaton a vector of counter indexed by its acceptance condition.

- class gspn_exception

  An exception used to forward GSPN errors.

- class gspn_interface
- class gspn_ssp_interface
- class nips_exception

  An exception used to forward NIPS errors.

- class nips_interface

  An interface to provide a PROMELA front-end.

Typedefs

- typedef std::set< const symbol ∗ > symbol_set
- typedef std::set< rsymbol > rsymbol_set
- typedef std::pair< evtgbayy::location, std::string > evtgba_parse_error

  A parse diagnostic with its location.

- typedef std::list< evtgba_parse_error > evtgba_parse_error_list

  A list of parser diagnostics, as filled by parse.

- typedef std::pair< neverclaimyy::location, std::string > neverclaim_parse_error

  A parse diagnostic with its location.

- typedef std::list< neverclaim_parse_error > neverclaim_parse_error_list

  A list of parser diagnostics, as filled by parse.

- typedef boost::shared_ptr< const saba_state > shared_saba_state
- typedef boost::shared_ptr< const state > shared_state
- typedef std::vector< bdd_ordered > acc_list_t
- typedef std::pair< const spot::state ∗, const spot::state ∗ > state_couple
- typedef std::vector< state_couple ∗ > simulation_relation
- typedef std::vector< spoiler_node ∗ > sn_v
- typedef std::vector< duplicator_node ∗ > dn_v
- typedef std::vector< const state ∗ > s_v
- typedef std::pair< tgbayy::location, std::string > tgba_parse_error

  A parse diagnostic with its location.

- typedef std::list< tgba_parse_error > tgba_parse_error_list

  A list of parser diagnostics, as filled by parse.

Enumerations

- enum reduce_tgba_options {

  Reduce_None = 0, Reduce_quotient_Dir_Sim = 1, Reduce_transition_Dir_Sim = 2, Reduce_quotient_Del_Sim = 4,

  Reduce_transition_Del_Sim = 8, Reduce_Scc = 16, Reduce_All = -1U }

  Options for reduce.

Functions

- std::ostream & dotty_reachable (std::ostream &os, const evtgba ∗g)

  Print reachable states in dot format.

- std::ostream & evtgba_save_reachable (std::ostream &os, const evtgba ∗g)

  Save reachable states in text format.

- evtgba_explicit ∗ tgba_to_evtgba (const tgba ∗a)

Convert a tgba into an evtgba.

- evtgba_explicit ∗ evtgba_parse (const std::string &filename, evtgba_parse_error_list &error_list, bool debug=false)

  Build a spot::evtgba_explicit from a text file.

- bool format_evtgba_parse_errors (std::ostream &os, const std::string &filename, evtgba_parse_error_list &error_list)

  Format diagnostics produced by spot::evtgba_parse.

- bool is_bare_word (const char ∗str)
- std::string quote_unless_bare_word (const std::string &str)

  Double-quote words that are not bare.

- bdd compute_all_acceptance_conditions (bdd neg_acceptance_conditions)

  Compute all acceptance conditions from all neg acceptance conditions.

- bdd compute_neg_acceptance_conditions (bdd all_acceptance_conditions)

  Compute neg acceptance conditions from all acceptance conditions.

- std::ostream & escape_str (std::ostream &os, const std::string &str)

  Escape " and \ characters in str.

- std::string escape_str (const std::string &str)

  Escape " and \ characters in str.

- size_t wang32_hash (size_t key)

  Thomas Wang's 32 bit hash function.

- size_t knuth32_hash (size_t key)

  Knuth's Multiplicative hash function.

- int memusage ()

  Total number of pages in use by the program.

- void srand (unsigned int seed)

  Reset the seed of the pseudo-random number generator.

- int rrand (int min, int max)

  Compute a pseudo-random integer value between min and max included.

- int mrand (int max)

  Compute a pseudo-random integer value between 0 and max-1 included.

- double drand ()

  Compute a pseudo-random double value between 0.0 and 1.0 (1.0 excluded).

- double nrand ()

  Compute a pseudo-random double value following a standard normal distribution. (Odeh & Evans).

- double bmrand ()

  Compute a pseudo-random double value following a standard normal distribution. (Box-Muller).

- int prand (double p)

  Return a pseudo-random positive integer value following a Poisson distribution with parameter p.

- const char ∗ version ()

  Return Spot's version.

- tgba_explicit_string ∗ neverclaim_parse (const std::string &filename, neverclaim_parse_error_list &error_list, bdd_dict ∗dict, ltl::environment &env=ltl::default_environment::instance(), bool debug=false)

  Build a spot::tgba_explicit from a Spin never claim file.

- bool format_neverclaim_parse_errors (std::ostream &os, const std::string &filename, neverclaim_parse_error_list &error_list)

  Format diagnostics produced by spot::neverclaim_parse.

- std::ostream & saba_dotty_reachable (std::ostream &os, const saba ∗g)

  Print reachable states in dot format.

- std::ostream & bdd_print_sat (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a list of literals.

- std::string bdd_format_sat (const bdd_dict ∗dict, bdd b)

  Format a BDD as a list of literals.

- std::ostream & bdd_print_acc (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a list of acceptance conditions.

- std::ostream & bdd_print_accset (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a set of acceptance conditions.

- std::string bdd_format_accset (const bdd_dict ∗dict, bdd b)

  Format a BDD as a set of acceptance conditions.

- std::ostream & bdd_print_set (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a set.

- std::string bdd_format_set (const bdd_dict ∗dict, bdd b)

  Format a BDD as a set.

- std::ostream & bdd_print_formula (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a formula.

- std::string bdd_format_formula (const bdd_dict ∗dict, bdd b)

  Format a BDD as a formula.

- std::ostream & bdd_print_dot (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a diagram in dotty format.

- std::ostream & bdd_print_table (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a table.

- bdd formula_to_bdd (const ltl::formula ∗f, bdd_dict ∗d, void ∗for_me)
- const ltl::formula ∗ bdd_to_formula (bdd f, const bdd_dict ∗d)
- void shared_state_deleter (state ∗s)
- tgba_bdd_concrete ∗ product (const tgba_bdd_concrete ∗left, const tgba_bdd_concrete ∗right)

  Multiplies two spot::tgba_bdd_concrete automata.
  This function builds the resulting product as another spot::tgba_bdd_concrete automaton.

- void display_safra (const tgba_safra_complement ∗a)

  Produce a dot output of the Safra automaton associated to a.

- tgba ∗ wdba_complement (const tgba ∗aut)

  Complement a weak deterministic Büchi automaton.

- std::vector< std::vector< sccs_set ∗ > > ∗ find_paths (tgba ∗a, const scc_map &m)
- unsigned max_spanning_paths (std::vector< sccs_set ∗ > ∗paths, scc_map &m)
- std::list< tgba ∗ > split_tgba (tgba ∗a, const scc_map &m, unsigned split_number)
- std::ostream & dotty_reachable (std::ostream &os, const tgba ∗g, dotty_decorator ∗dd=dotty_decorator::instance())

  Print reachable states in dot format.
  The dd argument allows to customize the output in various ways. See this page for a list of available decorators.

- tgba_explicit ∗ tgba_dupexp_bfs (const tgba ∗aut)

  Build an explicit automata from all states of aut, numbering states in bread first order as they are processed.

- tgba_explicit ∗ tgba_dupexp_dfs (const tgba ∗aut)

  Build an explicit automata from all states of aut, numbering states in depth first order as they are processed.

- tgba_bdd_concrete ∗ eltl_to_tgba_lacim (const ltl::formula ∗f, bdd_dict ∗dict)

  Build a spot::tgba_bdd_concrete from an ELTL formula.
  This is based on the following paper.

- std::ostream & print_tgba_run (std::ostream &os, const tgba ∗a, const tgba_run ∗run)

  Display a tgba_run.

- tgba ∗ tgba_run_to_tgba (const tgba ∗a, const tgba_run ∗run)

  Return an explicit_tgba corresponding to run (i.e. comparable states are merged).

- emptiness_check ∗ couvreur99 (const tgba ∗a, option_map options=option_map(), const numbered_state_heap_factory ∗nshf=numbered_state_heap_hash_map_factory::instance())

  Check whether the language of an automate is empty.

- emptiness_check ∗ explicit_gv04_check (const tgba ∗a, option_map o=option_map())

  Emptiness check based on Geldenhuys and Valmari's TACAS'04 paper.

- std::ostream & lbtt_reachable (std::ostream &os, const tgba ∗g)

Print reachable states in LBTT format.

- taa_tgba ∗ ltl_to_taa (const ltl::formula ∗f, bdd_dict ∗dict, bool refined_rules=false)

  Build a spot::taa∗ from an LTL formula.
  This is based on the following.

- tgba_explicit ∗ ltl_to_tgba_fm (const ltl::formula ∗f, bdd_dict ∗dict, bool exprop=false, bool symb_merge=true, bool branching_postponement=false, bool fair_loop_approx=false, const ltl::atomic_prop_set ∗unobs=0, int reduce_ltl=ltl::Reduce_None)

  Build a spot::tgba_explicit∗ from an LTL formula.
  This is based on the following paper.

- tgba_bdd_concrete ∗ ltl_to_tgba_lacim (const ltl::formula ∗f, bdd_dict ∗dict)

  Build a spot::tgba_bdd_concrete from an LTL formula.
  This is based on the following paper.

- emptiness_check ∗ explicit_magic_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ bit_state_hashing_magic_search (const tgba ∗a, size_t size, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ magic_search (const tgba ∗a, option_map o=option_map())

  Wrapper for the two magic_search implementations.

- tgba_explicit_number ∗ minimize_monitor (const tgba ∗a)

  Construct a minimal deterministic monitor.

- tgba_explicit_number ∗ minimize_wdba (const tgba ∗a)

  Minimize a Büchi automaton in the WDBA class.

- const tgba ∗ minimize_obligation (const tgba ∗aut_f, const ltl::formula ∗f=0, const tgba ∗aut_neg_f=0)

  Minimize an automaton if it represents an obligation property.

- std::ostream & never_claim_reachable (std::ostream &os, const tgba_sba_proxy ∗g, const ltl::formula ∗f=0, bool comments=false)

  Print reachable states in Spin never claim format.

- tgba_run ∗ project_tgba_run (const tgba ∗a_run, const tgba ∗a_proj, const tgba_run ∗run)

  Project a tgba_run on a tgba.
  If a tgba_run has been generated on a product, or any other on-the-fly algorithm with tgba operands,.

- tgba ∗ random_graph (int n, float d, const ltl::atomic_prop_set ∗ap, bdd_dict ∗dict, int n_acc=0, float a=0.1, float t=0.5, ltl::environment ∗env=&ltl::default_environment::instance())

  Construct a tgba randomly.

- tgba_run ∗ reduce_run (const tgba ∗a, const tgba_run ∗org)

  Reduce an accepting run.
  Return a run which is accepting for and that is no longer that org.

- const tgba ∗ reduc_tgba_sim (const tgba ∗a, int opt=Reduce_All)

  Remove some node of the automata using a simulation relation.

- direct_simulation_relation ∗ get_direct_relation_simulation (const tgba ∗a, std::ostream &os, int opt=-1)

  Compute a direct simulation relation on state of tgba f.

- delayed_simulation_relation ∗ get_delayed_relation_simulation (const tgba ∗a, std::ostream &os, int opt=-1)
- void free_relation_simulation (direct_simulation_relation ∗rel)

  To free a simulation relation.

- void free_relation_simulation (delayed_simulation_relation ∗rel)

  To free a simulation relation.

- bool replay_tgba_run (std::ostream &os, const tgba ∗a, const tgba_run ∗run, bool debug=false)

  Replay a tgba_run on a tgba.
  This is similar to print_tgba_run(), except that the run is actually replayed on the automaton while it is printed. Doing so makes it possible to display transition annotations (returned by spot::tgba::transition_annotation()). The output will stop if the run cannot be completed.

- bool is_guarantee_automaton (const tgba ∗aut, const scc_map ∗sm=0)

  Whether an automaton represents a guarantee property.

- bool is_safety_mwdba (const tgba ∗aut)

  Whether a minimized WDBA represents a safety property.

- std::ostream & tgba_save_reachable (std::ostream &os, const tgba ∗g)

  Save reachable states in text format.

- scc_stats build_scc_stats (const tgba ∗a)
- scc_stats build_scc_stats (const scc_map &m)
- std::ostream & dump_scc_dot (const tgba ∗a, std::ostream &out, bool verbose=false)
- std::ostream & dump_scc_dot (const scc_map &m, std::ostream &out, bool verbose=false)
- tgba ∗ scc_filter (const tgba ∗aut, bool remove_all_useless=false)

  Prune unaccepting SCCs and remove superfluous acceptance conditions.

- emptiness_check ∗ explicit_se05_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness check on the spot::tgba automaton a.

- emptiness_check ∗ bit_state_hashing_se05_search (const tgba ∗a, size_t size, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ se05 (const tgba ∗a, option_map o)

  Wrapper for the two se05 implementations.

- tgba_statistics stats_reachable (const tgba ∗g)

  Compute statistics for an automaton.

- tgba_sub_statistics sub_stats_reachable (const tgba ∗g)

  Compute subended statistics for an automaton.

- emptiness_check ∗ explicit_tau03_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ explicit_tau03_opt_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- tgba_explicit_string ∗ tgba_parse (const std::string &filename, tgba_parse_error_list &error_list, bdd_dict ∗dict, ltl::environment &env=ltl::default_environment::instance(), ltl::environment &envacc=ltl::default_environment::instance(), bool debug=false)

  Build a spot::tgba_explicit from a text file.

- bool format_tgba_parse_errors (std::ostream &os, const std::string &filename, tgba_parse_error_list &error_list)

  Format diagnostics produced by spot::tgba_parse.

- std::ostream & operator<< (std::ostream &os, const gspn_exception &e)
- couvreur99_check ∗ couvreur99_check_ssp_semi (const tgba ∗ssp_automata)
- couvreur99_check ∗ couvreur99_check_ssp_shy_semi (const tgba ∗ssp_automata)
- couvreur99_check ∗ couvreur99_check_ssp_shy (const tgba ∗ssp_automata, bool stack_inclusion=true, bool double_inclusion=false, bool reversed_double_inclusion=false, bool no_decomp=false)
- std::ostream & operator<< (std::ostream &os, const nips_exception &e)

  - tgba_explicit_number ∗ tgba_powerset (const tgba ∗aut, power_map &pm)

    Build a deterministic automaton, ignoring acceptance conditions.
    This create a deterministic automaton that recognizes the same language as aut would if its acceptance conditions were ignored. This is the classical powerset algorithm.

  - tgba_explicit_number ∗ tgba_powerset (const tgba ∗aut)

6.5.1 Typedef Documentation

6.5.1.1 typedef std::vector<bdd_ordered> spot::acc_list_t

6.5.1.2 typedef std::pair<evtgbayy::location, std::string> spot::evtgba_parse_error

A parse diagnostic with its location.

6.5.1.3 typedef std::list<evtgba_parse_error> spot::evtgba_parse_error_list

A list of parser diagnostics, as filled by parse.

6.5.1.4 typedef std::set<rsymbol> spot::rsymbol_set

6.5.1.5 typedef boost::shared_ptr<const saba_state> spot::shared_saba_state

6.5.1.6 typedef boost::shared_ptr<const state> spot::shared_state

6.5.1.7 typedef std::vector<state_couple∗> spot::simulation_relation

6.5.1.8 typedef std::pair<const spot::state∗, const spot::state∗> spot::state_couple

6.5.1.9 typedef std::set<const symbol∗> spot::symbol_set

6.5.2 Function Documentation

6.5.2.1 std::string spot::bdd_format_accset (const bdd_dict ∗ *dict*, bdd *b*)

Format a BDD as a set of acceptance conditions.

This is used when saving a TGBA.

Parameters

dict The dictionary to use, to lookup variables.

b The BDD to print.

Returns

The BDD formated as a string.

6.5.2.2 std::string spot::bdd_format_formula (const bdd_dict ∗ *dict*, bdd *b*)

Format a BDD as a formula.

Parameters

dict The dictionary to use, to lookup variables.
b The BDD to print.

Returns

The BDD formated as a string.

6.5.2.3 std::string spot::bdd_format_sat (const bdd_dict ∗ *dict,* bdd *b*)

Format a BDD as a list of literals.

This assumes that *b* is a conjunction of literals.

Parameters

dict The dictionary to use, to lookup variables.
b The BDD to print.

Returns

The BDD formated as a string.

6.5.2.4 std::string spot::bdd_format_set (const bdd_dict ∗ *dict,* bdd *b*)

Format a BDD as a set.

Parameters

dict The dictionary to use, to lookup variables.
b The BDD to print.

Returns

The BDD formated as a string.

6.5.2.5 std::ostream& spot::bdd_print_acc (std::ostream & *os,* const bdd_dict ∗ *dict,* bdd *b*)

Print a BDD as a list of acceptance conditions.

This is used when saving a TGBA.

Parameters

os The output stream.
dict The dictionary to use, to lookup variables.
b The BDD to print.

Returns

The BDD formated as a string.

6.5.2.6 std::ostream& spot::bdd_print_accset (std::ostream & *os*, const bdd_dict ∗ *dict*, bdd *b*)

Print a BDD as a set of acceptance conditions.

This is used when saving a TGBA.

Parameters

os The output stream.

dict The dictionary to use, to lookup variables.

b The BDD to print.

Returns

The BDD formated as a string.

6.5.2.7 std::ostream& spot::bdd_print_dot (std::ostream & *os*, const bdd_dict ∗ *dict*, bdd *b*)

Print a BDD as a diagram in dotty format.

Parameters

os The output stream.

dict The dictionary to use, to lookup variables.

b The BDD to print.

6.5.2.8 std::ostream& spot::bdd_print_formula (std::ostream & *os*, const bdd_dict ∗ *dict*, bdd *b*)

Print a BDD as a formula.

Parameters

os The output stream.

dict The dictionary to use, to lookup variables.

b The BDD to print.

6.5.2.9 std::ostream& spot::bdd_print_sat (std::ostream & *os*, const bdd_dict ∗ *dict*, bdd *b*)

Print a BDD as a list of literals.

This assumes that *b* is a conjunction of literals.

Parameters

os The output stream.

dict The dictionary to use, to lookup variables.

b The BDD to print.

6.5.2.10 std::ostream& spot::bdd_print_set (std::ostream & *os,* const bdd_dict ∗ *dict,* bdd *b*)

Print a BDD as a set.

Parameters

os The output stream.

dict The dictionary to use, to lookup variables.

b The BDD to print.

6.5.2.11 std::ostream& spot::bdd_print_table (std::ostream & *os,* const bdd_dict ∗ *dict,* bdd *b*)

Print a BDD as a table.

Parameters

os The output stream.

dict The dictionary to use, to lookup variables.

b The BDD to print.

6.5.2.12 const ltl::formula∗ spot::bdd_to_formula (bdd *f,* const bdd_dict ∗ *d*)

6.5.2.13 scc_stats spot::build_scc_stats (const tgba ∗ *a*)

6.5.2.14 scc_stats spot::build_scc_stats (const scc_map & *m*)

6.5.2.15 bdd spot::compute_all_acceptance_conditions (bdd *neg_acceptance_conditions*)

Compute all acceptance conditions from all neg acceptance conditions.

6.5.2.16 bdd spot::compute_neg_acceptance_conditions (bdd *all_acceptance_conditions*)

Compute neg acceptance conditions from all acceptance conditions.

6.5.2.17 void spot::display_safra (const tgba_safra_complement ∗ *a*)

Produce a dot output of the Safra automaton associated to *a*.

Parameters

a The `tgba_safra_complement` with an intermediate Safra automaton to display

6.5.2.18 std::ostream& spot::dotty_reachable (std::ostream & *os*, const evtgba ∗ *g*)

Print reachable states in dot format.

6.5.2.19 std::ostream& spot::dump_scc_dot (const tgba ∗ *a*, std::ostream & *out*, bool *verbose* = `false`)

6.5.2.20 std::ostream& spot::dump_scc_dot (const scc_map & *m*, std::ostream & *out*, bool *verbose* = `false`)

6.5.2.21 evtgba_explicit∗ spot::evtgba_parse (const std::string & *filename*, evtgba_parse_error_list & *error_list*, bool *debug* = `false`)

Build a spot::evtgba_explicit from a text file.

Parameters

filename The name of the file to parse.

error_list A list that will be filled with parse errors that occured during parsing.

debug When true, causes the parser to trace its execution.

Returns

A pointer to the evtgba built from *filename*, or 0 if the file could not be opened.

Note that the parser usually tries to recover from errors. It can return an non zero value even if it encountered error during the parsing of *filename*. If you want to make sure *filename* was parsed succesfully, check *error_list* for emptiness.

Warning

This function is not reentrant.

6.5.2.22 std::ostream& spot::evtgba_save_reachable (std::ostream & *os*, const evtgba ∗ *g*)

Save reachable states in text format.

6.5.2.23 std::vector<std::vector<sccs_set∗ > >∗ spot::find_paths (tgba ∗ *a*, const scc_map & *m*)

6.5.2.24 bool spot::format_evtgba_parse_errors (std::ostream & *os*, const std::string & *filename*, evtgba_parse_error_list & *error_list*)

Format diagnostics produced by spot::evtgba_parse.

Parameters

os Where diagnostics should be output.

filename The filename that should appear in the diagnostics.

error_list The error list filled by spot::ltl::parse while parsing *ltl_string*.

Returns

`true` iff any diagnostic was output.

6.5.2.25 bdd spot::formula_to_bdd (const ltl::formula ∗ *f*, bdd_dict ∗ *d*, void ∗ *for_me*)

6.5.2.26 bool spot::is_guarantee_automaton (const tgba ∗ *aut*, const scc_map ∗ *sm* = `0`)

Whether an automaton represents a guarantee property.

A weak deterministic TGBA represents a guarantee property if any accepting path ends on an accepting state with only one transition that is a self-loop labelled by true.

Note that in the general case, this is only a sufficient condition : some guarantee automata might not be recognized with this check e.g. because of some non-determinism in the automaton. In that case, you should interpret a `false` return value as "I don't know".

If you apply this function on a weak deterministic TGBA (e.g. after a successful minimization with minimize_obligation()), then the result leaves no doubt: false really means that the automaton is not a guarantee property.

Parameters

aut the automaton to check

sm an scc_map of the automaton if available (it will be built otherwise. If you supply an scc_map you should call build_map() before passing it to this function.

6.5.2.27 bool spot::is_safety_mwdba (const tgba * *aut*)

Whether a minimized WDBA represents a safety property.

A minimized WDBA (as returned by a successful run of minimize_obligation()) represent safety property if it contains only accepting transitions.

Parameters

aut the automaton to check

6.5.2.28 unsigned spot::max_spanning_paths (std::vector< sccs_set * > * *paths*, scc_map & *m*)

6.5.2.29 int spot::memusage ( )

Total number of pages in use by the program.

Returns

The total number of pages in use by the program if known. -1 otherwise.

6.5.2.30 std::ostream& spot::operator<< (std::ostream & *os*, const gspn_exception & *e*)

6.5.2.31 std::ostream& spot::operator<< (std::ostream & *os*, const nips_exception & *e*)

6.5.2.32 std::ostream& spot::saba_dotty_reachable (std::ostream & *os*, const saba * *g*)

Print reachable states in dot format.

6.5.2.33 tgba∗ spot::scc_filter (const tgba ∗ *aut*, bool *remove_all_useless* = `false`)

Prune unaccepting SCCs and remove superfluous acceptance conditions.

This function will explore the SCCs of the automaton and remove dead SCCs (i.e. SCC that are not accepting, and those with no exit path leading to an accepting SCC).

Additionally, this will try to remove useless acceptance conditions. This operation may diminish the number of acceptance condition of the automaton (for instance when two acceptance conditions are always used together we only keep one) but it will never remove all acceptance conditions, even if it would be OK to have zero.

Acceptance conditions on transitions going to non-accepting SCC are all removed. Acceptance conditions going to an accepting SCC and coming from another SCC are only removed if *remove_all_useless* is set. The default value of *remove_all_useless* is `false` because some algorithms (like the degeneralization) will work better if transitions going to an accepting SCC are accepting.

6.5.2.34 void spot::shared_state_deleter (state ∗ *s*) `[inline]`

References spot::state::destroy().

6.5.2.35 std::list<tgba∗> spot::split_tgba (tgba ∗ *a*, const scc_map & *m*, unsigned *split_number*)

6.5.2.36 evtgba_explicit∗ spot::tgba_to_evtgba (const tgba ∗ *a*)

Convert a tgba into an evtgba.

(This cannot be done on-the-fly because the alphabet of a tgba as unknown beforehand.)

6.6 spot::eltl Namespace Reference

Typedefs

- typedef std::pair< std::string, std::string > spair
- typedef std::pair< eltlyy::location, spair > parse_error

  A parse diagnostic <location, <file, message>>.

- typedef std::list< parse_error > parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- formula ∗ parse_file (const std::string &filename, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

Build a formula from a text file.

- formula ∗ parse_string (const std::string &eltl_string, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from an ELTL string.

- bool format_parse_errors (std::ostream &os, parse_error_list &error_list)

  Format diagnostics produced by spot::eltl::parse.

6.7 spot::ltl Namespace Reference

Namespaces

- namespace formula_tree

  Trees representing formulae where atomic propositions are unknown.

Classes

- class atomic_prop

  Atomic propositions.

- class automatop

  Automaton operators.

- class binop

  Binary operator.

- class constant

  A constant (True or False).

- class formula

  An LTL formula.
  The only way you can work with a formula is to build a spot::ltl::visitor or spot::ltl::const_visitor.

- struct formula_ptr_less_than

  Strict Weak Ordering for `const formula*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `const formula*`*.*

- struct formula_ptr_hash

  Hash Function for `const formula*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `const formula*`*.*

- class multop

  Multi-operand operators.
  These operators are considered commutative and associative.

- class nfa

  Nondeterministic Finite Automata used by automata operators.

- class succ_iterator
- class ref_formula

  A reference-counted LTL formula.

- class unop

  Unary operators.

- struct visitor

  Formula visitor that can modify the formula.
  Writing visitors is the prefered way to traverse a formula, since it doesn't involve any cast.

- struct const_visitor

  Formula visitor that cannot modify the formula.

- class declarative_environment

  A declarative environment.
  This environment recognizes all atomic propositions that have been previously declared. It will reject other.

- class default_environment

  A laxist environment.
  This environment recognizes all atomic propositions.

- class environment

  An environment that describes atomic propositions.

- class ltl_file

  Read LTL formulae from a file, one by one.

- class clone_visitor

  Clone a formula.
  This visitor is public, because it's convenient to derive from it and override part of its methods. But if you just want the functionality, consider using spot::ltl::formula::clone instead, it is way faster.

- class language_containment_checker
- class unabbreviate_logic_visitor

  Clone and rewrite a formula to remove most of the abbreviated logical operators.
  This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

- class postfix_visitor

  Apply an algorithm on each node of an AST, during a postfix traversal.
  Override one or more of the postifix_visitor::doit methods with the algorithm to apply.

- class random_ltl

  Generate random LTL formulae.
  This class recursively construct LTL formulae of a given size. The formulae will use the use atomic propositions from the set of proposition passed to the constructor, in addition to the constant and all LTL operators supported by Spot.

- class simplify_f_g_visitor

Replace `true U f` *and* `false R g` *by* `F f` *and* `G g`*.*

- class unabbreviate_ltl_visitor

  Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.
  The rewriting performed on logical operator is the same as the one done by spot::ltl::unabbreviate_logic_visitor.

Typedefs

- typedef std::pair< ltlyy::location, std::string > parse_error

  A parse diagnostic with its location.

- typedef std::list< parse_error > parse_error_list

  A list of parser diagnostics, as filled by parse.

- typedef std::set< atomic_prop ∗, formula_ptr_less_than > atomic_prop_set

  Set of atomic propositions.

Enumerations

- enum reduce_options {

  Reduce_None = 0, Reduce_Basics = 1, Reduce_Syntactic_Implications = 2, Reduce_Eventuality_And_Universality = 4,

  Reduce_Containment_Checks = 8, Reduce_Containment_Checks_Stronger = 16, Reduce_All = -1U
  }

  Options for spot::ltl::reduce.

Functions

- formula ∗ parse (const std::string &ltl_string, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from an LTL string.

- bool format_parse_errors (std::ostream &os, const std::string &ltl_string, parse_error_list &error_list)

  Format diagnostics produced by spot::ltl::parse.

- atomic_prop_set ∗ atomic_prop_collect (const formula ∗f, atomic_prop_set ∗s=0)

  Return the set of atomic propositions occurring in a formula.

- formula ∗ basic_reduce (const formula ∗f)

  Basic rewritings.

- bool is_GF (const formula ∗f)

  Whether a formula starts with GF.

- bool is_FG (const formula ∗f)

  Whether a formula starts with FG.

- formula ∗ clone (const formula ∗f)

  Clone a formula.

- formula ∗ reduce_tau03 (const formula ∗f, bool stronger=true)

  Reduce a formula using language containment relationships.

- void destroy (const formula ∗f)

  Destroys a formula.

- std::ostream & dotty (std::ostream &os, const formula ∗f)

  Write a formula tree using dot's syntax.

- std::ostream & dump (std::ostream &os, const formula ∗f)

  Dump a formula tree.

- int length (const formula ∗f)

  Compute the length of a formula.
  The length of a formula is the number of atomic properties, constants, and operators (logical and temporal) occurring in the formula. spot::ltl::multops count only for 1, even if they have more than two operands (e.g. `a | b | c` *has length 4, because | is represented once internally).*

- formula ∗ unabbreviate_logic (const formula ∗f)

  Clone and rewrite a formula to remove most of the abbreviated logical operators.
  This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

- formula ∗ negative_normal_form (const formula ∗f, bool negated=false)

  Build the negative normal form of f.
  All negations of the formula are pushed in front of the atomic propositions.

- formula ∗ reduce (const formula ∗f, int opt=Reduce_All)

  Reduce a formula f.

- bool is_eventual (const formula ∗f)

  Check whether a formula is a pure eventuality.
  Pure eventuality formulae are defined in.

- bool is_universal (const formula ∗f)

  Check whether a formula is purely universal.
  Purely universal formulae are defined in.

- formula ∗ simplify_f_g (const formula ∗f)

  Replace `true U f` *and* `false R g` *by* `F f` *and* `G g`*.*

- bool syntactic_implication (const formula ∗f1, const formula ∗f2)

  Syntactic implication.
  This comes from.

- bool syntactic_implication_neg (const formula ∗f1, const formula ∗f2, bool right)

  Syntactic implication.
  If right==false, true if !f1 < f2, false otherwise. If right==true, true if f1 < !f2, false otherwise.

- std::ostream & to_string (const formula ∗f, std::ostream &os, bool full_parent=false)

  Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

- std::string to_string (const formula ∗f, bool full_parent=false)

  Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

- std::ostream & to_spin_string (const formula ∗f, std::ostream &os, bool full_parent=false)

  Output a formula as a (parsable by Spin) string.

- std::string to_spin_string (const formula ∗f, bool full_parent=false)

  Convert a formula into a (parsable by Spin) string.

- formula ∗ unabbreviate_ltl (const formula ∗f)

  Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.

6.7.1 Function Documentation

6.7.1.1 formula∗ spot::ltl::reduce_tau03 (const formula ∗ *f*, bool *stronger* = `true`)

Reduce a formula using language containment relationships.

The method is taken from table 4.1 in

```
///@TechReport{   tauriainen.03.a83,
///  author = {Heikki Tauriainen},
///  title = {On Translating Linear Temporal Logic into Alternating and
///   Nondeterministic Automata},
///  institution = {Helsinki University of Technology, Laboratory for
///            Theoretical Computer Science},
///  address = {Espoo, Finland},
///  month = dec,
///  number         = {A83},
///  pages = {132},
///  type = {Research Report},
///  year = {2003},
///  note = {Reprint of Licentiate's thesis}
///}
///
/// (The "dagged" cells in the tables are not handled here.)
///
/// If \a stronger is set, additional rules are used to further
/// reduce some U, R, and X usages.
///
```

6.7.1.2 formula∗ spot::ltl::unabbreviate_ltl (const formula ∗ *f*)

Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.

The rewriting performed on logical operator is the same as the one done by spot::ltl::unabbreviate_logic.

This will also rewrite unary operators such as unop::F, and unop::G, using only binop::U, and binop::R.

6.8 spot::ltl::formula_tree Namespace Reference

Trees representing formulae where atomic propositions are unknown.

Classes

- struct node
- struct node_unop
- struct node_binop
- struct node_multop
- struct node_nfa
- struct node_atomic

Typedefs

- typedef boost::shared_ptr< node > node_ptr

  We use boost::shared_ptr to easily handle deletion.

Enumerations

- enum { True = -1, False = -2 }

  Integer values for True and False used in node_atomic.

Functions

- formula $*$ instanciate (const node_ptr np, const std::vector< formula $*$ > &v)
- size_t arity (const node_ptr np)

  Get the arity.

6.8.1 Detailed Description

Trees representing formulae where atomic propositions are unknown. Forward declaration. NFA's labels are reprensented by nodes which are defined in formula_tree.hh, included in nfa.cc.

6.8.2 Typedef Documentation

6.8.2.1 typedef boost::shared_ptr<node> spot::ltl::formula_tree::node_ptr

We use boost::shared_ptr to easily handle deletion.

6.8.3 Enumeration Type Documentation

6.8.3.1 anonymous enum

Integer values for True and False used in node_atomic.

Enumerator:

- ***True***
- ***False***

6.8.4 Function Documentation

6.8.4.1 size_t spot::ltl::formula_tree::arity (const node_ptr *np*)

Get the arity.

6.8.4.2 formula$*$ spot::ltl::formula_tree::instanciate (const node_ptr *np,* const std::vector$<$ formula $*$ $>$ & *v*)

Instanciate the formula corresponding to the node with atomic propositions taken from *v*.

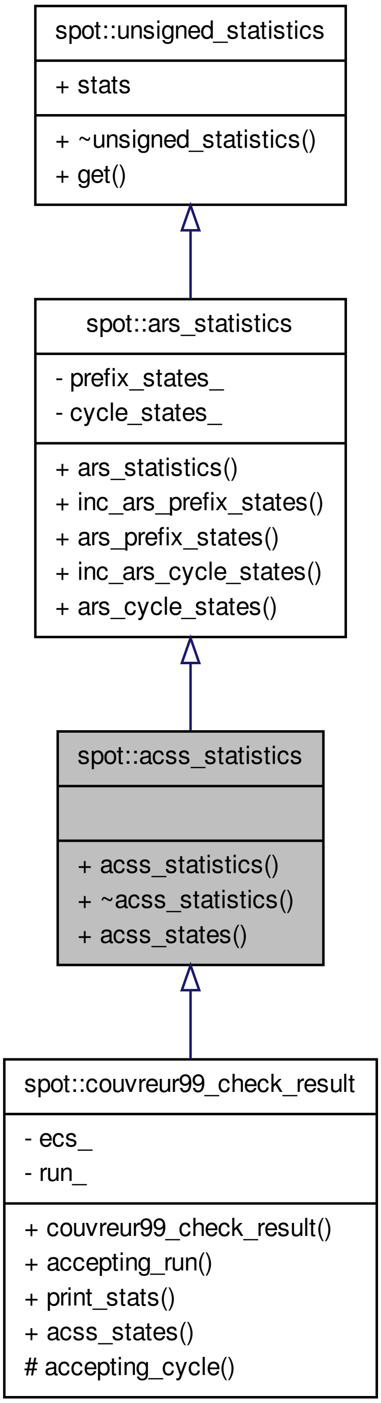
7 Class Documentation

7.1 spot::acss_statistics Class Reference

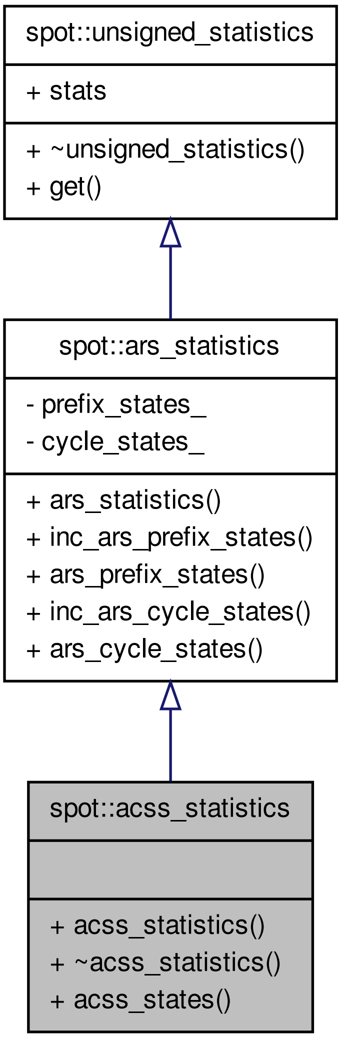
Accepting Cycle Search Space statistics.

`#include <tgbaalgos/emptiness_stats.hh>`

Inheritance diagram for spot::acss_statistics:



Collaboration diagram for spot::acss_statistics:



Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- acss_statistics ()
- virtual ∼acss_statistics ()

- virtual unsigned acss_states () const =0

  Number of states in the search space for the accepting cycle.

- void inc_ars_prefix_states ()
- unsigned ars_prefix_states () const
- void inc_ars_cycle_states ()
- unsigned ars_cycle_states () const
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

7.1.1 Detailed Description

Accepting Cycle Search Space statistics. Implementations of spot::emptiness_check_result may also implement this interface. Try to dynamic_cast the spot::emptiness_check_result pointer to know whether these statistics are available.

7.1.2 Member Typedef Documentation

7.1.2.1 typedef std::map<const char∗, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map `[inherited]`

7.1.2.2 typedef unsigned(unsigned_statistics::∗ spot::unsigned_statistics::unsigned_fun)() const `[inherited]`

7.1.3 Constructor & Destructor Documentation

7.1.3.1 spot::acss_statistics::acss_statistics ( ) `[inline]`

References spot::unsigned_statistics::stats.

7.1.3.2 virtual spot::acss_statistics::∼acss_statistics ( ) `[inline, virtual]`

7.1.4 Member Function Documentation

7.1.4.1 virtual unsigned spot::acss_statistics::acss_states ( ) const `[pure virtual]`

Number of states in the search space for the accepting cycle.

Implemented in spot::couvreur99_check_result.

7.1.4.2 unsigned spot::ars_statistics::ars_cycle_states ( ) const `[inline, inherited]`

References spot::ars_statistics::cycle_states_.

7.1.4.3 unsigned spot::ars_statistics::ars_prefix_states ( ) const `[inline, inherited]`

References spot::ars_statistics::prefix_states_.

7.1.4.4 unsigned spot::unsigned_statistics::get (const char ∗ *str*) const `[inline, inherited]`

References spot::unsigned_statistics::stats.

7.1.4.5 void spot::ars_statistics::inc_ars_cycle_states ( ) `[inline, inherited]`

References spot::ars_statistics::cycle_states_.

7.1.4.6 void spot::ars_statistics::inc_ars_prefix_states ( ) `[inline, inherited]`

References spot::ars_statistics::prefix_states_.

7.1.5 Member Data Documentation

7.1.5.1 stats_map spot::unsigned_statistics::stats `[inherited]`

Referenced by acss_statistics(), spot::ars_statistics::ars_statistics(), spot::ec_statistics::ec_statistics(), spot::unsigned_statistics::get(), and spot::unsigned_statistics_copy::seteq().

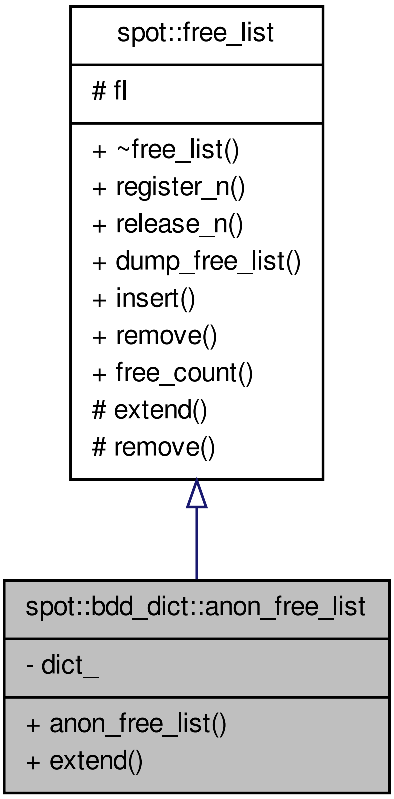
The documentation for this class was generated from the following file:

- tgbaalgos/emptiness_stats.hh

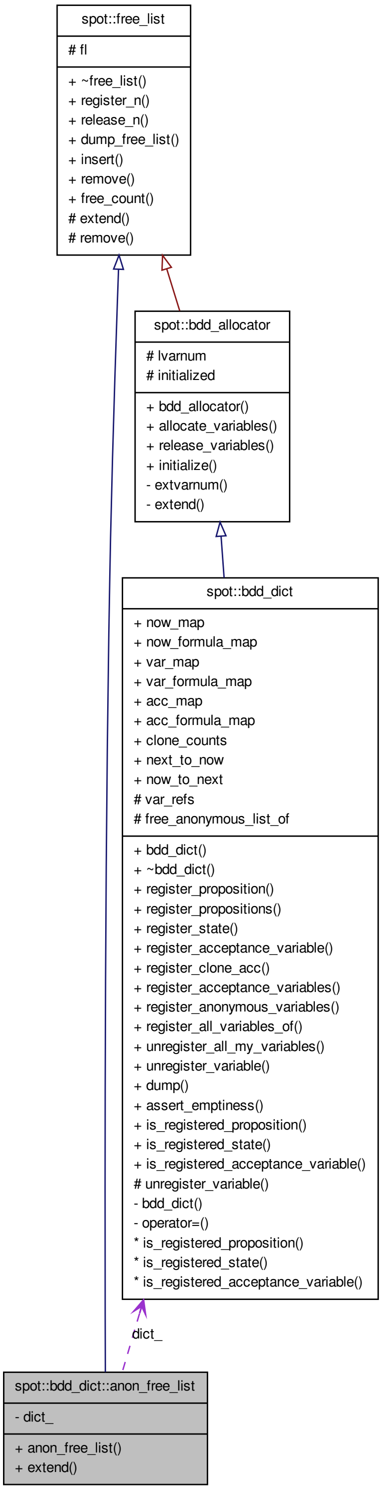
7.2 spot::bdd_dict::anon_free_list Class Reference

`#include <tgba/bdddict.hh>`

Inheritance diagram for spot::bdd_dict::anon_free_list:



Collaboration diagram for spot::bdd_dict::anon_free_list:



Public Member Functions

- anon_free_list (bdd_dict ∗d=0)
- virtual int extend (int n)
- int register_n (int n)

  Find n consecutive integers.

- void release_n (int base, int n)

  Release n consecutive integers starting at base.

- std::ostream & dump_free_list (std::ostream &os) const

  Dump the list to os for debugging.

- void insert (int base, int n)

  Extend the list by inserting a new pos-lenght pair.

- void remove (int base, int n=0)

  Remove n consecutive entries from the list, starting at base.

- int free_count () const

  Return the number of free integers on the list.

Protected Types

- typedef std::pair< int, int > pos_lenght_pair

  Such pairs describe `second` *free integer starting at* `first`*.*

- typedef std::list< pos_lenght_pair > free_list_type

Protected Member Functions

- void remove (free_list_type::iterator i, int base, int n)

  Remove n consecutive entries from the list, starting at base.

Protected Attributes

- free_list_type fl

  Tracks unused BDD variables.

Private Attributes

- bdd_dict ∗ dict_

7.2.1 Member Typedef Documentation

7.2.1.1 typedef std::list<pos_lenght_pair> spot::free_list::free_list_type `[protected, inherited]`

7.2.1.2 typedef std::pair<int, int> spot::free_list::pos_lenght_pair `[protected, inherited]`

Such pairs describe `second` free integer starting at `first`.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 spot::bdd_dict::anon_free_list::anon_free_list (bdd_dict ∗ *d* = *0*)

7.2.3 Member Function Documentation

7.2.3.1 std::ostream& spot::free_list::dump_free_list (std::ostream & *os*) const `[inherited]`

Dump the list to *os* for debugging.

7.2.3.2 virtual int spot::bdd_dict::anon_free_list::extend (int *n*) `[virtual]`

Allocate *n* integer.

This function is called by register_n() when the free list is empty or if *n* consecutive integers could not be found. It should allocate more integers, possibly changing the list, and return the first integer on a range of n consecutive integer requested by the user.

Implements spot::free_list.

7.2.3.3 int spot::free_list::free_count ( ) const `[inherited]`

Return the number of free integers on the list.

7.2.3.4 void spot::free_list::insert (int *base,* int *n*) `[inherited]`

Extend the list by inserting a new pos-lenght pair.

7.2.3.5 int spot::free_list::register_n (int *n*) `[inherited]`

Find *n* consecutive integers.

Browse the list of free integers until *n* consecutive integers are found. Extend the list (using extend()) otherwise.

Returns

the first integer of the range

7.2.3.6 void spot::free_list::release_n (int *base*, int *n*) `[inherited]`

Release *n* consecutive integers starting at *base*.

7.2.3.7 void spot::free_list::remove (int *base*, int *n* = *0*) `[inherited]`

Remove *n* consecutive entries from the list, starting at *base*.

7.2.3.8 void spot::free_list::remove (free_list_type::iterator *i*, int *base*, int *n*) `[protected, inherited]`

Remove *n* consecutive entries from the list, starting at *base*.

7.2.4 Member Data Documentation

7.2.4.1 bdd_dict∗ spot::bdd_dict::anon_free_list::dict_ `[private]`

7.2.4.2 free_list_type spot::free_list::fl `[protected, inherited]`

Tracks unused BDD variables.

The documentation for this class was generated from the following file:

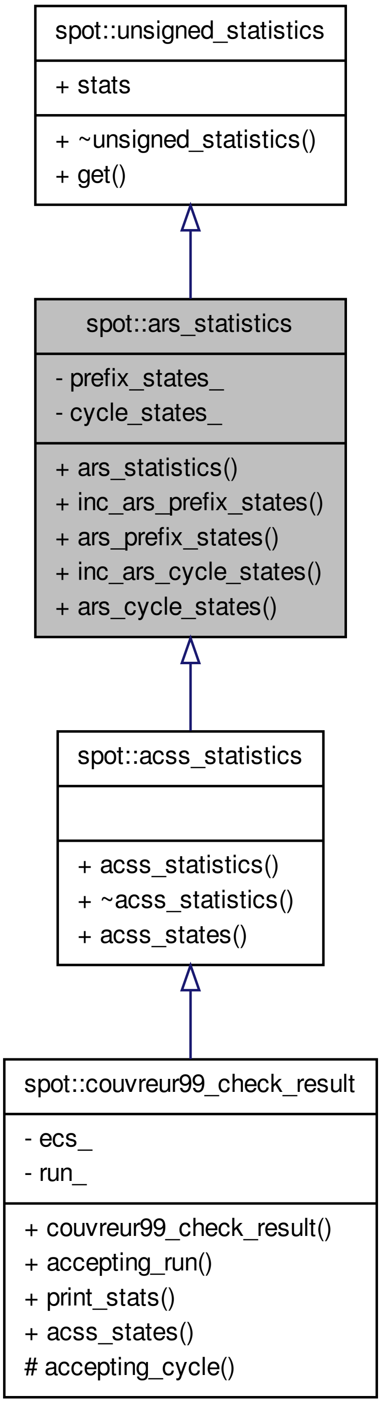
- tgba/bdddict.hh

7.3 spot::ars_statistics Class Reference

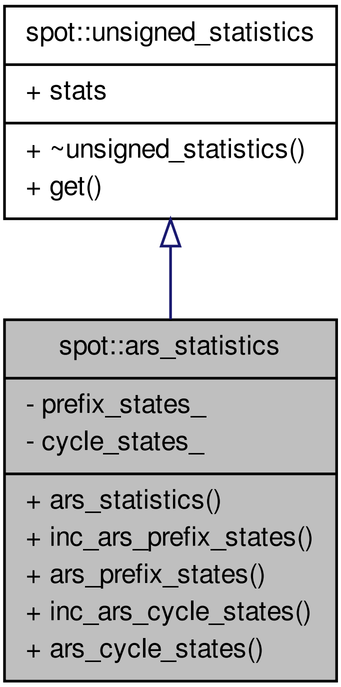
Accepting Run Search statistics.

`#include <tgbaalgos/emptiness_stats.hh>`

Inheritance diagram for spot::ars_statistics:



Collaboration diagram for spot::ars_statistics:



Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- ars_statistics ()
- void inc_ars_prefix_states ()
- unsigned ars_prefix_states () const
- void inc_ars_cycle_states ()
- unsigned ars_cycle_states () const
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

Private Attributes

- unsigned prefix_states_
- unsigned cycle_states_

  states visited to construct the prefix

7.3.1 Detailed Description

Accepting Run Search statistics. Implementations of spot::emptiness_check_result may also implement this interface. Try to dynamic_cast the spot::emptiness_check_result pointer to know whether these statistics are available.

7.3.2 Member Typedef Documentation

7.3.2.1 typedef std::map<const char∗, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map `[inherited]`

7.3.2.2 typedef unsigned(unsigned_statistics::∗ spot::unsigned_statistics::unsigned_fun)() const `[inherited]`

7.3.3 Constructor & Destructor Documentation

7.3.3.1 spot::ars_statistics::ars_statistics ( ) `[inline]`

References spot::unsigned_statistics::stats.

7.3.4 Member Function Documentation

7.3.4.1 unsigned spot::ars_statistics::ars_cycle_states ( ) const `[inline]`

References cycle_states_.

7.3.4.2 unsigned spot::ars_statistics::ars_prefix_states ( ) const `[inline]`

References prefix_states_.

7.3.4.3 unsigned spot::unsigned_statistics::get (const char * *str*) const `[inline, inherited]`

References spot::unsigned_statistics::stats.

7.3.4.4 void spot::ars_statistics::inc_ars_cycle_states ( ) `[inline]`

References cycle_states_.

7.3.4.5 void spot::ars_statistics::inc_ars_prefix_states ( ) `[inline]`

References prefix_states_.

7.3.5 Member Data Documentation

7.3.5.1 unsigned spot::ars_statistics::cycle_states_ `[private]`

states visited to construct the prefix

Referenced by ars_cycle_states(), and inc_ars_cycle_states().

7.3.5.2 unsigned spot::ars_statistics::prefix_states_ `[private]`

Referenced by ars_prefix_states(), and inc_ars_prefix_states().

7.3.5.3 stats_map spot::unsigned_statistics::stats `[inherited]`

Referenced by spot::acss_statistics::acss_statistics(), ars_statistics(), spot::ec_statistics::ec_statistics(), spot::unsigned_statistics::get(), and spot::unsigned_statistics_copy::seteq().

The documentation for this class was generated from the following file:

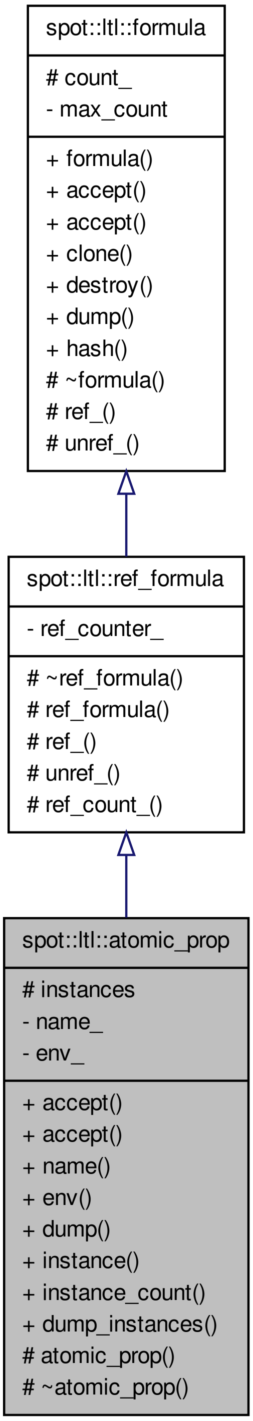
- tgbaalgos/emptiness_stats.hh

7.4 spot::ltl::atomic_prop Class Reference

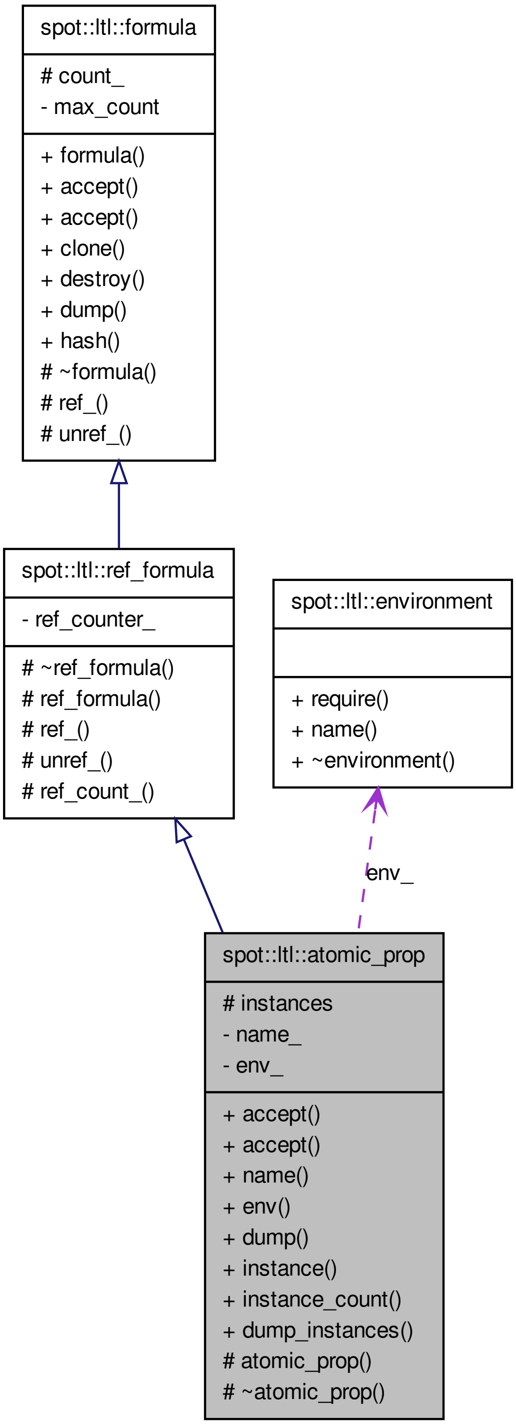
Atomic propositions.

`#include <ltlast/atomic_prop.hh>`

Inheritance diagram for spot::ltl::atomic_prop:



Collaboration diagram for spot::ltl::atomic_prop:



Public Member Functions

- virtual void accept (visitor &visitor)

  Entry point for vspot::ltl::visitor instances.

- virtual void accept (const_visitor &visitor) const

  Entry point for vspot::ltl::const_visitor instances.

- const std::string & name () const

  Get the name of the atomic proposition.

- environment & env () const

  Get the environment of the atomic proposition.

- virtual std::string dump () const

  Return a canonic representation of the atomic proposition.

- formula ∗ clone () const

  clone this node

- void destroy () const

  release this node

- size_t hash () const

  Return a hash key for the formula.

Static Public Member Functions

- static atomic_prop ∗ instance (const std::string &name, environment &env)
- static unsigned instance_count ()

  Number of instantiated atomic propositions. For debugging.

- static std::ostream & dump_instances (std::ostream &os)

  List all instances of atomic propositions. For debugging.

Protected Types

- typedef std::pair< std::string, environment ∗ > pair
- typedef std::map< pair, atomic_prop ∗ > map

Protected Member Functions

- atomic_prop (const std::string &name, environment &env)
- virtual ∼atomic_prop ()
- void ref_ ()

  increment reference counter if any

- bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

- unsigned ref_count_ ()

  Number of references to this formula.

Protected Attributes

- size_t count_

  The hash key of this formula.

Static Protected Attributes

- static map instances

Private Attributes

- std::string name_
- environment ∗ env_

7.4.1 Detailed Description

Atomic propositions.

7.4.2 Member Typedef Documentation

7.4.2.1 typedef std::map<pair, atomic_prop∗> spot::ltl::atomic_prop::map `[protected]`

7.4.2.2 typedef std::pair<std::string, environment∗> spot::ltl::atomic_prop::pair `[protected]`

7.4.3 Constructor & Destructor Documentation

7.4.3.1 spot::ltl::atomic_prop::atomic_prop (const std::string & *name*, environment & *env*) `[protected]`

7.4.3.2 virtual spot::ltl::atomic_prop::∼atomic_prop ( ) `[protected, virtual]`

7.4.4 Member Function Documentation

7.4.4.1 virtual void spot::ltl::atomic_prop::accept (visitor & *v*) `[virtual]`

Entry point for vspot::ltl::visitor instances.

Implements spot::ltl::formula.

7.4.4.2 virtual void spot::ltl::atomic_prop::accept (const_visitor & *v*) const `[virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implements spot::ltl::formula.

7.4.4.3 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.4.4.4 void spot::ltl::formula::destroy ( ) const `[inherited]`

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.4.4.5 virtual std::string spot::ltl::atomic_prop::dump ( ) const `[virtual]`

Return a canonic representation of the atomic proposition.

Implements spot::ltl::formula.

7.4.4.6 static std::ostream& spot::ltl::atomic_prop::dump_instances (std::ostream & *os*) `[static]`

List all instances of atomic propositions. For debugging.

7.4.4.7 environment& spot::ltl::atomic_prop::env ( ) const

Get the environment of the atomic proposition.

7.4.4.8 size_t spot::ltl::formula::hash ( ) const `[inline, inherited]`

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.4.4.9 static atomic_prop∗ spot::ltl::atomic_prop::instance (const std::string & *name*, environment & *env*) `[static]`

Build an atomic proposition with name *name* in environment *env*.

7.4.4.10 static unsigned spot::ltl::atomic_prop::instance_count ( ) `[static]`

Number of instantiated atomic propositions. For debugging.

7.4.4.11 const std::string& spot::ltl::atomic_prop::name ( ) const

Get the name of the atomic proposition.

7.4.4.12 void spot::ltl::ref_formula::ref_ ( ) `[protected, virtual, inherited]`

increment reference counter if any

Reimplemented from spot::ltl::formula.

7.4.4.13 unsigned spot::ltl::ref_formula::ref_count_ ( ) `[protected, inherited]`

Number of references to this formula.

7.4.4.14 bool spot::ltl::ref_formula::unref_ ( ) `[protected, virtual, inherited]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented from spot::ltl::formula.

7.4.5 Member Data Documentation

7.4.5.1 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.4.5.2 environment∗ spot::ltl::atomic_prop::env_ `[private]`

7.4.5.3 map spot::ltl::atomic_prop::instances `[static, protected]`

7.4.5.4 std::string spot::ltl::atomic_prop::name_ `[private]`

The documentation for this class was generated from the following file:

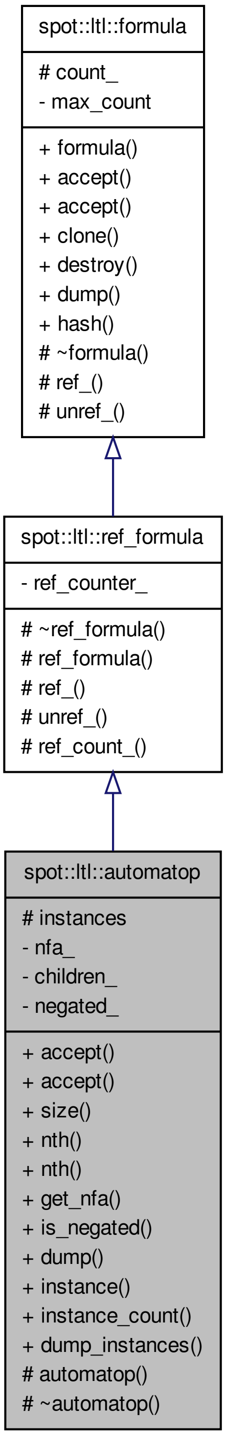
- ltlast/atomic_prop.hh

7.5 spot::ltl::automatop Class Reference

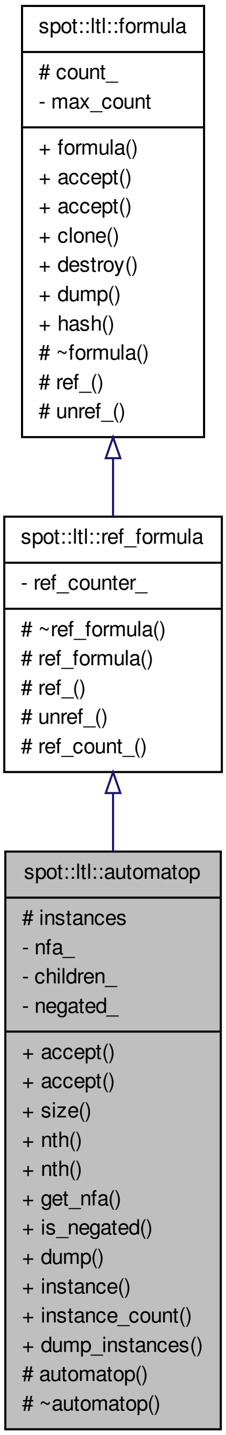
Automaton operators.

`#include <ltlast/automatop.hh>`

Inheritance diagram for spot::ltl::automatop:



Collaboration diagram for spot::ltl::automatop:



Classes

- struct tripletcmp

  Comparison functor used internally by ltl::automatop.

Public Types

- typedef std::vector< formula ∗ > vec

  List of formulae.

Public Member Functions

- virtual void accept (visitor &v)

  Entry point for vspot::ltl::visitor instances.
- virtual void accept (const_visitor &v) const

  Entry point for vspot::ltl::const_visitor instances.
- unsigned size () const

  Get the number of argument.
- const formula ∗ nth (unsigned n) const

  Get the nth argument.
- formula ∗ nth (unsigned n)

  Get the nth argument.
- const spot::ltl::nfa::ptr get_nfa () const

  Get the NFA of this operator.
- bool is_negated () const

  Whether the automaton is negated.
- std::string dump () const

  Return a canonic representation of the atomic proposition.
- formula ∗ clone () const

  clone this node
- void destroy () const

  release this node
- size_t hash () const

  Return a hash key for the formula.

Static Public Member Functions

- static automatop ∗ instance (const nfa::ptr nfa, vec ∗v, bool negated)

  Build a spot::ltl::automatop with many children.

- static unsigned instance_count ()

  Number of instantiated multop operators. For debugging.

- static std::ostream & dump_instances (std::ostream &os)

  Dump all instances. For debugging.

Protected Types

- typedef std::pair< std::pair< nfa::ptr, bool >, vec ∗ > triplet
- typedef std::map< triplet, automatop ∗, tripletcmp > map

Protected Member Functions

- automatop (const nfa::ptr, vec ∗v, bool negated)
- virtual ∼automatop ()
- void ref_ ()

  increment reference counter if any

- bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

- unsigned ref_count_ ()

  Number of references to this formula.

Protected Attributes

- size_t count_

  The hash key of this formula.

Static Protected Attributes

- static map instances

Private Attributes

- const nfa::ptr nfa_
- vec ∗ children_
- bool negated_

7.5.1 Detailed Description

Automaton operators.

7.5.2 Member Typedef Documentation

7.5.2.1 typedef std::map<triplet, automatop∗, tripletcmp> spot::ltl::automatop::map `[protected]`

7.5.2.2 typedef std::pair<std::pair<nfa::ptr, bool>, vec∗> spot::ltl::automatop::triplet `[protected]`

7.5.2.3 typedef std::vector<formula∗> spot::ltl::automatop::vec

List of formulae.

7.5.3 Constructor & Destructor Documentation

7.5.3.1 spot::ltl::automatop::automatop (const nfa::ptr , vec ∗ *v*, bool *negated*) `[protected]`

7.5.3.2 virtual spot::ltl::automatop::∼automatop ( ) `[protected, virtual]`

7.5.4 Member Function Documentation

7.5.4.1 virtual void spot::ltl::automatop::accept (visitor & *v*) `[virtual]`

Entry point for vspot::ltl::visitor instances.

Implements spot::ltl::formula.

7.5.4.2 virtual void spot::ltl::automatop::accept (const_visitor & *v*) const `[virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implements spot::ltl::formula.

7.5.4.3 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.5.4.4 void spot::ltl::formula::destroy ( ) const `[inherited]`

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.5.4.5 std::string spot::ltl::automatop::dump ( ) const `[virtual]`

Return a canonic representation of the atomic proposition.

Implements spot::ltl::formula.

7.5.4.6 static std::ostream& spot::ltl::automatop::dump_instances (std::ostream & *os*) `[static]`

Dump all instances. For debugging.

7.5.4.7 const spot::ltl::nfa::ptr spot::ltl::automatop::get_nfa ( ) const

Get the NFA of this operator.

7.5.4.8 size_t spot::ltl::formula::hash ( ) const `[inline, inherited]`

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.5.4.9 static automatop∗ spot::ltl::automatop::instance (const nfa::ptr *nfa,* vec ∗ *v,* bool *negated*) `[static]`

Build a spot::ltl::automatop with many children.

This vector is acquired by the spot::ltl::automatop class, the caller should allocate it with `new`, but not use it (especially not destroy it) after it has been passed to spot::ltl::automatop.

7.5.4.10 static unsigned spot::ltl::automatop::instance_count ( ) `[static]`

Number of instantiated multop operators. For debugging.

7.5.4.11 bool spot::ltl::automatop::is_negated ( ) const

Whether the automaton is negated.

7.5.4.12 const formula∗ spot::ltl::automatop::nth (unsigned *n*) const

Get the nth argument.

Starting with $n = 0$.

7.5.4.13 formula∗ spot::ltl::automatop::nth (unsigned *n*)

Get the nth argument.

Starting with $n = 0$.

7.5.4.14 void spot::ltl::ref_formula::ref_ ( ) `[protected, virtual, inherited]`

increment reference counter if any

Reimplemented from spot::ltl::formula.

7.5.4.15 unsigned spot::ltl::ref_formula::ref_count_ ( ) `[protected, inherited]`

Number of references to this formula.

7.5.4.16 unsigned spot::ltl::automatop::size ( ) const

Get the number of argument.

7.5.4.17 bool spot::ltl::ref_formula::unref_ ( ) `[protected, virtual, inherited]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented from spot::ltl::formula.

7.5.5 Member Data Documentation

7.5.5.1 vec∗ spot::ltl::automatop::children_ `[private]`

7.5.5.2 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.5.5.3 map spot::ltl::automatop::instances `[static, protected]`

7.5.5.4 bool spot::ltl::automatop::negated_ `[private]`

7.5.5.5 const nfa::ptr spot::ltl::automatop::nfa_ `[private]`

The documentation for this class was generated from the following file:

- ltlast/automatop.hh

7.6 spot::barand< gen > Class Template Reference

Compute pseudo-random integer value between 0 and n included, following a binomial distribution for probability p.

`#include <misc/random.hh>`

Public Member Functions

- barand (int n, double p)
- int rand () const

Protected Attributes

- const int n_
- const double m_
- const double s_

7.6.1 Detailed Description

template<double(*)() gen> class spot::barand< gen >

Compute pseudo-random integer value between 0 and *n* included, following a binomial distribution for probability *p*. *gen* must be a random function computing a pseudo-random double value following a standard normal distribution. Use nrand() or bmrand().

Usually approximating a binomial distribution using a normal distribution and is accurate only if `n*p` and `n*(1-p)` are greater than 5.

7.6.2 Constructor & Destructor Documentation

7.6.2.1 template<double(*)() gen> spot::barand< gen >::barand (int *n*, double *p*) `[inline]`

7.6.3 Member Function Documentation

7.6.3.1 template<double(*)() gen> int spot::barand< gen >::rand ( ) const `[inline]`

References spot::barand< gen >::m_, spot::barand< gen >::n_, and spot::barand< gen >::s_.

7.6.4 Member Data Documentation

7.6.4.1 template<double(*)() gen> const double spot::barand< gen >::m_ `[protected]`

Referenced by spot::barand< gen >::rand().

7.6.4.2 template<double(*)() gen> const int spot::barand< gen >::n_ `[protected]`

Referenced by spot::barand< gen >::rand().

7.6.4.3 template<double(*)() gen> const double spot::barand< gen >::s_ `[protected]`

Referenced by spot::barand< gen >::rand().

The documentation for this class was generated from the following file:

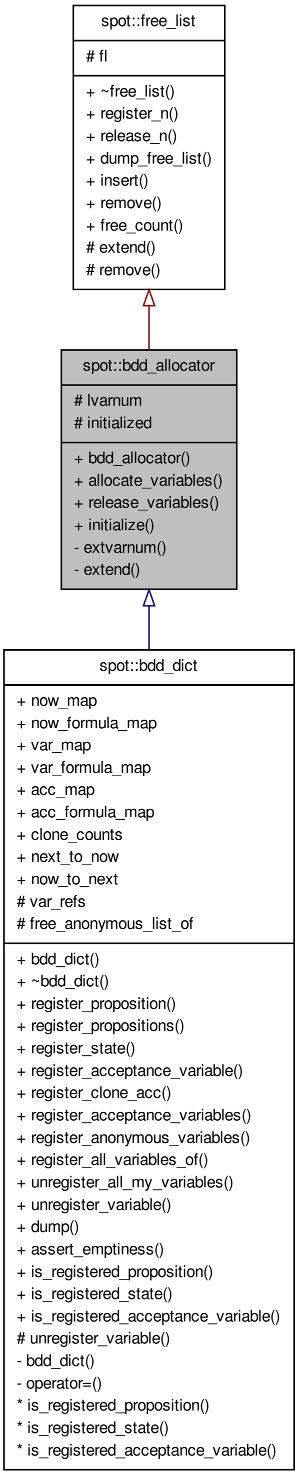
- misc/random.hh

7.7 spot::bdd_allocator Class Reference

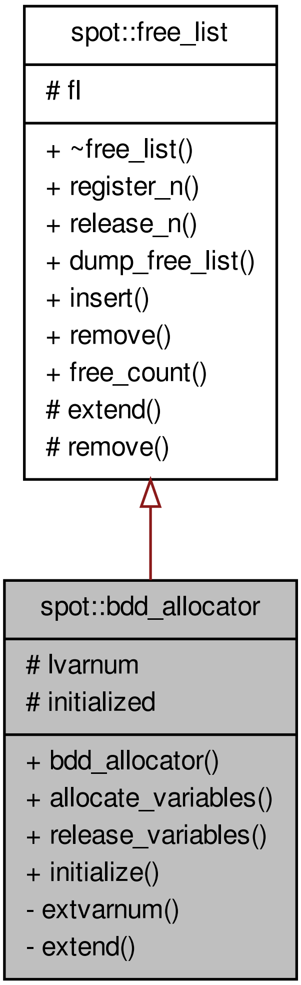
Manage ranges of variables.

`#include <misc/bddalloc.hh>`

Inheritance diagram for spot::bdd_allocator:



Collaboration diagram for spot::bdd_allocator:



Public Member Functions

- bdd_allocator ()

  Default constructor.

- int allocate_variables (int n)

  Allocate n BDD variables.

- void release_variables (int base, int n)

  Release n BDD variables starting at base.

Static Public Member Functions

- static void initialize ()

  Initialize the BDD library.

Protected Attributes

- int lvarnum

  number of variables in use in this allocator.

Static Protected Attributes

- static bool initialized

  Whether the BDD library has been initialized.

Private Types

- typedef std::pair< int, int > pos_lenght_pair

  Such pairs describe `second` *free integer starting at* `first`*.*

- typedef std::list< pos_lenght_pair > free_list_type

Private Member Functions

- void extvarnum (int more)

  Require more variables.

- virtual int extend (int n)
- int register_n (int n)

  Find n consecutive integers.

- void release_n (int base, int n)

  Release n consecutive integers starting at base.

- std::ostream & dump_free_list (std::ostream &os) const

  Dump the list to os for debugging.

- void insert (int base, int n)

  Extend the list by inserting a new pos-lenght pair.

- void remove (int base, int n=0)

  Remove n consecutive entries from the list, starting at base.

- void remove (free_list_type::iterator i, int base, int n)

  Remove n consecutive entries from the list, starting at base.

- int free_count () const

  Return the number of free integers on the list.

Private Attributes

- free_list_type fl

  Tracks unused BDD variables.

7.7.1 Detailed Description

Manage ranges of variables.

7.7.2 Member Typedef Documentation

7.7.2.1 typedef std::list<pos_lenght_pair> spot::free_list::free_list_type `[protected, inherited]`

7.7.2.2 typedef std::pair<int, int> spot::free_list::pos_lenght_pair `[protected, inherited]`

Such pairs describe `second` free integer starting at `first`.

7.7.3 Constructor & Destructor Documentation

7.7.3.1 spot::bdd_allocator::bdd_allocator ( )

Default constructor.

7.7.4 Member Function Documentation

7.7.4.1 int spot::bdd_allocator::allocate_variables (int *n*)

Allocate *n* BDD variables.

7.7.4.2 std::ostream& spot::free_list::dump_free_list (std::ostream & *os*) const `[inherited]`

Dump the list to *os* for debugging.

7.7.4.3 virtual int spot::bdd_allocator::extend (int *n*) `[private, virtual]`

Allocate *n* integer.

This function is called by register_n() when the free list is empty or if *n* consecutive integers could not be found. It should allocate more integers, possibly changing the list, and return the first integer on a range of n consecutive integer requested by the user.

Implements spot::free_list.

7.7.4.4 void spot::bdd_allocator::extvarnum (int *more*) `[private]`

Require more variables.

7.7.4.5 int spot::free_list::free_count ( ) const `[inherited]`

Return the number of free integers on the list.

7.7.4.6 static void spot::bdd_allocator::initialize ( ) `[static]`

Initialize the BDD library.

7.7.4.7 void spot::free_list::insert (int *base,* int *n*) `[inherited]`

Extend the list by inserting a new pos-lenght pair.

7.7.4.8 int spot::free_list::register_n (int *n*) `[inherited]`

Find *n* consecutive integers.

Browse the list of free integers until *n* consecutive integers are found. Extend the list (using extend()) otherwise.

Returns

the first integer of the range

7.7.4.9 void spot::free_list::release_n (int *base,* int *n*) `[inherited]`

Release *n* consecutive integers starting at *base*.

7.7.4.10 void spot::bdd_allocator::release_variables (int *base*, int *n*)

Release *n* BDD variables starting at *base*.

7.7.4.11 void spot::free_list::remove (int *base*, int *n* = *0*) `[inherited]`

Remove *n* consecutive entries from the list, starting at *base*.

7.7.4.12 void spot::free_list::remove (free_list_type::iterator *i*, int *base*, int *n*) `[protected, inherited]`

Remove *n* consecutive entries from the list, starting at *base*.

7.7.5 Member Data Documentation

7.7.5.1 free_list_type spot::free_list::fl `[protected, inherited]`

Tracks unused BDD variables.

7.7.5.2 bool spot::bdd_allocator::initialized `[static, protected]`

Whether the BDD library has been initialized.

7.7.5.3 int spot::bdd_allocator::lvarnum `[protected]`

number of variables in use in this allocator.

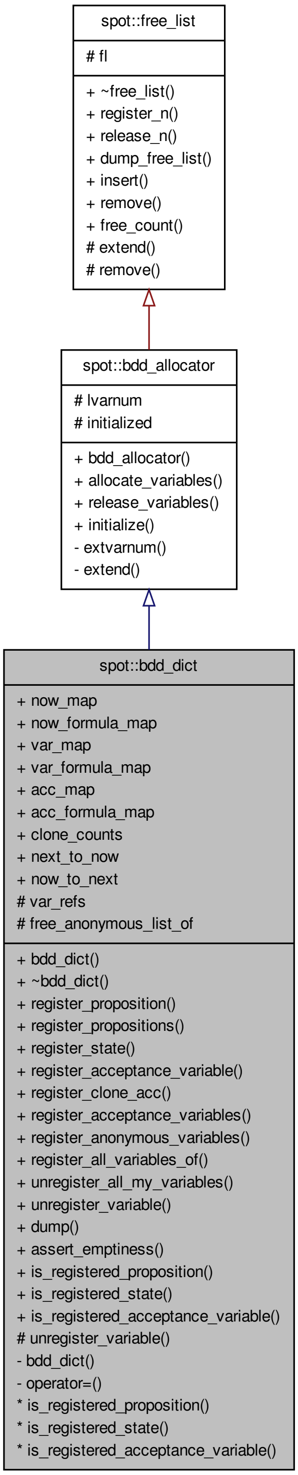
The documentation for this class was generated from the following file:

- misc/bddalloc.hh

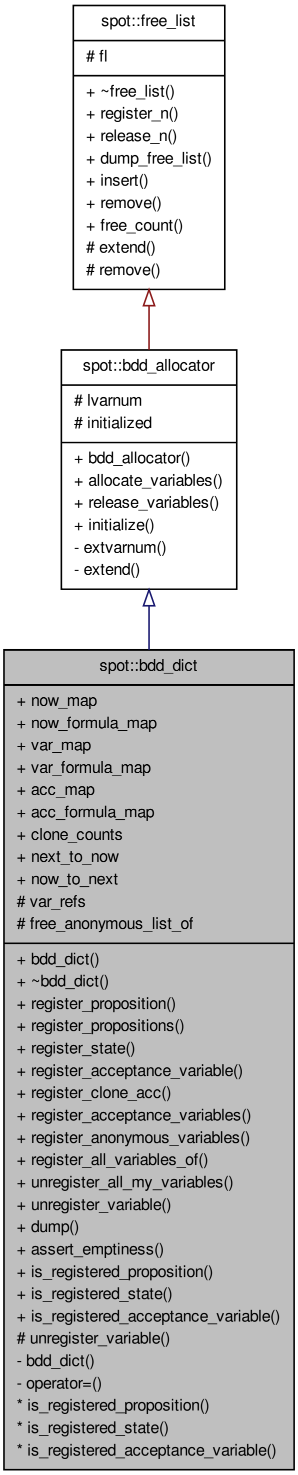
7.8 spot::bdd_dict Class Reference

`#include <tgba/bdddict.hh>`

Inheritance diagram for spot::bdd_dict:



Collaboration diagram for spot::bdd_dict:



Classes

- class anon_free_list

Public Types

- typedef std::map< const ltl::formula ∗, int > fv_map

  Formula-to-BDD-variable maps.

- typedef std::map< int, const ltl::formula ∗ > vf_map

  BDD-variable-to-formula maps.

- typedef std::map< int, int > cc_map

  Clone counts.

Public Member Functions

- bdd_dict ()
- ∼bdd_dict ()
- int register_proposition (const ltl::formula ∗f, const void ∗for_me)

  Register an atomic proposition.

- void register_propositions (bdd f, const void ∗for_me)

  Register BDD variables as atomic propositions.

- int register_state (const ltl::formula ∗f, const void ∗for_me)

  Register a couple of Now/Next variables.

- int register_acceptance_variable (const ltl::formula ∗f, const void ∗for_me)

  Register an atomic proposition.

- int register_clone_acc (int var, const void ∗for_me)

  Clone an acceptance variable VAR for FOR_ME.

- void register_acceptance_variables (bdd f, const void ∗for_me)

  Register BDD variables as acceptance variables.

- int register_anonymous_variables (int n, const void ∗for_me)

  Register anonymous BDD variables.

- void register_all_variables_of (const void ∗from_other, const void ∗for_me)

  Duplicate the variable usage of another object.

- void unregister_all_my_variables (const void ∗me)

  Release all variables used by an object.

- void unregister_variable (int var, const void ∗me)

  Release a variable used by me.

- std::ostream & dump (std::ostream &os) const

  Dump all variables for debugging.

- void assert_emptiness () const

  Make sure the dictionary is empty.

- int allocate_variables (int n)

  Allocate n BDD variables.

- void release_variables (int base, int n)

  Release n BDD variables starting at base.

  - bool is_registered_proposition (const ltl::formula ∗f, const void ∗by_me)
  - bool is_registered_state (const ltl::formula ∗f, const void ∗by_me)
  - bool is_registered_acceptance_variable (const ltl::formula ∗f, const void ∗by_me)

Static Public Member Functions

- static void initialize ()

  Initialize the BDD library.

Public Attributes

- fv_map now_map

  Maps formulae to "Now" BDD variables.

- vf_map now_formula_map

  Maps "Now" BDD variables to formulae.

- fv_map var_map

  Maps atomic propositions to BDD variables.

- vf_map var_formula_map

  Maps BDD variables to atomic propositions.

- fv_map acc_map

  Maps acceptance conditions to BDD variables.

- vf_map acc_formula_map

  Maps BDD variables to acceptance conditions.

- cc_map clone_counts
- bddPair ∗ next_to_now

  Map Next variables to Now variables.

- bddPair ∗ now_to_next

  Map Now variables to Next variables.

Protected Types

- typedef std::set< const void ∗ > ref_set

  BDD-variable reference counts.

- typedef std::map< int, ref_set > vr_map
- typedef std::map< const void ∗, anon_free_list > free_anonymous_list_of_type

  List of unused anonymous variable number for each automaton.

Protected Member Functions

- void unregister_variable (vr_map::iterator &cur, const void ∗me)

Protected Attributes

- vr_map var_refs
- free_anonymous_list_of_type free_anonymous_list_of
- int lvarnum

  number of variables in use in this allocator.

Static Protected Attributes

- static bool initialized

  Whether the BDD library has been initialized.

Private Member Functions

- bdd_dict (const bdd_dict &other)
- bdd_dict & operator= (const bdd_dict &other)

7.8.1 Detailed Description

Map BDD variables to formulae.

7.8.2 Member Typedef Documentation

7.8.2.1 typedef std::map<int, int> spot::bdd_dict::cc_map

Clone counts.

7.8.2.2 typedef std::map<const void∗, anon_free_list> spot::bdd_dict::free_anonymous_list_of_type `[protected]`

List of unused anonymous variable number for each automaton.

7.8.2.3 typedef std::map<const ltl::formula*, int> spot::bdd_dict::fv_map

Formula-to-BDD-variable maps.

7.8.2.4 typedef std::set<const void*> spot::bdd_dict::ref_set `[protected]`

BDD-variable reference counts.

7.8.2.5 typedef std::map<int, const ltl::formula*> spot::bdd_dict::vf_map

BDD-variable-to-formula maps.

7.8.2.6 typedef std::map<int, ref_set> spot::bdd_dict::vr_map `[protected]`

7.8.3 Constructor & Destructor Documentation

7.8.3.1 spot::bdd_dict::bdd_dict ( )

7.8.3.2 spot::bdd_dict::~bdd_dict ( )

7.8.3.3 spot::bdd_dict::bdd_dict (const bdd_dict & *other*) `[private]`

7.8.4 Member Function Documentation

7.8.4.1 int spot::bdd_allocator::allocate_variables (int *n*) `[inherited]`

Allocate *n* BDD variables.

7.8.4.2 void spot::bdd_dict::assert_emptiness ( ) const

Make sure the dictionary is empty.

This will print diagnostics and abort if the dictionary is not empty. Use for debugging.

7.8.4.3 std::ostream& spot::bdd_dict::dump (std::ostream & *os*) const

Dump all variables for debugging.

Parameters

os The output stream.

7.8.4.4 static void spot::bdd_allocator::initialize ( ) `[static, inherited]`

Initialize the BDD library.

7.8.4.5 bool spot::bdd_dict::is_registered_acceptance_variable (const ltl::formula ∗ *f,* const void ∗ *by_me*)

7.8.4.6 bool spot::bdd_dict::is_registered_proposition (const ltl::formula ∗ *f,* const void ∗ *by_me*)

Check whether formula *f* has already been registered by *by_me*.

7.8.4.7 bool spot::bdd_dict::is_registered_state (const ltl::formula ∗ *f,* const void ∗ *by_me*)

7.8.4.8 bdd_dict& spot::bdd_dict::operator= (const bdd_dict & *other*) `[private]`

7.8.4.9 int spot::bdd_dict::register_acceptance_variable (const ltl::formula ∗ *f,* const void ∗ *for_me*)

Register an atomic proposition.

Return (and maybe allocate) a BDD variable designating an acceptance set associated to formula *f*. The *for_me* argument should point to the object using this BDD variable, this is used for reference counting. It is perfectly safe to call this function several time with the same arguments.

Returns

The variable number. Use bdd_ithvar() or bdd_nithvar() to convert this to a BDD.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.8.4.10 void spot::bdd_dict::register_acceptance_variables (bdd *f,* const void ∗ *for_me*)

Register BDD variables as acceptance variables.

Register all variables occurring in *f* as acceptance variables used by *for_me*. This assumes that these acceptance variables are already known from the dictionary (i.e., they have already been registered by register_acceptance_variable() for another automaton).

7.8.4.11 void spot::bdd_dict::register_all_variables_of (const void ∗ *from_other,* const void ∗ *for_me*)

Duplicate the variable usage of another object.

This tells this dictionary that the *for_me* object will be using the same BDD variables as the *from_other* objects. This ensure that the variables won't be freed when *from_other* is deleted if *from_other* is still alive.

7.8.4.12 int spot::bdd_dict::register_anonymous_variables (int *n,* const void ∗ *for_me*)

Register anonymous BDD variables.

Return (and maybe allocate) *n* consecutive BDD variables which will be used only by *for_me*.

Returns

The variable number. Use bdd_ithvar() or bdd_nithvar() to convert this to a BDD.

7.8.4.13 int spot::bdd_dict::register_clone_acc (int *var,* const void ∗ *for_me*)

Clone an acceptance variable VAR for FOR_ME.

This is used in products TGBAs when both operands share the same acceptance variables but they need to be distinguished in the result.

7.8.4.14 int spot::bdd_dict::register_proposition (const ltl::formula ∗ *f,* const void ∗ *for_me*)

Register an atomic proposition.

Return (and maybe allocate) a BDD variable designating formula *f*. The *for_me* argument should point to the object using this BDD variable, this is used for reference counting. It is perfectly safe to call this function several time with the same arguments.

Returns

The variable number. Use bdd_ithvar() or bdd_nithvar() to convert this to a BDD.

7.8.4.15 void spot::bdd_dict::register_propositions (bdd *f*, const void ∗ *for_me*)

Register BDD variables as atomic propositions.

Register all variables occurring in *f* as atomic propositions used by *for_me*. This assumes that these atomic propositions are already known from the dictionary (i.e., they have already been registered by register_proposition() for another automaton).

7.8.4.16 int spot::bdd_dict::register_state (const ltl::formula ∗ *f*, const void ∗ *for_me*)

Register a couple of Now/Next variables.

Return (and maybe allocate) two BDD variables for a state associated to formula *f*. The *for_me* argument should point to the object using this BDD variable, this is used for reference counting. It is perfectly safe to call this function several time with the same arguments.

Returns

> The first variable number. Add one to get the second variable. Use bdd_ithvar() or bdd_nithvar() to convert this to a BDD.

7.8.4.17 void spot::bdd_allocator::release_variables (int *base*, int *n*) `[inherited]`

Release *n* BDD variables starting at *base*.

7.8.4.18 void spot::bdd_dict::unregister_all_my_variables (const void ∗ *me*)

Release all variables used by an object.

Usually called in the destructor if *me*.

7.8.4.19 void spot::bdd_dict::unregister_variable (int *var*, const void ∗ *me*)

Release a variable used by *me*.

7.8.4.20 void spot::bdd_dict::unregister_variable (vr_map::iterator & *cur*, const void ∗ *me*) `[protected]`

7.8.5 Member Data Documentation

7.8.5.1 vf_map spot::bdd_dict::acc_formula_map

Maps BDD variables to acceptance conditions.

7.8.5.2 fv_map spot::bdd_dict::acc_map

Maps acceptance conditions to BDD variables.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.8.5.3 cc_map spot::bdd_dict::clone_counts

7.8.5.4 free_anonymous_list_of_type spot::bdd_dict::free_anonymous_list_of `[protected]`

7.8.5.5 bool spot::bdd_allocator::initialized `[static, protected, inherited]`

Whether the BDD library has been initialized.

7.8.5.6 int spot::bdd_allocator::lvarnum `[protected, inherited]`

number of variables in use in this allocator.

7.8.5.7 bddPair* spot::bdd_dict::next_to_now

Map Next variables to Now variables.

Use with BuDDy's bdd_replace() function.

7.8.5.8 vf_map spot::bdd_dict::now_formula_map

Maps "Now" BDD variables to formulae.

7.8.5.9 fv_map spot::bdd_dict::now_map

Maps formulae to "Now" BDD variables.

7.8.5.10 bddPair∗ spot::bdd_dict::now_to_next

Map Now variables to Next variables.

Use with BuDDy's bdd_replace() function.

7.8.5.11 vf_map spot::bdd_dict::var_formula_map

Maps BDD variables to atomic propositions.

7.8.5.12 fv_map spot::bdd_dict::var_map

Maps atomic propositions to BDD variables.

7.8.5.13 vr_map spot::bdd_dict::var_refs `[protected]`

The documentation for this class was generated from the following file:

- tgba/bdddict.hh

7.9 spot::bdd_less_than Struct Reference

Comparison functor for BDDs.

`#include <misc/bddlt.hh>`

Public Member Functions

- bool operator() (const bdd &left, const bdd &right) const

7.9.1 Detailed Description

Comparison functor for BDDs.

7.9.2 Member Function Documentation

7.9.2.1 bool spot::bdd_less_than::operator() (const bdd & *left,* const bdd & *right*) const `[inline]`

The documentation for this struct was generated from the following file:

- misc/bddlt.hh

7.10 spot::bdd_ordered Class Reference

`#include <tgba/tgbakvcomplement.hh>`

Public Member Functions

- bdd_ordered ()
- bdd_ordered (int bdd_, unsigned order_)
- unsigned order () const
- unsigned & order ()
- bdd get_bdd () const

Private Attributes

- int bdd_
- unsigned order_

7.10.1 Constructor & Destructor Documentation

7.10.1.1 spot::bdd_ordered::bdd_ordered ( ) `[inline]`

7.10.1.2 spot::bdd_ordered::bdd_ordered (int *bdd_,* unsigned *order_*) `[inline]`

7.10.2 Member Function Documentation

7.10.2.1 bdd spot::bdd_ordered::get_bdd ( ) const `[inline]`

References order_.

7.10.2.2 unsigned spot::bdd_ordered::order ( ) const `[inline]`

7.10.2.3 unsigned& spot::bdd_ordered::order ( ) `[inline]`

References order_.

7.10.3 Member Data Documentation

7.10.3.1 int spot::bdd_ordered::bdd_ `[private]`

7.10.3.2 unsigned spot::bdd_ordered::order_ `[private]`

Referenced by get_bdd(), and order().

The documentation for this class was generated from the following file:

- tgba/tgbakvcomplement.hh

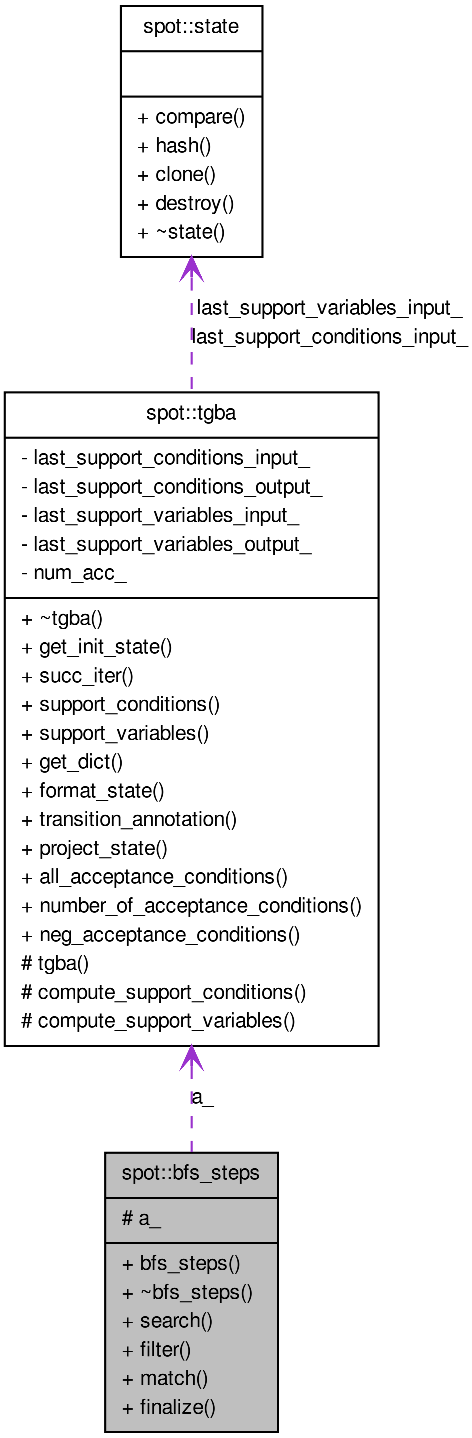
7.11 spot::bfs_steps Class Reference

Make a BFS in a spot::tgba to compute a tgba_run::steps.

This class should be used to compute the shortest path between a state of a spot::tgba and the first transition or state that matches some conditions.

`#include <tgbaalgos/bfssteps.hh>`

Collaboration diagram for spot::bfs_steps:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
a_
spot::bfs_steps
# a_
+ bfs_steps()
+ ~bfs_steps()
+ search()
+ filter()
+ match()
+ finalize()

Public Member Functions

- bfs_steps (const tgba ∗a)
- virtual ∼bfs_steps ()
- const state ∗ search (const state ∗start, tgba_run::steps &l)

  Start the search from start, and append the resulting path (if any) to l.

- virtual const state ∗ filter (const state ∗s)=0

  Return a state∗ that is unique for a.

- virtual bool match (tgba_run::step &step, const state ∗dest)=0

  Whether a new transition completes a path.

- virtual void finalize (const std::map< const state ∗, tgba_run::step, state_ptr_less_than > &father, const tgba_run::step &s, const state ∗start, tgba_run::steps &l)

  Append the resulting path to the resulting run.

Protected Attributes

- const tgba ∗ a_

  The spot::tgba we are searching into.

7.11.1 Detailed Description

Make a BFS in a spot::tgba to compute a tgba_run::steps.

This class should be used to compute the shortest path between a state of a spot::tgba and the first transition or state that matches some conditions. These conditions should be specified by defining bfs_steps::match() in a subclass. Also the search can be restricted to some set of states with a proper definition of bfs_steps::filter().

7.11.2 Constructor & Destructor Documentation

7.11.2.1 spot::bfs_steps::bfs_steps (const tgba ∗ *a*)

7.11.2.2 virtual spot::bfs_steps::∼bfs_steps ( ) `[virtual]`

7.11.3 Member Function Documentation

7.11.3.1 virtual const state∗ spot::bfs_steps::filter (const state ∗ *s*) `[pure virtual]`

Return a state∗ that is unique for *a*.

bfs_steps does not do handle the memory for the states it generates, this is the job of filter(). Here *s* is a new state∗ that search() has just allocated (using tgba_succ_iterator::current_state()), and the return of this function should be a state∗ that does not need to be freed by search().

If you already have a map or a set which uses states as keys, you should probably arrange for filter() to return these keys, and destroy *s*. Otherwise you will have to define such a set, just to be able to destroy all the state∗ in a subclass.

This function can return 0 if the given state should not be explored.

7.11.3.2 virtual void spot::bfs_steps::finalize (const std::map< const state ∗, tgba_run::step, state_ptr_less_than > & *father*, const tgba_run::step & *s*, const state ∗ *start*, tgba_run::steps & *l*) `[virtual]`

Append the resulting path to the resulting run.

This is called after match() has returned true, to append the resulting path to *l*. This seldom needs to be overridden, unless you do not want *l* to be updated (in which case an empty finalize() will do).

7.11.3.3 virtual bool spot::bfs_steps::match (tgba_run::step & *step*, const state ∗ *dest*) `[pure virtual]`

Whether a new transition completes a path.

This function is called immediately after each call to filter() that does not return 0.

Parameters

step	the source state (as returned by filter()), and the labels of the outgoing transition
dest	the destination state (as returned by filter())

Returns

true iff a path that included this step should be accepted.

The search() algorithms stops as soon as match() returns true, and when this happens the list argument of search() is be augmented with the shortest past that ends with this transition.

7.11.3.4 const state∗ spot::bfs_steps::search (const state ∗ *start*, tgba_run::steps & *l*)

Start the search from *start*, and append the resulting path (if any) to *l*.

Returns

the destination state of the last step (not included in *l*) if a matching path was found, or 0 otherwise.

7.11.4 Member Data Documentation

7.11.4.1 const tgba∗ spot::bfs_steps::a_ `[protected]`

The spot::tgba we are searching into.

The documentation for this class was generated from the following file:

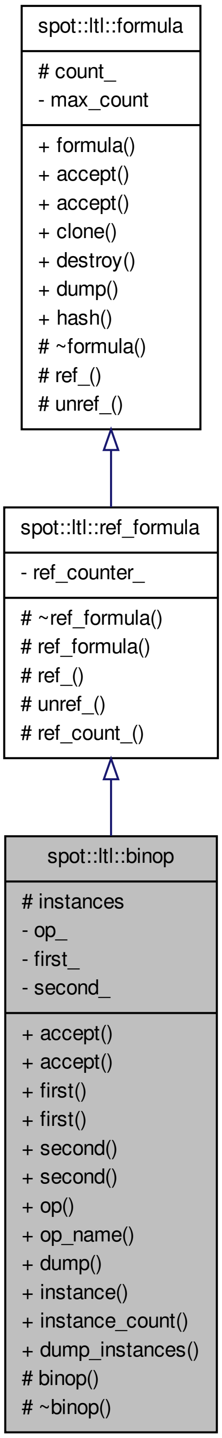
- tgbaalgos/bfssteps.hh

7.12 spot::ltl::binop Class Reference

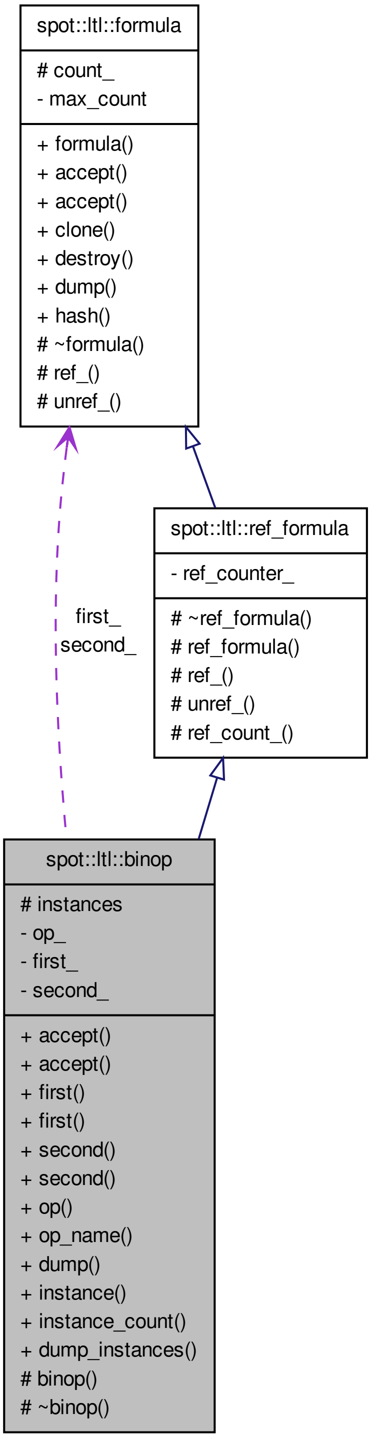
Binary operator.

`#include <ltlast/binop.hh>`

Inheritance diagram for spot::ltl::binop:



Collaboration diagram for spot::ltl::binop:



Public Types

- enum type {
  Xor, Implies, Equiv, U,
  R, W, M }

Public Member Functions

- virtual void accept (visitor &v)

  Entry point for vspot::ltl::visitor instances.

- virtual void accept (const_visitor &v) const

  Entry point for vspot::ltl::const_visitor instances.

- const formula ∗ first () const

  Get the first operand.

- formula ∗ first ()

  Get the first operand.

- const formula ∗ second () const

  Get the second operand.

- formula ∗ second ()

  Get the second operand.

- type op () const

  Get the type of this operator.

- const char ∗ op_name () const

  Get the type of this operator, as a string.

- virtual std::string dump () const

  Return a canonic representation of the atomic proposition.

- formula ∗ clone () const

  clone this node

- void destroy () const

  release this node

- size_t hash () const

  Return a hash key for the formula.

Static Public Member Functions

- static binop ∗ instance (type op, formula ∗first, formula ∗second)
- static unsigned instance_count ()

  Number of instantiated binary operators. For debugging.

- static std::ostream & dump_instances (std::ostream &os)

  Dump all instances. For debugging.

Protected Types

- typedef std::pair< formula ∗, formula ∗ > pairf
- typedef std::pair< type, pairf > pair
- typedef std::map< pair, binop ∗ > map

Protected Member Functions

- binop (type op, formula ∗first, formula ∗second)
- virtual ∼binop ()
- void ref_ ()

  increment reference counter if any

- bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

- unsigned ref_count_ ()

  Number of references to this formula.

Protected Attributes

- size_t count_

  The hash key of this formula.

Static Protected Attributes

- static map instances

Private Attributes

- type op_
- formula ∗ first_
- formula ∗ second_

7.12.1 Detailed Description

Binary operator.

7.12.2 Member Typedef Documentation

7.12.2.1 typedef std::map<pair, binop*> spot::ltl::binop::map `[protected]`

7.12.2.2 typedef std::pair<type, pairf> spot::ltl::binop::pair `[protected]`

7.12.2.3 typedef std::pair<formula*, formula*> spot::ltl::binop::pairf `[protected]`

7.12.3 Member Enumeration Documentation

7.12.3.1 enum spot::ltl::binop::type

Different kinds of binary opertaors

And and Or are not here. Because they are often nested we represent them as multops.

Enumerator:

- ***Xor***
- ***Implies***
- ***Equiv***
- ***U***
- ***R***
- ***W***
- ***M***

7.12.4 Constructor & Destructor Documentation

7.12.4.1 spot::ltl::binop::binop (type *op,* formula * *first,* formula * *second*) `[protected]`

7.12.4.2 virtual spot::ltl::binop::∼binop ( ) `[protected, virtual]`

7.12.5 Member Function Documentation

7.12.5.1 virtual void spot::ltl::binop::accept (visitor & *v*) `[virtual]`

Entry point for vspot::ltl::visitor instances.

Implements spot::ltl::formula.

7.12.5.2 virtual void spot::ltl::binop::accept (const_visitor & *v*) const `[virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implements spot::ltl::formula.

7.12.5.3 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.12.5.4 void spot::ltl::formula::destroy ( ) const `[inherited]`

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.12.5.5 virtual std::string spot::ltl::binop::dump ( ) const `[virtual]`

Return a canonic representation of the atomic proposition.

Implements spot::ltl::formula.

7.12.5.6 static std::ostream& spot::ltl::binop::dump_instances (std::ostream & *os*) `[static]`

Dump all instances. For debugging.

7.12.5.7 const formula∗ spot::ltl::binop::first ( ) const

Get the first operand.

7.12.5.8 formula∗ spot::ltl::binop::first ( )

Get the first operand.

7.12.5.9 size_t spot::ltl::formula::hash ( ) const `[inline, inherited]`

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.12.5.10 static binop∗ spot::ltl::binop::instance (type *op,* formula ∗ *first,* formula ∗ *second*) `[static]`

Build an unary operator with operation *op* and children *first* and *second*.

7.12.5.11 static unsigned spot::ltl::binop::instance_count ( ) `[static]`

Number of instantiated binary operators. For debugging.

7.12.5.12 type spot::ltl::binop::op ( ) const

Get the type of this operator.

7.12.5.13 const char∗ spot::ltl::binop::op_name ( ) const

Get the type of this operator, as a string.

7.12.5.14 void spot::ltl::ref_formula::ref_ ( ) `[protected, virtual, inherited]`

increment reference counter if any

Reimplemented from spot::ltl::formula.

7.12.5.15 unsigned spot::ltl::ref_formula::ref_count_ ( ) `[protected, inherited]`

Number of references to this formula.

7.12.5.16 const formula∗ spot::ltl::binop::second ( ) const

Get the second operand.

7.12.5.17 formula∗ spot::ltl::binop::second ( )

Get the second operand.

7.12.5.18 bool spot::ltl::ref_formula::unref_ ( ) `[protected, virtual, inherited]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented from spot::ltl::formula.

7.12.6 Member Data Documentation

7.12.6.1 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.12.6.2 formula∗ spot::ltl::binop::first_ `[private]`

7.12.6.3 map spot::ltl::binop::instances `[static, protected]`

7.12.6.4 type spot::ltl::binop::op_ `[private]`

7.12.6.5 formula∗ spot::ltl::binop::second_ `[private]`

The documentation for this class was generated from the following file:

- ltlast/binop.hh

7.13 spot::char_ptr_less_than Struct Reference

Strict Weak Ordering for `char*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `const char*`.

`#include <misc/ltstr.hh>`

Public Member Functions

- bool operator() (const char *left, const char *right) const

7.13.1 Detailed Description

Strict Weak Ordering for `char*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `const char*`. For instance here is how one could declare a map of `const state*`.

```
std::map<const char*, int, spot::state_ptr_less_than> seen;
```

7.13.2 Member Function Documentation

7.13.2.1 bool spot::char_ptr_less_than::operator() (const char * *left*, const char * *right*) const `[inline]`

The documentation for this struct was generated from the following file:

- misc/ltstr.hh

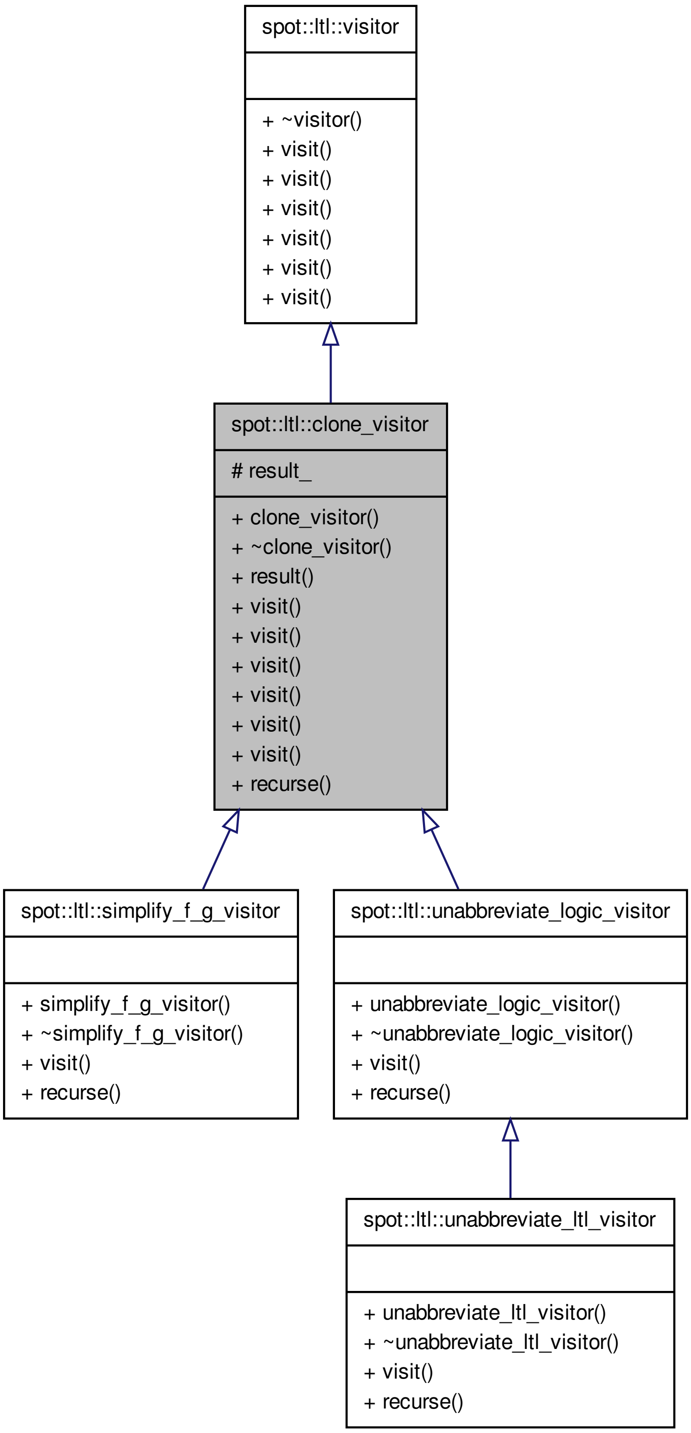
7.14 spot::ltl::clone_visitor Class Reference

Clone a formula.

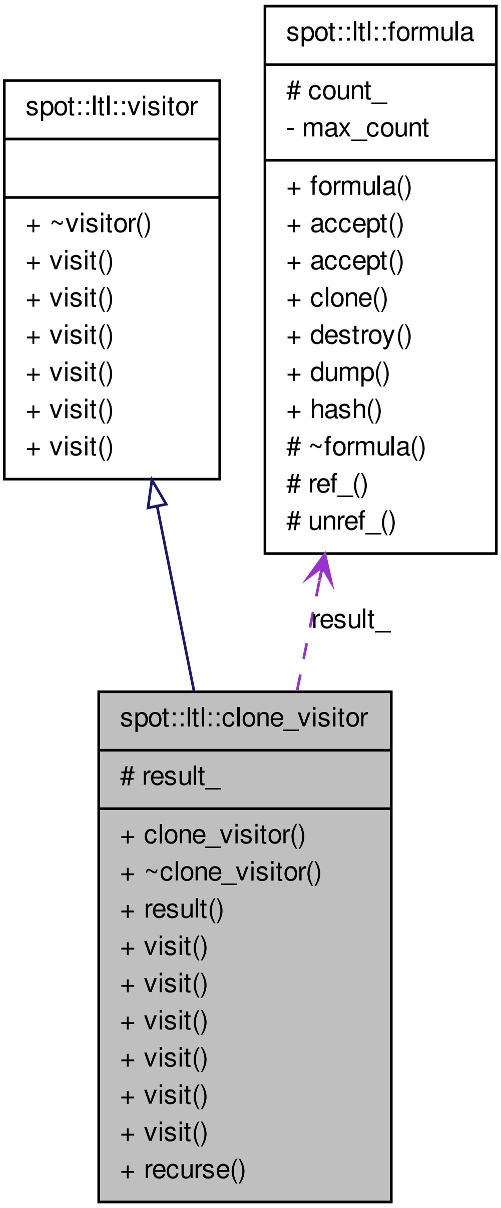
This visitor is public, because it's convenient to derive from it and override part of its methods. But if you just want the functionality, consider using spot::ltl::formula::clone instead, it is way faster.

`#include <ltlvisit/clone.hh>`

Inheritance diagram for spot::ltl::clone_visitor:



Collaboration diagram for spot::ltl::clone_visitor:



Public Member Functions

- clone_visitor ()
- virtual ∼clone_visitor ()
- formula ∗ result () const

- void visit (atomic_prop *ap)
- void visit (unop *uo)
- void visit (binop *bo)
- void visit (automatop *mo)
- void visit (multop *mo)
- void visit (constant *c)
- virtual formula * recurse (formula *f)

Protected Attributes

- formula * result_

7.14.1 Detailed Description

Clone a formula.

This visitor is public, because it's convenient to derive from it and override part of its methods. But if you just want the functionality, consider using spot::ltl::formula::clone instead, it is way faster.

7.14.2 Constructor & Destructor Documentation

7.14.2.1 spot::ltl::clone_visitor::clone_visitor ( )

7.14.2.2 virtual spot::ltl::clone_visitor::~clone_visitor ( ) `[virtual]`

7.14.3 Member Function Documentation

7.14.3.1 virtual formula* spot::ltl::clone_visitor::recurse (formula * *f*) `[virtual]`

Reimplemented in spot::ltl::unabbreviate_logic_visitor, spot::ltl::simplify_f_g_visitor, and spot::ltl::unabbreviate_ltl_visitor.

7.14.3.2 formula* spot::ltl::clone_visitor::result ( ) const

7.14.3.3 void spot::ltl::clone_visitor::visit (constant * *c*) `[virtual]`

Implements spot::ltl::visitor.

7.14.3.4 void spot::ltl::clone_visitor::visit (multop $*$ *mo*) `[virtual]`

Implements spot::ltl::visitor.

7.14.3.5 void spot::ltl::clone_visitor::visit (automatop $*$ *mo*) `[virtual]`

Implements spot::ltl::visitor.

7.14.3.6 void spot::ltl::clone_visitor::visit (atomic_prop $*$ *ap*) `[virtual]`

Implements spot::ltl::visitor.

7.14.3.7 void spot::ltl::clone_visitor::visit (unop $*$ *uo*) `[virtual]`

Implements spot::ltl::visitor.

Reimplemented in spot::ltl::unabbreviate_ltl_visitor.

7.14.3.8 void spot::ltl::clone_visitor::visit (binop $*$ *bo*) `[virtual]`

Implements spot::ltl::visitor.

Reimplemented in spot::ltl::unabbreviate_logic_visitor, and spot::ltl::simplify_f_g_visitor.

7.14.4 Member Data Documentation

7.14.4.1 formula$*$ spot::ltl::clone_visitor::result_ `[protected]`

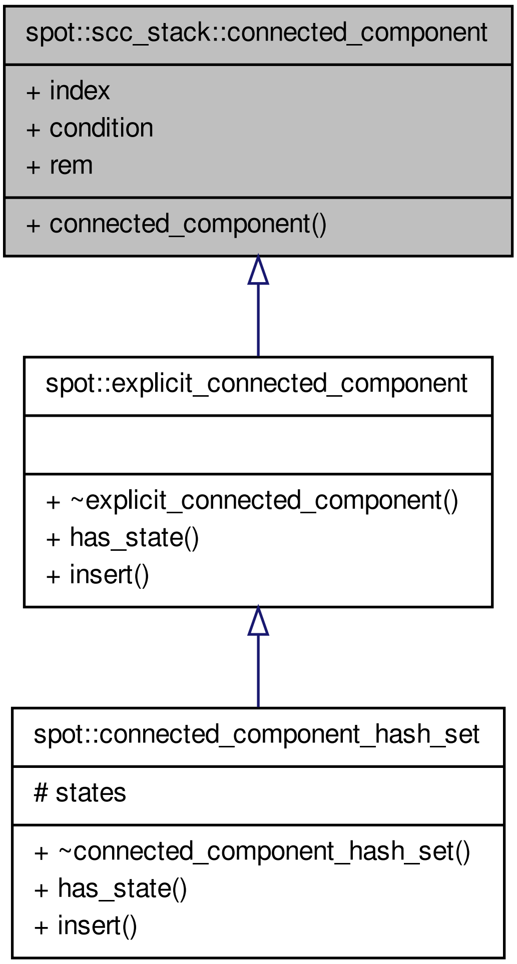
The documentation for this class was generated from the following file:

- ltlvisit/clone.hh

7.15 spot::scc_stack::connected_component Struct Reference

`#include <tgbaalgos/gtec/sccstack.hh>`

Inheritance diagram for spot::scc_stack::connected_component:


spot::scc_stack::connected_component
+ index
+ condition
+ rem
+ connected_component()
spot::explicit_connected_component
+ ~explicit_connected_component()
+ has_state()
+ insert()
spot::connected_component_hash_set
# states
+ ~connected_component_hash_set()
+ has_state()
+ insert()

Public Member Functions

- connected_component (int index=-1)

Public Attributes

- int index

  Index of the SCC.

- bdd condition
- std::list< const state ∗ > rem

7.15.1 Constructor & Destructor Documentation

7.15.1.1 spot::scc_stack::connected_component::connected_component (int *index* = `-1`)

7.15.2 Member Data Documentation

7.15.2.1 bdd spot::scc_stack::connected_component::condition

The bdd condition is the union of all acceptance conditions of transitions which connect the states of the connected component.

7.15.2.2 int spot::scc_stack::connected_component::index

Index of the SCC.

7.15.2.3 std::list<const state*> spot::scc_stack::connected_component::rem

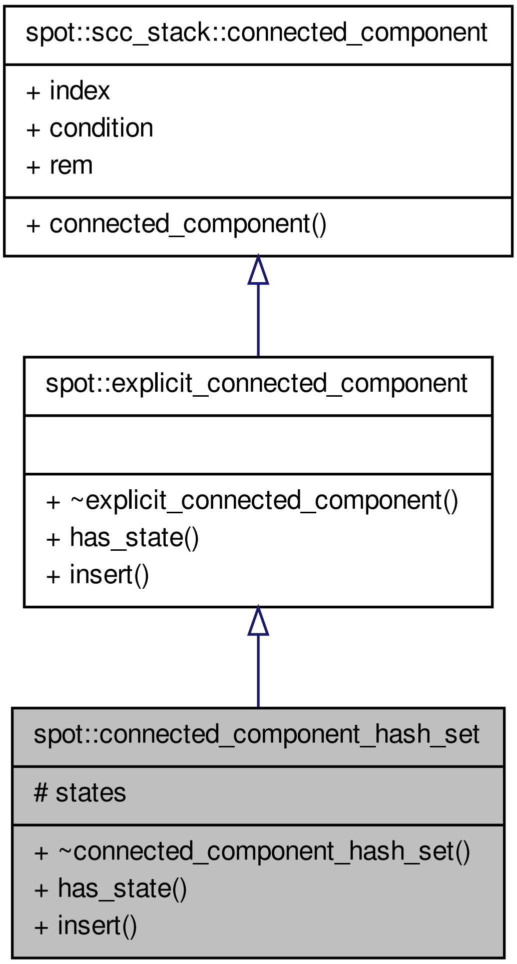
The documentation for this struct was generated from the following file:

- tgbaalgos/gtec/sccstack.hh

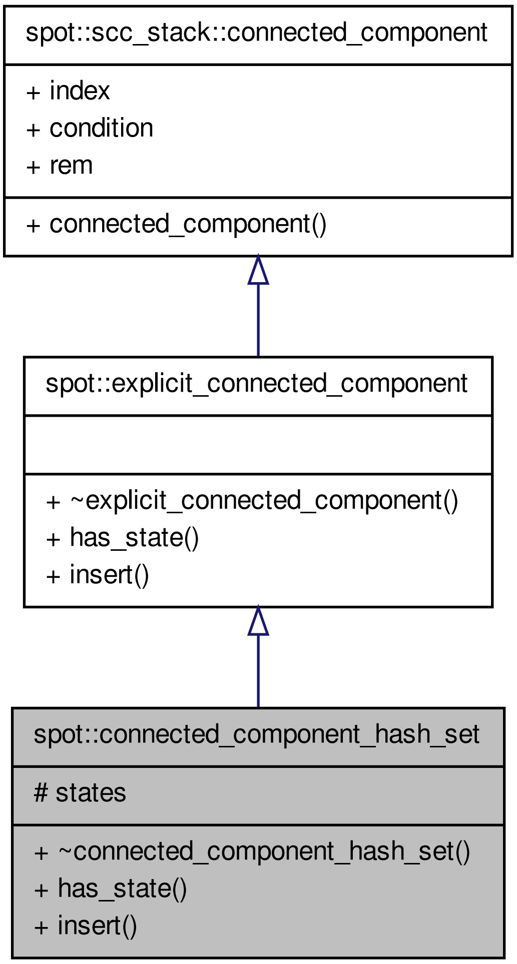
7.16 spot::connected_component_hash_set Class Reference

`#include <tgbaalgos/gtec/explscc.hh>`

Inheritance diagram for spot::connected_component_hash_set:


spot::scc_stack::connected_component
+ index
+ condition
+ rem
+ connected_component()
spot::explicit_connected_component
+ ~explicit_connected_component()
+ has_state()
+ insert()
spot::connected_component_hash_set
# states
+ ~connected_component_hash_set()
+ has_state()
+ insert()

Collaboration diagram for spot::connected_component_hash_set:


spot::scc_stack::connected_component
+ index
+ condition
+ rem
+ connected_component()
spot::explicit_connected_component
+ ~explicit_connected_component()
+ has_state()
+ insert()
spot::connected_component_hash_set
# states
+ ~connected_component_hash_set()
+ has_state()
+ insert()

Public Member Functions

- virtual ∼connected_component_hash_set ()
- virtual const state ∗ has_state (const state ∗s) const

  Check if the SCC contains states s.

- virtual void insert (const state ∗s)

  Insert a new state in the SCC.

Public Attributes

- int index

  Index of the SCC.

- bdd condition
- std::list< const state ∗ > rem

Protected Types

- typedef Sgi::hash_set< const state ∗, state_ptr_hash, state_ptr_equal > set_type

Protected Attributes

- set_type states

7.16.1 Detailed Description

A straightforward implementation of explicit_connected_component using a hash.

7.16.2 Member Typedef Documentation

7.16.2.1 typedef Sgi::hash_set<const state∗, state_ptr_hash, state_ptr_equal> spot::connected_component_hash_set::set_type `[protected]`

7.16.3 Constructor & Destructor Documentation

7.16.3.1 virtual spot::connected_component_hash_set::∼connected_component_hash_set ( ) `[inline, virtual]`

7.16.4 Member Function Documentation

7.16.4.1 virtual const state∗ spot::connected_component_hash_set::has_state (const state ∗ *s*) const `[virtual]`

Check if the SCC contains states *s*.

Return the representative of *s* in the SCC, and destroy *s* if it is different (acting like numbered_state_heap::filter), or 0 otherwise.

Implements spot::explicit_connected_component.

7.16.4.2 virtual void spot::connected_component_hash_set::insert (const state ∗ *s*) `[virtual]`

Insert a new state in the SCC.

Implements spot::explicit_connected_component.

7.16.5 Member Data Documentation

7.16.5.1 bdd spot::scc_stack::connected_component::condition `[inherited]`

The bdd condition is the union of all acceptance conditions of transitions which connect the states of the connected component.

7.16.5.2 int spot::scc_stack::connected_component::index `[inherited]`

Index of the SCC.

7.16.5.3 std::list<const state∗> spot::scc_stack::connected_component::rem `[inherited]`

7.16.5.4 set_type spot::connected_component_hash_set::states `[protected]`

The documentation for this class was generated from the following file:

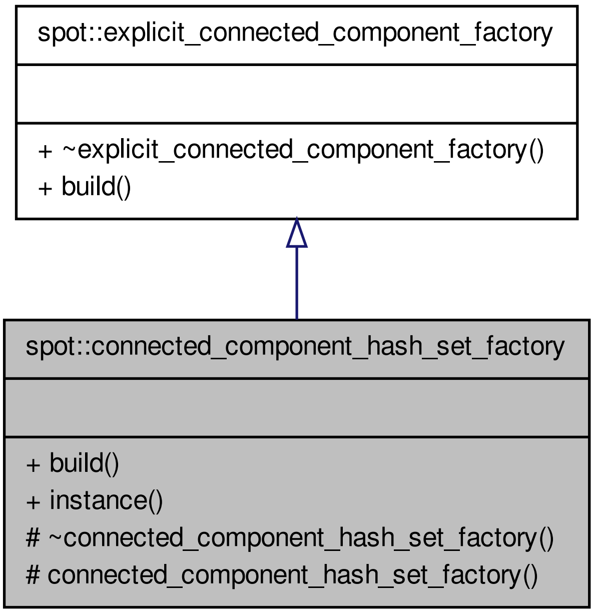
- tgbaalgos/gtec/explscc.hh

7.17 spot::connected_component_hash_set_factory Class Reference

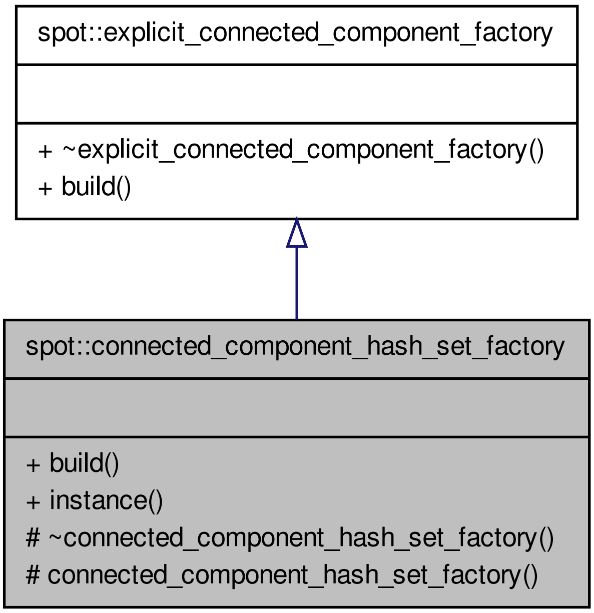
Factory for connected_component_hash_set.

`#include <tgbaalgos/gtec/explscc.hh>`

Inheritance diagram for spot::connected_component_hash_set_factory:


spot::explicit_connected_component_factory
+ ~explicit_connected_component_factory()
+ build()
spot::connected_component_hash_set_factory
+ build()
+ instance()
# ~connected_component_hash_set_factory()
# connected_component_hash_set_factory()

Collaboration diagram for spot::connected_component_hash_set_factory:


spot::explicit_connected_component_factory
+ ~explicit_connected_component_factory()
+ build()
spot::connected_component_hash_set_factory
+ build()
+ instance()
# ~connected_component_hash_set_factory()
# connected_component_hash_set_factory()

Public Member Functions

- virtual connected_component_hash_set ∗ build () const

  Create an explicit_connected_component.

Static Public Member Functions

- static const connected_component_hash_set_factory ∗ instance ()

  Get the unique instance of this class.

Protected Member Functions

- virtual ~connected_component_hash_set_factory ()
- connected_component_hash_set_factory ()

  Construction is forbiden.

7.17.1 Detailed Description

Factory for connected_component_hash_set. This class is a singleton. Retrieve the instance using instance().

7.17.2 Constructor & Destructor Documentation

7.17.2.1 virtual spot::connected_component_hash_set_factory::∼connected_component_hash_set_factory ( ) `[inline, protected, virtual]`

7.17.2.2 spot::connected_component_hash_set_factory::connected_component_hash_set_factory ( ) `[protected]`

Construction is forbiden.

7.17.3 Member Function Documentation

7.17.3.1 virtual connected_component_hash_set∗ spot::connected_component_hash_set_factory::build ( ) const `[virtual]`

Create an explicit_connected_component.

Implements spot::explicit_connected_component_factory.

7.17.3.2 static const connected_component_hash_set_factory∗ spot::connected_component_hash_set_factory::instance ( ) `[static]`

Get the unique instance of this class.

The documentation for this class was generated from the following file:

- tgbaalgos/gtec/explscc.hh

7.18 spot::ltl::const_visitor Struct Reference

Formula visitor that cannot modify the formula.

`#include <ltlast/visitor.hh>`

Public Member Functions

- virtual ∼const_visitor ()
- virtual void visit (const atomic_prop ∗node)=0

- virtual void visit (const constant ∗node)=0
- virtual void visit (const binop ∗node)=0
- virtual void visit (const unop ∗node)=0
- virtual void visit (const multop ∗node)=0
- virtual void visit (const automatop ∗node)=0

7.18.1 Detailed Description

Formula visitor that cannot modify the formula. Writing visitors is the prefered way to traverse a formula, since it doesn't involve any cast.

If you want to modify the visited formula, inherit from spot::ltl:visitor instead.

7.18.2 Constructor & Destructor Documentation

7.18.2.1 virtual spot::ltl::const_visitor::∼const_visitor ( ) `[inline, virtual]`

7.18.3 Member Function Documentation

7.18.3.1 virtual void spot::ltl::const_visitor::visit (const atomic_prop ∗ *node*) `[pure virtual]`

7.18.3.2 virtual void spot::ltl::const_visitor::visit (const automatop ∗ *node*) `[pure virtual]`

7.18.3.3 virtual void spot::ltl::const_visitor::visit (const multop ∗ *node*) `[pure virtual]`

7.18.3.4 virtual void spot::ltl::const_visitor::visit (const unop ∗ *node*) `[pure virtual]`

7.18.3.5 virtual void spot::ltl::const_visitor::visit (const binop ∗ *node*) `[pure virtual]`

7.18.3.6 virtual void spot::ltl::const_visitor::visit (const constant ∗ *node*) `[pure virtual]`

The documentation for this struct was generated from the following file:

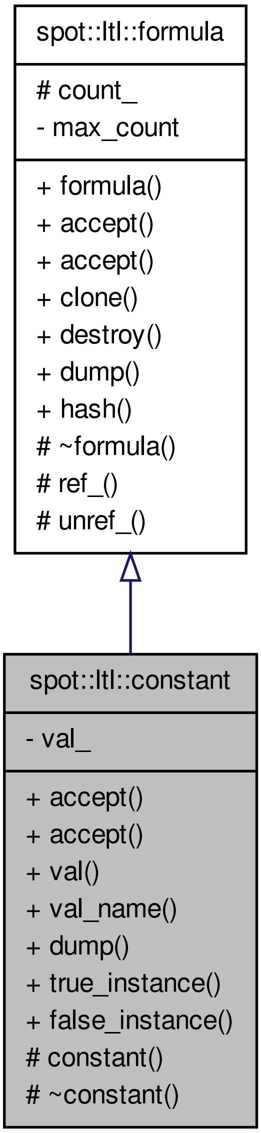
- ltlast/visitor.hh

7.19 spot::ltl::constant Class Reference

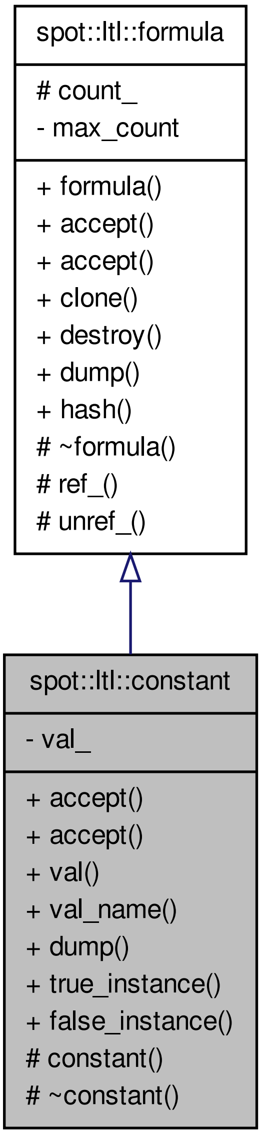
A constant (True or False).

`#include <ltlast/constant.hh>`

Inheritance diagram for spot::ltl::constant:



Collaboration diagram for spot::ltl::constant:



Public Types

- enum type { False, True }

Public Member Functions

- virtual void accept (visitor &v)

Entry point for vspot::ltl::visitor instances.

- virtual void accept (const_visitor &v) const

  Entry point for vspot::ltl::const_visitor instances.

- type val () const

  Return the value of the constant.

- const char ∗ val_name () const

  Return the value of the constant as a string.

- virtual std::string dump () const

  Return a canonic representation of the formula.

- formula ∗ clone () const

  clone this node

- void destroy () const

  release this node

- size_t hash () const

  Return a hash key for the formula.

Static Public Member Functions

- static constant ∗ true_instance ()

  Get the sole instance of spot::ltl::constant::constant(True).

- static constant ∗ false_instance ()

  Get the sole instance of spot::ltl::constant::constant(False).

Protected Member Functions

- constant (type val)
- virtual ∼constant ()
- virtual void ref_ ()

  increment reference counter if any

- virtual bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Protected Attributes

- size_t count_

  The hash key of this formula.

Private Attributes

- type val_

7.19.1 Detailed Description

A constant (True or False).

7.19.2 Member Enumeration Documentation

7.19.2.1 enum spot::ltl::constant::type

Enumerator:

False

True

7.19.3 Constructor & Destructor Documentation

7.19.3.1 spot::ltl::constant::constant (type *val*) `[protected]`

7.19.3.2 virtual spot::ltl::constant::∼constant ( ) `[protected, virtual]`

7.19.4 Member Function Documentation

7.19.4.1 virtual void spot::ltl::constant::accept (visitor & *v*) `[virtual]`

Entry point for vspot::ltl::visitor instances.

Implements spot::ltl::formula.

7.19.4.2 virtual void spot::ltl::constant::accept (const_visitor & *v*) const `[virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implements spot::ltl::formula.

7.19.4.3 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.19.4.4 void spot::ltl::formula::destroy ( ) const [inherited]

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.19.4.5 virtual std::string spot::ltl::constant::dump ( ) const [virtual]

Return a canonic representation of the formula.

Implements spot::ltl::formula.

7.19.4.6 static constant∗ spot::ltl::constant::false_instance ( ) [static]

Get the sole instance of spot::ltl::constant::constant(False).

7.19.4.7 size_t spot::ltl::formula::hash ( ) const [inline, inherited]

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.19.4.8 virtual void spot::ltl::formula::ref_ ( ) [protected, virtual, inherited]

increment reference counter if any

Reimplemented in spot::ltl::ref_formula.

7.19.4.9 static constant∗ spot::ltl::constant::true_instance ( ) [static]

Get the sole instance of spot::ltl::constant::constant(True).

7.19.4.10 virtual bool spot::ltl::formula::unref_ ( ) [protected, virtual, inherited]

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented in spot::ltl::ref_formula.

7.19.4.11 type spot::ltl::constant::val ( ) const

Return the value of the constant.

7.19.4.12 const char∗ spot::ltl::constant::val_name ( ) const

Return the value of the constant as a string.

7.19.5 Member Data Documentation

7.19.5.1 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.19.5.2 type spot::ltl::constant::val_ `[private]`

The documentation for this class was generated from the following file:

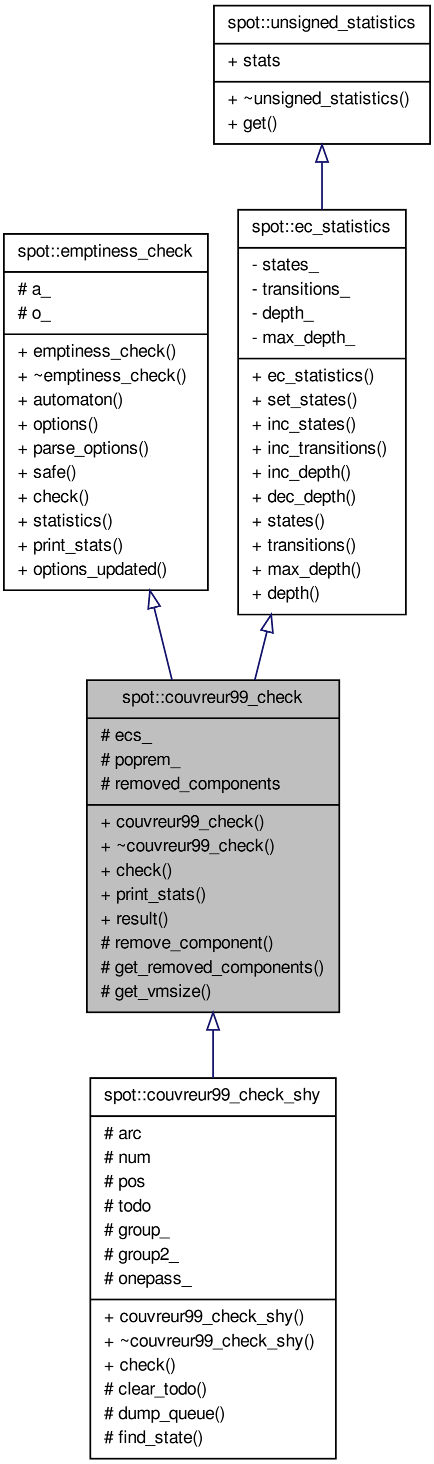
- ltlast/constant.hh

7.20 spot::couvreur99_check Class Reference

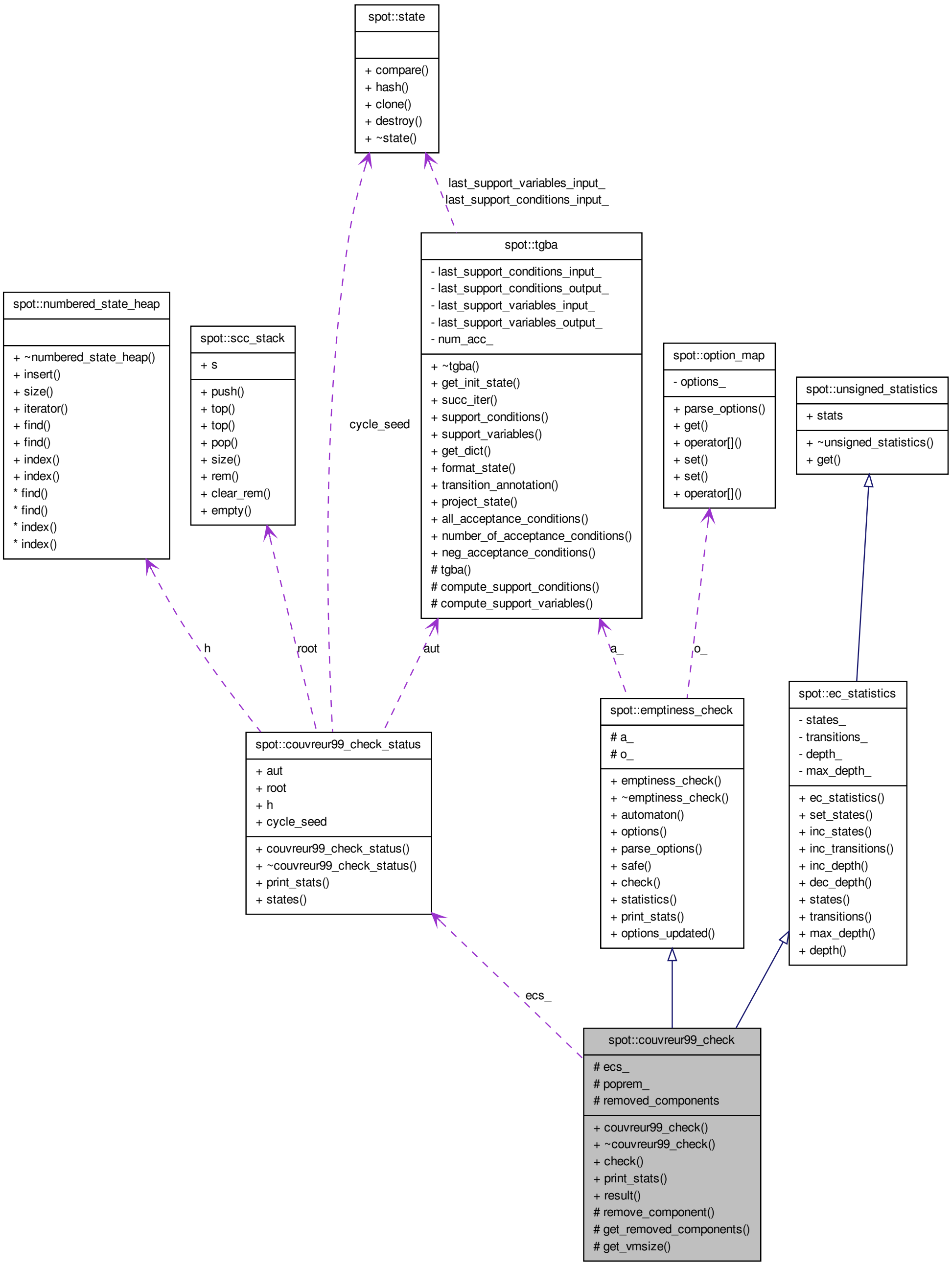
An implementation of the Couvreur99 emptiness-check algorithm.

`#include <tgbaalgos/gtec/gtec.hh>`

Inheritance diagram for spot::couvreur99_check:



Collaboration diagram for spot::couvreur99_check:



Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- couvreur99_check (const tgba ∗a, option_map o=option_map(), const numbered_state_heap_factory ∗nshf=numbered_state_heap_hash_map_factory::instance())
- virtual ∼couvreur99_check ()
- virtual emptiness_check_result ∗ check ()

  Check whether the automaton's language is empty.
- virtual std::ostream & print_stats (std::ostream &os) const
- const couvreur99_check_status ∗ result () const

  Return the status of the emptiness-check.
- const tgba ∗ automaton () const

  The automaton that this emptiness-check inspects.
- const option_map & options () const

  Return the options parametrizing how the emptiness check is realized.
- const char ∗ parse_options (char ∗options)

  Modify the algorithm options.
- virtual bool safe () const

  Return false iff accepting_run() can return 0 for non-empty automata.
- virtual emptiness_check_result ∗ check ()=0

  Check whether the automaton contain an accepting run.
- virtual const unsigned_statistics ∗ statistics () const

  Return statistics, if available.
- virtual std::ostream & print_stats (std::ostream &os) const

  Print statistics, if any.
- virtual void options_updated (const option_map &old)

  Notify option updates.
- void set_states (unsigned n)
- void inc_states ()
- void inc_transitions ()
- void inc_depth (unsigned n=1)
- void dec_depth (unsigned n=1)
- unsigned states () const
- unsigned transitions () const
- unsigned max_depth () const
- unsigned depth () const
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

Protected Member Functions

- void remove_component (const state ∗start_delete)

  Remove a strongly component from the hash.

- unsigned get_removed_components () const
- unsigned get_vmsize () const

Protected Attributes

- couvreur99_check_status ∗ ecs_
- bool poprem_

  Whether to store the state to be removed.

- unsigned removed_components

  Number of dead SCC removed by the algorithm.

- const tgba ∗ a_

  The automaton.

- option_map o_

  The options.

7.20.1 Detailed Description

An implementation of the Couvreur99 emptiness-check algorithm. See the documentation for spot::couvreur99.

7.20.2 Member Typedef Documentation

7.20.2.1 typedef std::map<const char∗, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map `[inherited]`

7.20.2.2 typedef unsigned(unsigned_statistics::∗ spot::unsigned_statistics::unsigned_fun)() const `[inherited]`

7.20.3 Constructor & Destructor Documentation

7.20.3.1 spot::couvreur99_check::couvreur99_check (const tgba ∗ *a*, option_map *o* = option_map *()*, const numbered_state_heap_factory ∗ *nshf* = *numbered_state_heap_hash_map_factory::instance()*)

7.20.3.2 virtual spot::couvreur99_check::∼couvreur99_check ( ) `[virtual]`

7.20.4 Member Function Documentation

7.20.4.1 const tgba∗ spot::emptiness_check::automaton ( ) const `[inline, inherited]`

The automaton that this emptiness-check inspects.

References spot::emptiness_check::a_.

7.20.4.2 virtual emptiness_check_result∗ spot::emptiness_check::check ( ) `[pure virtual, inherited]`

Check whether the automaton contain an accepting run.

Return 0 if the automaton accepts no run. Return an instance of emptiness_check_result otherwise. This instance might allow to obtain one sample acceptance run. The result has to be destroyed before the emptiness_check instance that generated it.

Some emptiness_check algorithms may allow check() to be called several time, but generally you should not assume that.

Some emptiness_check algorithms, especially those using bit state hashing may return 0 even if the automaton is not empty.

See also

safe()

7.20.4.3 virtual emptiness_check_result∗ spot::couvreur99_check::check ( ) `[virtual]`

Check whether the automaton's language is empty.

Reimplemented in spot::couvreur99_check_shy.

7.20.4.4 void spot::ec_statistics::dec_depth (unsigned *n* = *1*) `[inline, inherited]`

References spot::ec_statistics::depth_.

7.20.4.5 unsigned spot::ec_statistics::depth ( ) const `[inline, inherited]`

References spot::ec_statistics::depth_.

7.20.4.6 unsigned spot::unsigned_statistics::get (const char * *str*) const `[inline, inherited]`

References spot::unsigned_statistics::stats.

7.20.4.7 unsigned spot::couvreur99_check::get_removed_components ( ) const `[protected]`

7.20.4.8 unsigned spot::couvreur99_check::get_vmsize ( ) const `[protected]`

7.20.4.9 void spot::ec_statistics::inc_depth (unsigned *n* = *1*) `[inline, inherited]`

References spot::ec_statistics::depth_, and spot::ec_statistics::max_depth_.

7.20.4.10 void spot::ec_statistics::inc_states ( ) `[inline, inherited]`

References spot::ec_statistics::states_.

7.20.4.11 void spot::ec_statistics::inc_transitions ( ) `[inline, inherited]`

References spot::ec_statistics::transitions_.

7.20.4.12 unsigned spot::ec_statistics::max_depth ( ) const `[inline, inherited]`

References spot::ec_statistics::max_depth_.

7.20.4.13 const option_map& spot::emptiness_check::options ( ) const `[inline, inherited]`

Return the options parametrizing how the emptiness check is realized.

References spot::emptiness_check::o_.

7.20.4.14 virtual void spot::emptiness_check::options_updated (const option_map & *old*) `[virtual, inherited]`

Notify option updates.

7.20.4.15 const char∗ spot::emptiness_check::parse_options (char ∗ *options*) `[inherited]`

Modify the algorithm options.

7.20.4.16 virtual std::ostream& spot::couvreur99_check::print_stats (std::ostream & *os*) const `[virtual]`

7.20.4.17 virtual std::ostream& spot::emptiness_check::print_stats (std::ostream & *os*) const `[virtual, inherited]`

Print statistics, if any.

7.20.4.18 void spot::couvreur99_check::remove_component (const state ∗ *start_delete*) `[protected]`

Remove a strongly component from the hash.

This function remove all accessible state from a given state. In other words, it removes the strongly connected component that contains this state.

7.20.4.19 const couvreur99_check_status∗ spot::couvreur99_check::result ( ) const

Return the status of the emptiness-check.

When check() succeed, the status should be passed along to spot::counter_example.

This status should not be deleted, it is a pointer to a member of this class that will be deleted when the couvreur99 object is deleted.

7.20.4.20 virtual bool spot::emptiness_check::safe ( ) const `[virtual, inherited]`

Return false iff accepting_run() can return 0 for non-empty automata.

7.20.4.21 void spot::ec_statistics::set_states (unsigned *n*) `[inline, inherited]`

References spot::ec_statistics::states_.

7.20.4.22 unsigned spot::ec_statistics::states ( ) const `[inline, inherited]`

References spot::ec_statistics::states_.

7.20.4.23 virtual const unsigned_statistics∗ spot::emptiness_check::statistics ( ) const `[virtual, inherited]`

Return statistics, if available.

7.20.4.24 unsigned spot::ec_statistics::transitions ( ) const `[inline, inherited]`

References spot::ec_statistics::transitions_.

7.20.5 Member Data Documentation

7.20.5.1 const tgba∗ spot::emptiness_check::a_ `[protected, inherited]`

The automaton.

Referenced by spot::emptiness_check::automaton().

7.20.5.2 couvreur99_check_status∗ spot::couvreur99_check::ecs_ `[protected]`

7.20.5.3 option_map spot::emptiness_check::o_ `[protected, inherited]`

The options.

Referenced by spot::emptiness_check::options().

7.20.5.4 bool spot::couvreur99_check::poprem_ `[protected]`

Whether to store the state to be removed.

7.20.5.5 unsigned spot::couvreur99_check::removed_components `[protected]`

Number of dead SCC removed by the algorithm.

7.20.5.6 stats_map spot::unsigned_statistics::stats `[inherited]`

Referenced by spot::acss_statistics::acss_statistics(), spot::ars_statistics::ars_statistics(), spot::ec_statistics::ec_statistics(), spot::unsigned_statistics::get(), and spot::unsigned_statistics_copy::seteq().

The documentation for this class was generated from the following file:

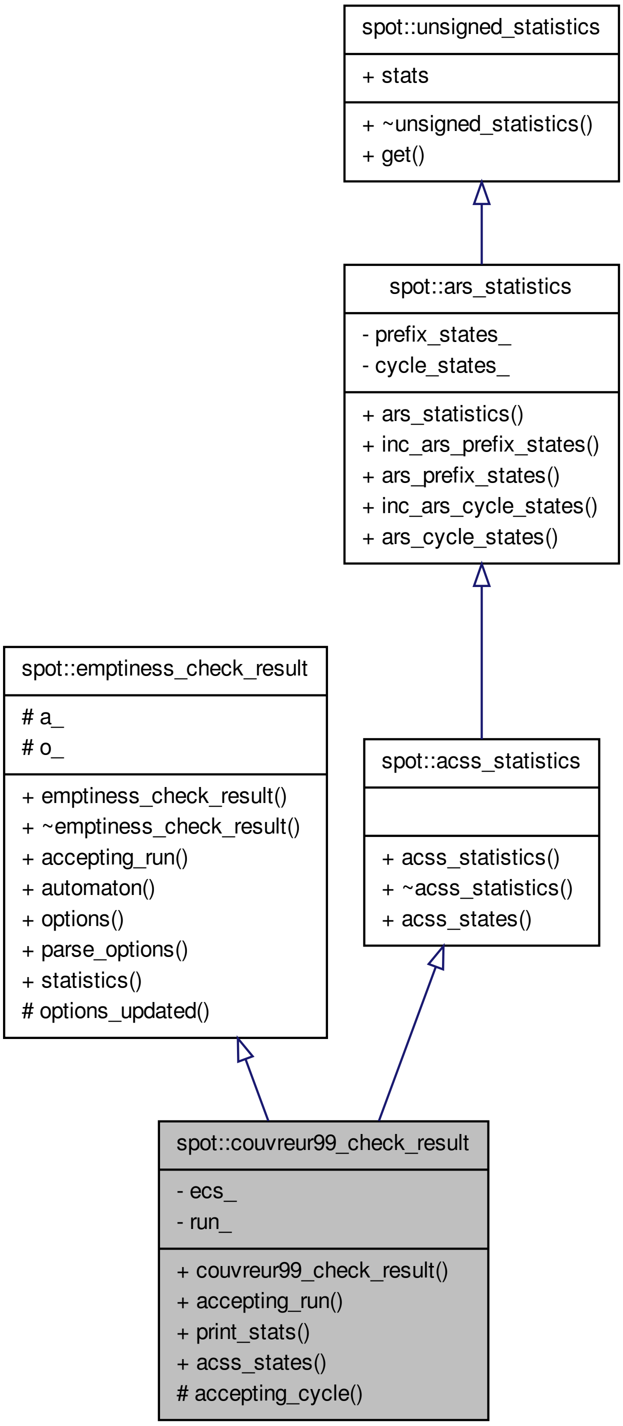
- tgbaalgos/gtec/gtec.hh

7.21 spot::couvreur99_check_result Class Reference

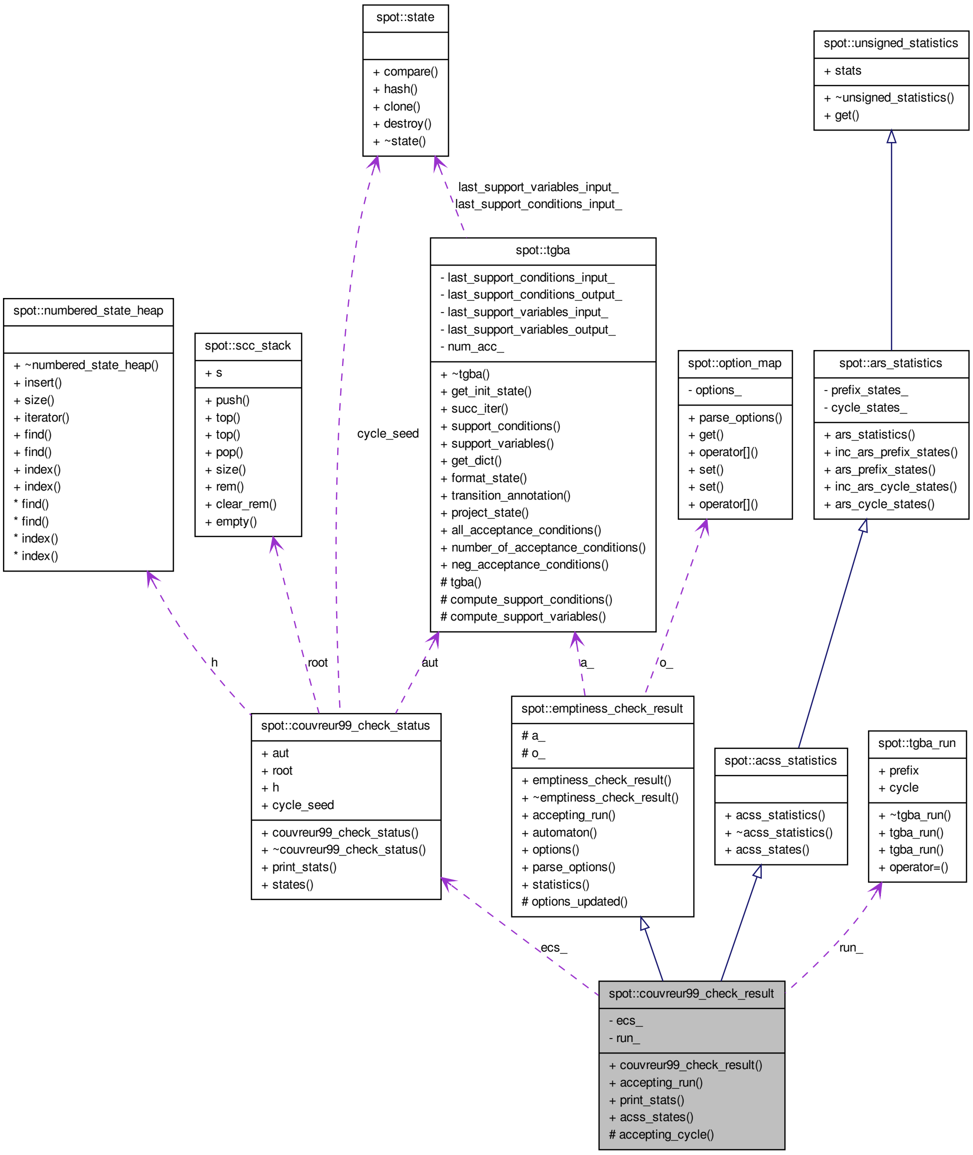
Compute a counter example from a spot::couvreur99_check_status.

`#include <tgbaalgos/gtec/ce.hh>`

Inheritance diagram for spot::couvreur99_check_result:



Collaboration diagram for spot::couvreur99_check_result:



Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- couvreur99_check_result (const couvreur99_check_status ∗ecs, option_map o=option_map())
- virtual tgba_run ∗ accepting_run ()

- void print_stats (std::ostream &os) const
- virtual unsigned acss_states () const

  Number of states in the search space for the accepting cycle.

- virtual tgba_run ∗ accepting_run ()

  Return a run accepted by the automata passed to the emptiness check.

- const tgba ∗ automaton () const

  The automaton on which an accepting_run() was found.

- const option_map & options () const

  Return the options parametrizing how the accepting run is computed.

- const char ∗ parse_options (char ∗options)

  Modify the algorithm options.

- virtual const unsigned_statistics ∗ statistics () const

  Return statistics, if available.

- void inc_ars_prefix_states ()
- unsigned ars_prefix_states () const
- void inc_ars_cycle_states ()
- unsigned ars_cycle_states () const
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

Protected Member Functions

- void accepting_cycle ()
- virtual void options_updated (const option_map &old)

  Notify option updates.

Protected Attributes

- const tgba ∗ a_

  The automaton.

- option_map o_

  The options.

Private Attributes

- const couvreur99_check_status ∗ ecs_
- tgba_run ∗ run_

7.21.1 Detailed Description

Compute a counter example from a spot::couvreur99_check_status.

7.21.2 Member Typedef Documentation

7.21.2.1 typedef std::map<const char*, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map `[inherited]`

7.21.2.2 typedef unsigned(unsigned_statistics::* spot::unsigned_statistics::unsigned_fun)() const `[inherited]`

7.21.3 Constructor & Destructor Documentation

7.21.3.1 spot::couvreur99_check_result::couvreur99_check_result (const couvreur99_check_status * *ecs*, option_map *o* = option_map `()`)

7.21.4 Member Function Documentation

7.21.4.1 void spot::couvreur99_check_result::accepting_cycle ( ) `[protected]`

Called by accepting_run() to find a cycle which traverses all acceptance conditions in the accepted SCC.

7.21.4.2 virtual tgba_run* spot::couvreur99_check_result::accepting_run ( ) `[virtual]`

7.21.4.3 virtual tgba_run* spot::emptiness_check_result::accepting_run ( ) `[virtual, inherited]`

Return a run accepted by the automata passed to the emptiness check.

This method might actually compute the acceptance run. (Not all emptiness check algorithms actually produce a counter-example as a side-effect of checking emptiness, some need some post-processing.)

This can also return 0 if the emptiness check algorithm cannot produce a counter example (that does not mean there is no counter-example; the mere existence of an instance of this class asserts the existence of a counter-example).

7.21.4.4 virtual unsigned spot::couvreur99_check_result::acss_states ( ) const `[virtual]`

Number of states in the search space for the accepting cycle.

Implements spot::acss_statistics.

7.21.4.5 unsigned spot::ars_statistics::ars_cycle_states ( ) const `[inline, inherited]`

References spot::ars_statistics::cycle_states_.

7.21.4.6 unsigned spot::ars_statistics::ars_prefix_states ( ) const `[inline, inherited]`

References spot::ars_statistics::prefix_states_.

7.21.4.7 const tgba∗ spot::emptiness_check_result::automaton ( ) const `[inline, inherited]`

The automaton on which an accepting_run() was found.

References spot::emptiness_check_result::a_.

7.21.4.8 unsigned spot::unsigned_statistics::get (const char ∗ *str*) const `[inline, inherited]`

References spot::unsigned_statistics::stats.

7.21.4.9 void spot::ars_statistics::inc_ars_cycle_states ( ) `[inline, inherited]`

References spot::ars_statistics::cycle_states_.

7.21.4.10 void spot::ars_statistics::inc_ars_prefix_states ( ) `[inline, inherited]`

References spot::ars_statistics::prefix_states_.

7.21.4.11 const option_map& spot::emptiness_check_result::options ( ) const `[inline, inherited]`

Return the options parametrizing how the accepting run is computed.

References spot::emptiness_check_result::o_.

7.21.4.12 virtual void spot::emptiness_check_result::options_updated (const option_map & *old*) `[protected, virtual, inherited]`

Notify option updates.

7.21.4.13 const char∗ spot::emptiness_check_result::parse_options (char ∗ *options*) `[inherited]`

Modify the algorithm options.

7.21.4.14 void spot::couvreur99_check_result::print_stats (std::ostream & *os*) const

7.21.4.15 virtual const unsigned_statistics∗ spot::emptiness_check_result::statistics ( ) const `[virtual, inherited]`

Return statistics, if available.

7.21.5 Member Data Documentation

7.21.5.1 const tgba∗ spot::emptiness_check_result::a_ `[protected, inherited]`

The automaton.

Referenced by spot::emptiness_check_result::automaton().

7.21.5.2 const couvreur99_check_status∗ spot::couvreur99_check_result::ecs_ `[private]`

7.21.5.3 option_map spot::emptiness_check_result::o_ `[protected, inherited]`

The options.

Referenced by spot::emptiness_check_result::options().

7.21.5.4 tgba_run∗ spot::couvreur99_check_result::run_ `[private]`

7.21.5.5 stats_map spot::unsigned_statistics::stats `[inherited]`

Referenced by spot::acss_statistics::acss_statistics(), spot::ars_statistics::ars_statistics(), spot::ec_statistics::ec_statistics(), spot::unsigned_statistics::get(), and spot::unsigned_statistics_copy::seteq().

The documentation for this class was generated from the following file:

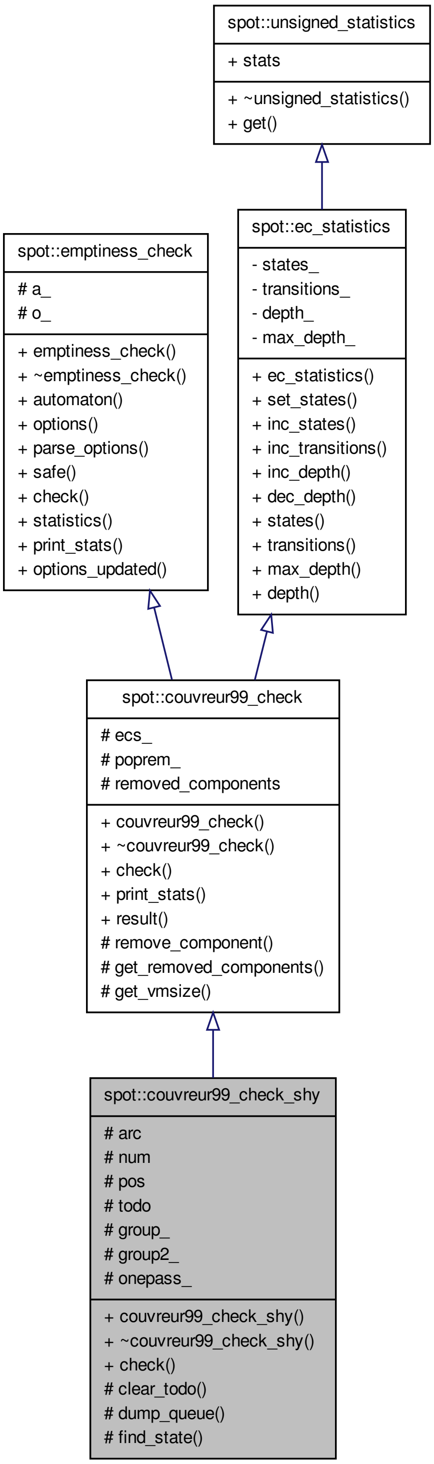
- tgbaalgos/gtec/ce.hh

7.22 spot::couvreur99_check_shy Class Reference

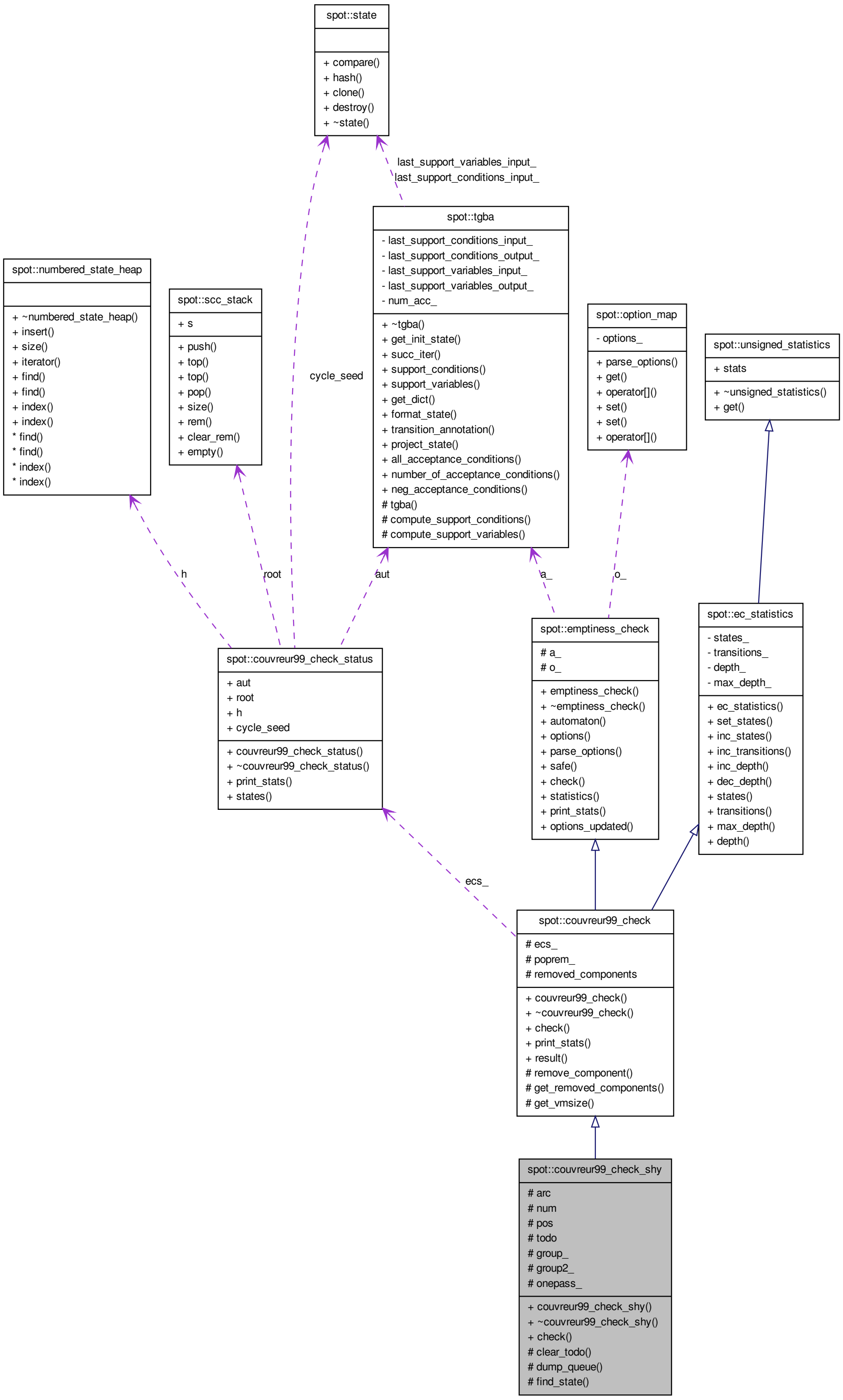
A version of spot::couvreur99_check that tries to visit known states first.

`#include <tgbaalgos/gtec/gtec.hh>`

Inheritance diagram for spot::couvreur99_check_shy:



Collaboration diagram for spot::couvreur99_check_shy:



Classes

- struct successor
- struct todo_item

Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- couvreur99_check_shy (const tgba ∗a, option_map o=option_map(), const numbered_state_heap_factory ∗nshf=numbered_state_heap_hash_map_factory::instance())
- virtual ∼couvreur99_check_shy ()
- virtual emptiness_check_result ∗ check ()

  Check whether the automaton's language is empty.

- virtual emptiness_check_result ∗ check ()=0

  Check whether the automaton contain an accepting run.

- virtual std::ostream & print_stats (std::ostream &os) const
- virtual std::ostream & print_stats (std::ostream &os) const

  Print statistics, if any.

- const couvreur99_check_status ∗ result () const

  Return the status of the emptiness-check.

- const tgba ∗ automaton () const

  The automaton that this emptiness-check inspects.

- const option_map & options () const

  Return the options parametrizing how the emptiness check is realized.

- const char ∗ parse_options (char ∗options)

  Modify the algorithm options.

- virtual bool safe () const

  Return false iff accepting_run() can return 0 for non-empty automata.

- virtual const unsigned_statistics ∗ statistics () const

  Return statistics, if available.

- virtual void options_updated (const option_map &old)

  Notify option updates.

- void set_states (unsigned n)
- void inc_states ()
- void inc_transitions ()
- void inc_depth (unsigned n=1)

- void dec_depth (unsigned n=1)
- unsigned states () const
- unsigned transitions () const
- unsigned max_depth () const
- unsigned depth () const
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

Protected Types

- typedef std::list< successor > succ_queue
- typedef std::list< todo_item > todo_list

Protected Member Functions

- void clear_todo ()
- void dump_queue (std::ostream &os=std::cerr)

  Dump the queue for debugging.

- virtual numbered_state_heap::state_index_p find_state (const state ∗s)

  find the SCC number of a unprocessed state.

- void remove_component (const state ∗start_delete)

  Remove a strongly component from the hash.

- unsigned get_removed_components () const
- unsigned get_vmsize () const

Protected Attributes

- std::stack< bdd > arc
- int num
- succ_queue::iterator pos
- todo_list todo
- bool group_

  Whether successors should be grouped for states in the same SCC.

- bool group2_
- bool onepass_
- couvreur99_check_status ∗ ecs_
- bool poprem_

  Whether to store the state to be removed.

- unsigned removed_components

  Number of dead SCC removed by the algorithm.

- const tgba ∗ a_

  The automaton.

- option_map o_

  The options.

7.22.1 Detailed Description

A version of spot::couvreur99_check that tries to visit known states first. See the documentation for spot::couvreur99.

7.22.2 Member Typedef Documentation

7.22.2.1 typedef std::map<const char∗, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map `[inherited]`

7.22.2.2 typedef std::list<successor> spot::couvreur99_check_shy::succ_queue `[protected]`

7.22.2.3 typedef std::list<todo_item> spot::couvreur99_check_shy::todo_list `[protected]`

7.22.2.4 typedef unsigned(unsigned_statistics::∗ spot::unsigned_statistics::unsigned_fun)() const `[inherited]`

7.22.3 Constructor & Destructor Documentation

7.22.3.1 spot::couvreur99_check_shy::couvreur99_check_shy (const tgba ∗ *a*, option_map *o* = option_map `()`, const numbered_state_heap_factory ∗ *nshf* = *`numbered_state_heap_hash_map_factory::instance()`*)

7.22.3.2 virtual spot::couvreur99_check_shy::∼couvreur99_check_shy ( ) `[virtual]`

7.22.4 Member Function Documentation

7.22.4.1 const tgba∗ spot::emptiness_check::automaton ( ) const `[inline, inherited]`

The automaton that this emptiness-check inspects.

References spot::emptiness_check::a_.

7.22.4.2 virtual emptiness_check_result∗ spot::emptiness_check::check ( ) `[pure virtual, inherited]`

Check whether the automaton contain an accepting run.

Return 0 if the automaton accepts no run. Return an instance of emptiness_check_result otherwise. This instance might allow to obtain one sample acceptance run. The result has to be destroyed before the emptiness_check instance that generated it.

Some emptiness_check algorithms may allow check() to be called several time, but generally you should not assume that.

Some emptiness_check algorithms, especially those using bit state hashing may return 0 even if the automaton is not empty.

See also

safe()

7.22.4.3 virtual emptiness_check_result∗ spot::couvreur99_check_shy::check ( ) `[virtual]`

Check whether the automaton's language is empty.

Reimplemented from spot::couvreur99_check.

7.22.4.4 void spot::couvreur99_check_shy::clear_todo ( ) `[protected]`

7.22.4.5 void spot::ec_statistics::dec_depth (unsigned *n* = *1*) `[inline, inherited]`

References spot::ec_statistics::depth_.

7.22.4.6 unsigned spot::ec_statistics::depth ( ) const `[inline, inherited]`

References spot::ec_statistics::depth_.

7.22.4.7 void spot::couvreur99_check_shy::dump_queue (std::ostream & *os* = `std::cerr`) `[protected]`

Dump the queue for debugging.

7.22.4.8 virtual numbered_state_heap::state_index_p spot::couvreur99_check_shy::find_state (const state ∗ *s*) `[protected, virtual]`

find the SCC number of a unprocessed state.

Sometimes we want to modify some of the above structures when looking up a new state. This happens for instance when find() must perform inclusion checking and add new states to process to TODO during this step. (Because TODO must be known, sub-classing spot::numbered_state_heap is not enough.) Then overriding this method is the way to go.

7.22.4.9 unsigned spot::unsigned_statistics::get (const char ∗ *str*) const `[inline, inherited]`

References spot::unsigned_statistics::stats.

7.22.4.10 unsigned spot::couvreur99_check::get_removed_components ( ) const `[protected, inherited]`

7.22.4.11 unsigned spot::couvreur99_check::get_vmsize ( ) const `[protected, inherited]`

7.22.4.12 void spot::ec_statistics::inc_depth (unsigned *n* = `1`) `[inline, inherited]`

References spot::ec_statistics::depth_, and spot::ec_statistics::max_depth_.

7.22.4.13 void spot::ec_statistics::inc_states ( ) `[inline, inherited]`

References spot::ec_statistics::states_.

7.22.4.14 void spot::ec_statistics::inc_transitions ( ) `[inline, inherited]`

References spot::ec_statistics::transitions_.

7.22.4.15 unsigned spot::ec_statistics::max_depth ( ) const `[inline, inherited]`

References spot::ec_statistics::max_depth_.

7.22.4.16 const option_map& spot::emptiness_check::options ( ) const `[inline, inherited]`

Return the options parametrizing how the emptiness check is realized.

References spot::emptiness_check::o_.

7.22.4.17 virtual void spot::emptiness_check::options_updated (const option_map & *old*) `[virtual, inherited]`

Notify option updates.

7.22.4.18 const char∗ spot::emptiness_check::parse_options (char ∗ *options*) `[inherited]`

Modify the algorithm options.

7.22.4.19 virtual std::ostream& spot::emptiness_check::print_stats (std::ostream & *os*) const `[virtual, inherited]`

Print statistics, if any.

7.22.4.20 virtual std::ostream& spot::couvreur99_check::print_stats (std::ostream & *os*) const `[virtual, inherited]`

7.22.4.21 void spot::couvreur99_check::remove_component (const state ∗ *start_delete*) `[protected, inherited]`

Remove a strongly component from the hash.

This function remove all accessible state from a given state. In other words, it removes the strongly connected component that contains this state.

7.22.4.22 const couvreur99_check_status∗ spot::couvreur99_check::result ( ) const `[inherited]`

Return the status of the emptiness-check.

When check() succeed, the status should be passed along to spot::counter_example.

This status should not be deleted, it is a pointer to a member of this class that will be deleted when the couvreur99 object is deleted.

7.22.4.23 virtual bool spot::emptiness_check::safe ( ) const `[virtual, inherited]`

Return false iff accepting_run() can return 0 for non-empty automata.

7.22.4.24 void spot::ec_statistics::set_states (unsigned *n*) `[inline, inherited]`

References spot::ec_statistics::states_.

7.22.4.25 unsigned spot::ec_statistics::states ( ) const `[inline, inherited]`

References spot::ec_statistics::states_.

7.22.4.26 virtual const unsigned_statistics∗ spot::emptiness_check::statistics ( ) const `[virtual, inherited]`

Return statistics, if available.

7.22.4.27 unsigned spot::ec_statistics::transitions ( ) const `[inline, inherited]`

References spot::ec_statistics::transitions_.

7.22.5 Member Data Documentation

7.22.5.1 const tgba∗ spot::emptiness_check::a_ `[protected, inherited]`

The automaton.

Referenced by spot::emptiness_check::automaton().

7.22.5.2 std::stack<bdd> spot::couvreur99_check_shy::arc `[protected]`

7.22.5.3 couvreur99_check_status* spot::couvreur99_check::ecs_ `[protected, inherited]`

7.22.5.4 bool spot::couvreur99_check_shy::group2_ `[protected]`

7.22.5.5 bool spot::couvreur99_check_shy::group_ `[protected]`

Whether successors should be grouped for states in the same SCC.

7.22.5.6 int spot::couvreur99_check_shy::num `[protected]`

7.22.5.7 option_map spot::emptiness_check::o_ `[protected, inherited]`

The options.

Referenced by spot::emptiness_check::options().

7.22.5.8 bool spot::couvreur99_check_shy::onepass_ `[protected]`

7.22.5.9 bool spot::couvreur99_check::poprem_ `[protected, inherited]`

Whether to store the state to be removed.

7.22.5.10 succ_queue::iterator spot::couvreur99_check_shy::pos `[protected]`

7.22.5.11 unsigned spot::couvreur99_check::removed_components `[protected, inherited]`

Number of dead SCC removed by the algorithm.

7.22.5.12 stats_map spot::unsigned_statistics::stats `[inherited]`

Referenced by spot::acss_statistics::acss_statistics(), spot::ars_statistics::ars_statistics(), spot::ec_statistics::ec_statistics(), spot::unsigned_statistics::get(), and spot::unsigned_statistics_copy::seteq().

7.22.5.13 todo_list spot::couvreur99_check_shy::todo `[protected]`

The documentation for this class was generated from the following file:

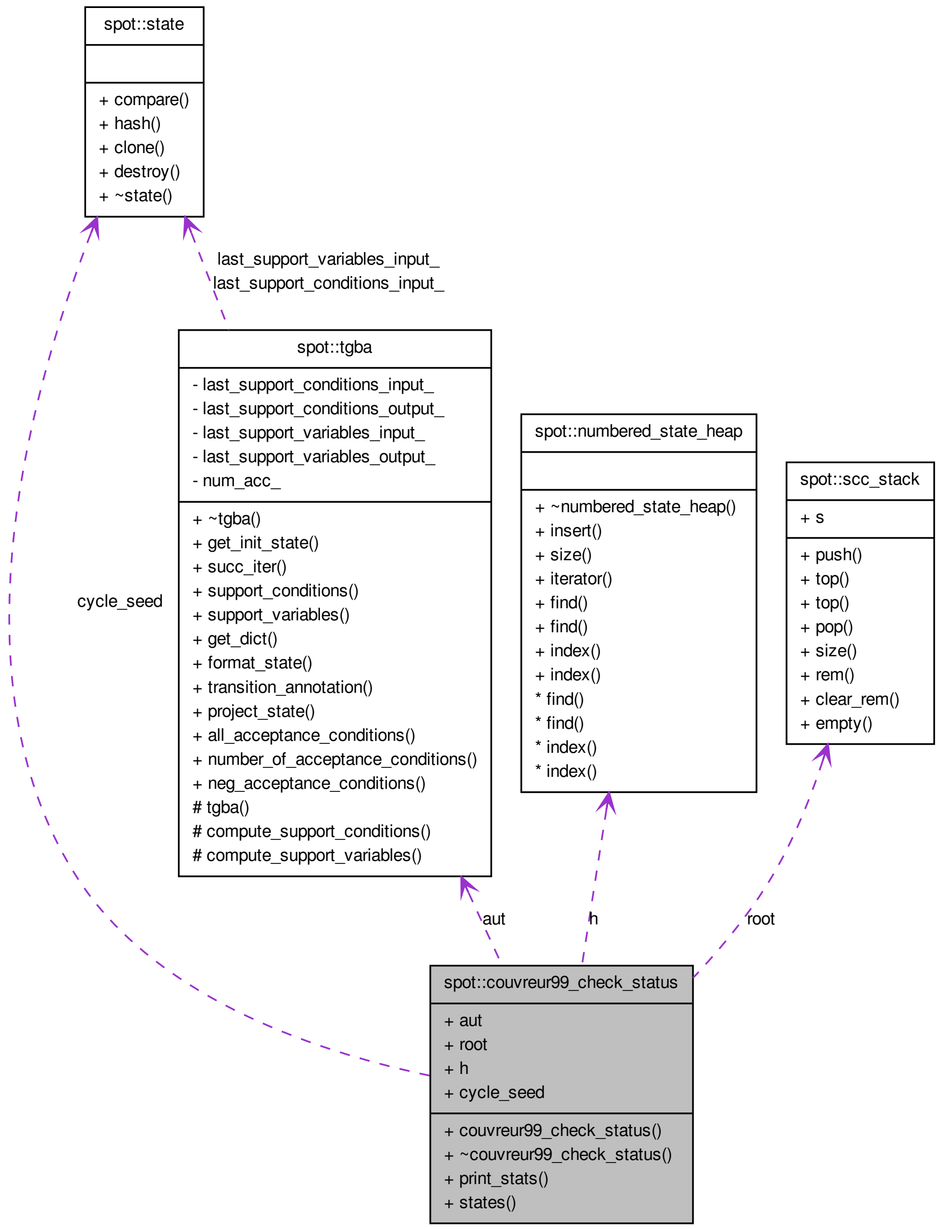
- tgbaalgos/gtec/gtec.hh

7.23 spot::couvreur99_check_status Class Reference

The status of the emptiness-check on success.

`#include <tgbaalgos/gtec/status.hh>`

Collaboration diagram for spot::couvreur99_check_status:



Public Member Functions

- couvreur99_check_status (const tgba ∗aut, const numbered_state_heap_factory ∗nshf)
- ~couvreur99_check_status ()
- void print_stats (std::ostream &os) const

  Output statistics about this object.

- int states () const

  Return the number of states visited by the search.

Public Attributes

- const tgba ∗ aut
- scc_stack root
- numbered_state_heap ∗ h

  Heap of visited states.

- const state ∗ cycle_seed

7.23.1 Detailed Description

The status of the emptiness-check on success. This contains everything needed to construct a counter-example: the automata, the stack of SCCs traversed by the counter-example, and the heap of visited states with their indexes.

7.23.2 Constructor & Destructor Documentation

7.23.2.1 spot::couvreur99_check_status::couvreur99_check_status (const tgba ∗ *aut*, const numbered_state_heap_factory ∗ *nshf*)

7.23.2.2 spot::couvreur99_check_status::∼couvreur99_check_status ( )

7.23.3 Member Function Documentation

7.23.3.1 void spot::couvreur99_check_status::print_stats (std::ostream & *os*) const

Output statistics about this object.

7.23.3.2 int spot::couvreur99_check_status::states ( ) const

Return the number of states visited by the search.

7.23.4 Member Data Documentation

7.23.4.1 const tgba∗ spot::couvreur99_check_status::aut

7.23.4.2 const state∗ spot::couvreur99_check_status::cycle_seed

7.23.4.3 numbered_state_heap∗ spot::couvreur99_check_status::h

Heap of visited states.

7.23.4.4 scc_stack spot::couvreur99_check_status::root

The documentation for this class was generated from the following file:

- tgbaalgos/gtec/status.hh

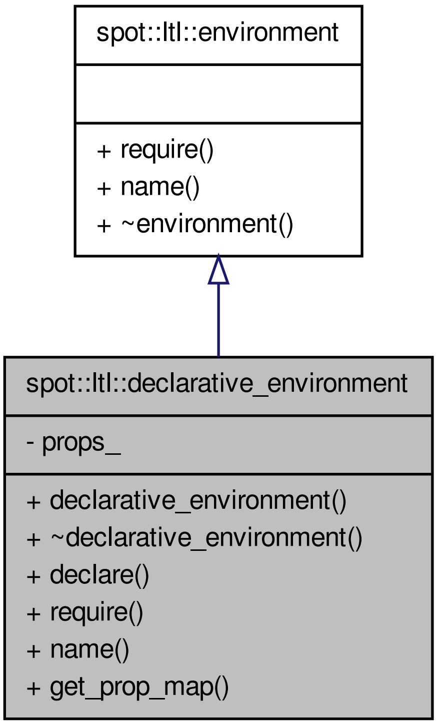
7.24 spot::ltl::declarative_environment Class Reference

A declarative environment.

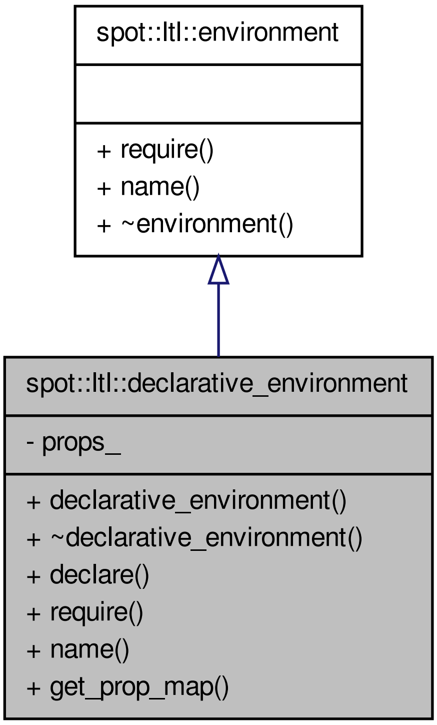
This environment recognizes all atomic propositions that have been previously declared. It will reject other.

`#include <ltlenv/declenv.hh>`

Inheritance diagram for spot::ltl::declarative_environment:



Collaboration diagram for spot::ltl::declarative_environment:



Public Types

- typedef std::map< const std::string, ltl::atomic_prop ∗ > prop_map

Public Member Functions

- declarative_environment ()
- ∼declarative_environment ()
- bool declare (const std::string &prop_str)
- virtual ltl::formula ∗ require (const std::string &prop_str)

  Obtain the formula associated to prop_str.
- virtual const std::string & name ()

  Get the name of the environment.
- const prop_map & get_prop_map () const

  Get the map of atomic proposition known to this environment.

Private Attributes

- prop_map props_

7.24.1 Detailed Description

A declarative environment.

This environment recognizes all atomic propositions that have been previously declared. It will reject other.

7.24.2 Member Typedef Documentation

7.24.2.1 typedef std::map<const std::string, ltl::atomic_prop∗> spot::ltl::declarative_environment::prop_map

7.24.3 Constructor & Destructor Documentation

7.24.3.1 spot::ltl::declarative_environment::declarative_environment ( )

7.24.3.2 spot::ltl::declarative_environment::∼declarative_environment ( )

7.24.4 Member Function Documentation

7.24.4.1 bool spot::ltl::declarative_environment::declare (const std::string & *prop_str*)

Declare an atomic proposition. Return false iff the proposition was already declared.

7.24.4.2 const prop_map& spot::ltl::declarative_environment::get_prop_map ( ) const

Get the map of atomic proposition known to this environment.

7.24.4.3 virtual const std::string& spot::ltl::declarative_environment::name ( ) `[virtual]`

Get the name of the environment.

Implements spot::ltl::environment.

7.24.4.4 virtual ltl::formula∗ spot::ltl::declarative_environment::require (const std::string & *prop_str*) `[virtual]`

Obtain the formula associated to *prop_str*.

Usually *prop_str*, is the name of an atomic proposition, and spot::ltl::require simply returns the associated spot::ltl::atomic_prop.

Note this is not a `const` method. Some environments will "create" the atomic proposition when requested.

We return a spot::ltl::formula instead of an spot::ltl::atomic_prop, because this will allow nifty tricks (e.g., we could name formulae in an environment, and let the parser build a larger tree from these).

Returns

0 iff *prop_str* is not part of the environment, or the associated spot::ltl::formula otherwise.

Implements spot::ltl::environment.

7.24.5 Member Data Documentation

7.24.5.1 prop_map spot::ltl::declarative_environment::props_ `[private]`

The documentation for this class was generated from the following file:

- ltlenv/declenv.hh

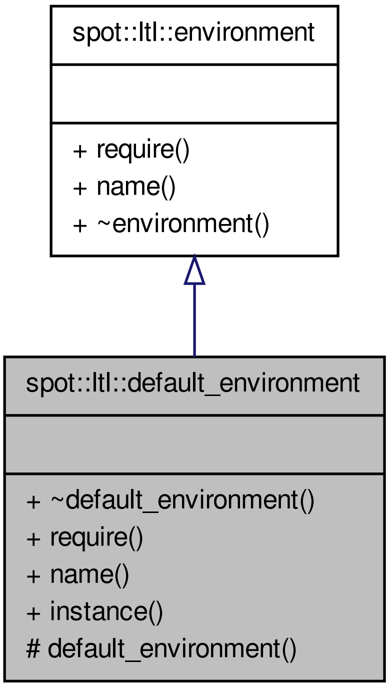
7.25 spot::ltl::default_environment Class Reference

A laxist environment.

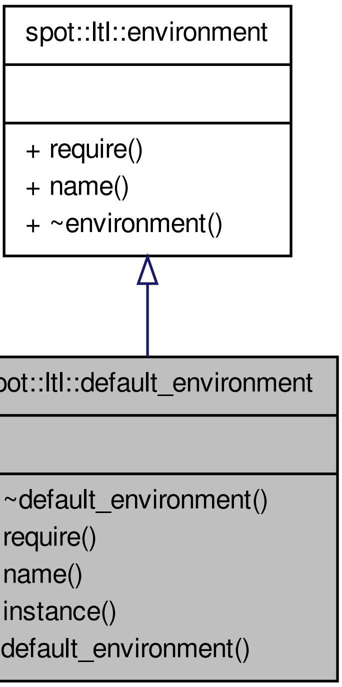
This environment recognizes all atomic propositions.

`#include <ltlenv/defaultenv.hh>`

Inheritance diagram for spot::ltl::default_environment:



Collaboration diagram for spot::ltl::default_environment:



Public Member Functions

- virtual ~default_environment ()
- virtual formula ∗ require (const std::string &prop_str)

  Obtain the formula associated to prop_str.

- virtual const std::string & name ()

  Get the name of the environment.

Static Public Member Functions

- static default_environment & instance ()

  Get the sole instance of spot::ltl::default_environment.

Protected Member Functions

- default_environment ()

7.25.1 Detailed Description

A laxist environment.

This environment recognizes all atomic propositions. This is a singleton. Use default_environment::instance() to obtain the instance.

7.25.2 Constructor & Destructor Documentation

7.25.2.1 virtual spot::ltl::default_environment::∼default_environment ( ) `[virtual]`

7.25.2.2 spot::ltl::default_environment::default_environment ( ) `[protected]`

7.25.3 Member Function Documentation

7.25.3.1 static default_environment& spot::ltl::default_environment::instance ( ) `[static]`

Get the sole instance of spot::ltl::default_environment.

7.25.3.2 virtual const std::string& spot::ltl::default_environment::name ( ) `[virtual]`

Get the name of the environment.

Implements spot::ltl::environment.

7.25.3.3 virtual formula∗ spot::ltl::default_environment::require (const std::string & *prop_str*) `[virtual]`

Obtain the formula associated to *prop_str*.

Usually *prop_str*, is the name of an atomic proposition, and spot::ltl::require simply returns the associated spot::ltl::atomic_prop.

Note this is not a `const` method. Some environments will "create" the atomic proposition when requested.

We return a spot::ltl::formula instead of an spot::ltl::atomic_prop, because this will allow nifty tricks (e.g., we could name formulae in an environment, and let the parser build a larger tree from these).

Returns

0 iff *prop_str* is not part of the environment, or the associated spot::ltl::formula otherwise.

Implements spot::ltl::environment.

The documentation for this class was generated from the following file:

- ltlenv/defaultenv.hh

7.26 spot::delayed_simulation_relation Class Reference

`#include <tgba/tgbareduc.hh>`

The documentation for this class was generated from the following file:

- tgba/tgbareduc.hh

7.27 spot::direct_simulation_relation Class Reference

`#include <tgba/tgbareduc.hh>`

The documentation for this class was generated from the following file:

- tgba/tgbareduc.hh

7.28 spot::taa_succ_iterator::distance_sort Struct Reference

Public Member Functions

- bool operator() (const iterator_pair &lhs, const iterator_pair &rhs) const

7.28.1 Member Function Documentation

7.28.1.1 bool spot::taa_succ_iterator::distance_sort::operator() (const iterator_pair & *lhs*, const iterator_pair & *rhs*) const `[inline]`

The documentation for this struct was generated from the following file:

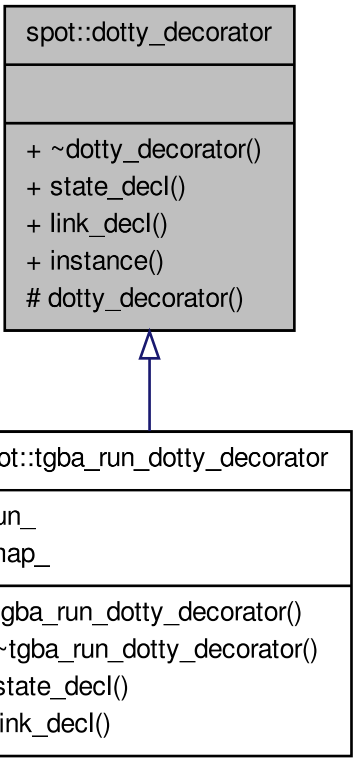
- tgba/taatgba.hh

7.29 spot::dotty_decorator Class Reference

Choose state and link styles for spot::dotty_reachable.

`#include <tgbaalgos/dottydec.hh>`

Inheritance diagram for spot::dotty_decorator:



Public Member Functions

- virtual ∼dotty_decorator ()
- virtual std::string state_decl (const tgba ∗a, const state ∗s, int n, tgba_succ_iterator ∗si, const std::string &label)

  Compute the style of a state.

- virtual std::string link_decl (const tgba ∗a, const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si, const std::string &label)

  Compute the style of a link.

Static Public Member Functions

- static dotty_decorator ∗ instance ()

  Get the unique instance of the default dotty_decorator.

Protected Member Functions

- dotty_decorator ()

7.29.1 Detailed Description

Choose state and link styles for spot::dotty_reachable.

7.29.2 Constructor & Destructor Documentation

7.29.2.1 virtual spot::dotty_decorator::∼dotty_decorator ( ) `[virtual]`

7.29.2.2 spot::dotty_decorator::dotty_decorator ( ) `[protected]`

7.29.3 Member Function Documentation

7.29.3.1 static dotty_decorator∗ spot::dotty_decorator::instance ( ) `[static]`

Get the unique instance of the default dotty_decorator.

7.29.3.2 virtual std::string spot::dotty_decorator::link_decl (const tgba ∗ *a*, const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*, const std::string & *label*) `[virtual]`

Compute the style of a link.

This function should output a string of the form `[label="foo", style=bar, ...]`. The default implementation will simply output `[label="LABEL"]` with `LABEL` replaced by the value of *label*.

Parameters

a the automaton being drawn

in_s the source state of the transition being drawn (owned by the caller)

in the unique number associated to *in_s*

out_s the destination state of the transition being drawn (owned by the caller)

out the unique number associated to *out_s*

si an iterator over the successors of *in_s*, pointing to the current transition (owned by the caller and cannot be iterated)

label the computed name of this state

Reimplemented in spot::tgba_run_dotty_decorator.

7.29.3.3 virtual std::string spot::dotty_decorator::state_decl (const tgba ∗ *a*, const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*, const std::string & *label*) `[virtual]`

Compute the style of a state.

This function should output a string of the form `[label="foo", style=bar, ...]`. The default implementation will simply output `[label="LABEL"]` with `LABEL` replaced by the value of *label*.

Parameters

a the automaton being drawn

s the state being drawn (owned by the caller)

n a unique number for this state

si an iterator over the successors of this state (owned by the caller, but can be freely iterated)

label the computed name of this state

Reimplemented in spot::tgba_run_dotty_decorator.

The documentation for this class was generated from the following file:

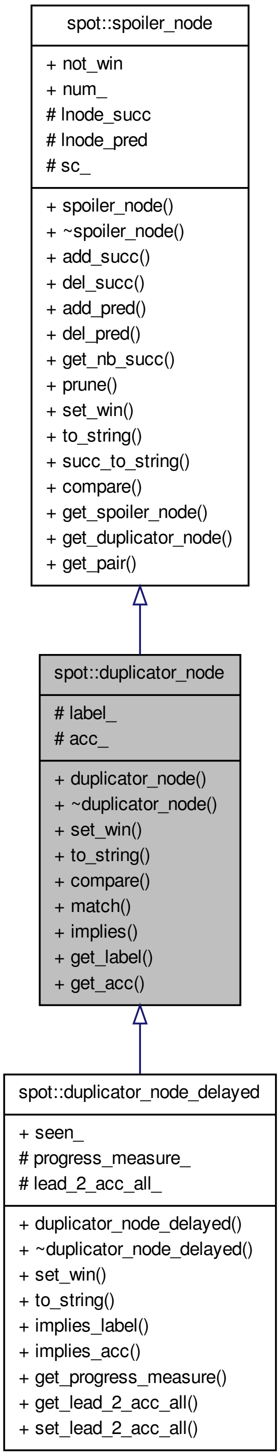
- tgbaalgos/dottydec.hh

7.30 spot::duplicator_node Class Reference

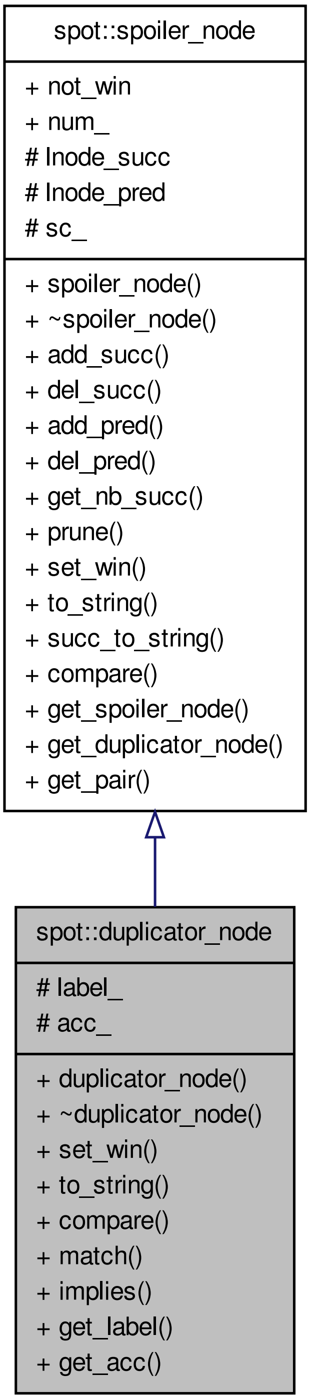
Duplicator node of parity game graph.

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::duplicator_node:



Collaboration diagram for spot::duplicator_node:



Public Member Functions

- duplicator_node (const state ∗d_node, const state ∗s_node, bdd l, bdd a, int num)
- virtual ∼duplicator_node ()
- virtual bool set_win ()
- virtual std::string to_string (const tgba ∗a)
- virtual bool compare (spoiler_node ∗n)
- bool match (bdd l, bdd a)
- bool implies (bdd l, bdd a)
- bdd get_label () const
- bdd get_acc () const
- bool add_succ (spoiler_node ∗n)

  Add a successor. Return true if n wasn't yet in the list of successor, false eitherwise.

- void del_succ (spoiler_node ∗n)
- virtual void add_pred (spoiler_node ∗n)
- virtual void del_pred ()
- int get_nb_succ ()
- bool prune ()
- virtual std::string succ_to_string ()
- const state ∗ get_spoiler_node ()
- const state ∗ get_duplicator_node ()
- state_couple ∗ get_pair ()

Public Attributes

- bool not_win
- int num_

Protected Attributes

- bdd label_
- bdd acc_
- sn_v ∗ lnode_succ
- sn_v ∗ lnode_pred
- state_couple ∗ sc_

7.30.1 Detailed Description

Duplicator node of parity game graph.

7.30.2 Constructor & Destructor Documentation

7.30.2.1 spot::duplicator_node::duplicator_node (const state ∗ *d_node,* const state ∗ *s_node,* bdd *l,* bdd *a,* int *num*)

7.30.2.2 virtual spot::duplicator_node::∼duplicator_node ( ) `[virtual]`

7.30.3 Member Function Documentation

7.30.3.1 virtual void spot::spoiler_node::add_pred (spoiler_node ∗ *n*) `[virtual, inherited]`

7.30.3.2 bool spot::spoiler_node::add_succ (spoiler_node ∗ *n*) `[inherited]`

Add a successor. Return true if *n* wasn't yet in the list of successor, false eitherwise.

7.30.3.3 virtual bool spot::duplicator_node::compare (spoiler_node ∗ *n*) `[virtual]`

Reimplemented from spot::spoiler_node.

7.30.3.4 virtual void spot::spoiler_node::del_pred ( ) `[virtual, inherited]`

7.30.3.5 void spot::spoiler_node::del_succ (spoiler_node ∗ *n*) `[inherited]`

7.30.3.6 bdd spot::duplicator_node::get_acc ( ) const

7.30.3.7 const state∗ spot::spoiler_node::get_duplicator_node ( ) `[inherited]`

7.30.3.8 bdd spot::duplicator_node::get_label ( ) const

7.30.3.9 int spot::spoiler_node::get_nb_succ ( ) `[inherited]`

7.30.3.10 state_couple* spot::spoiler_node::get_pair ( ) `[inherited]`

7.30.3.11 const state* spot::spoiler_node::get_spoiler_node ( ) `[inherited]`

7.30.3.12 bool spot::duplicator_node::implies (bdd *l*, bdd *a*)

7.30.3.13 bool spot::duplicator_node::match (bdd *l*, bdd *a*)

7.30.3.14 bool spot::spoiler_node::prune ( ) `[inherited]`

7.30.3.15 virtual bool spot::duplicator_node::set_win ( ) `[virtual]`

Reimplemented from spot::spoiler_node.

Reimplemented in spot::duplicator_node_delayed.

7.30.3.16 virtual std::string spot::spoiler_node::succ_to_string ( ) `[virtual, inherited]`

7.30.3.17 virtual std::string spot::duplicator_node::to_string (const tgba * *a*) `[virtual]`

Reimplemented from spot::spoiler_node.

Reimplemented in spot::duplicator_node_delayed.

7.30.4 Member Data Documentation

7.30.4.1 bdd spot::duplicator_node::acc_ `[protected]`

7.30.4.2 bdd spot::duplicator_node::label_ `[protected]`

7.30.4.3 sn_v∗ spot::spoiler_node::lnode_pred `[protected, inherited]`

7.30.4.4 sn_v∗ spot::spoiler_node::lnode_succ `[protected, inherited]`

7.30.4.5 bool spot::spoiler_node::not_win `[inherited]`

7.30.4.6 int spot::spoiler_node::num_ `[inherited]`

7.30.4.7 state_couple∗ spot::spoiler_node::sc_ `[protected, inherited]`

The documentation for this class was generated from the following file:

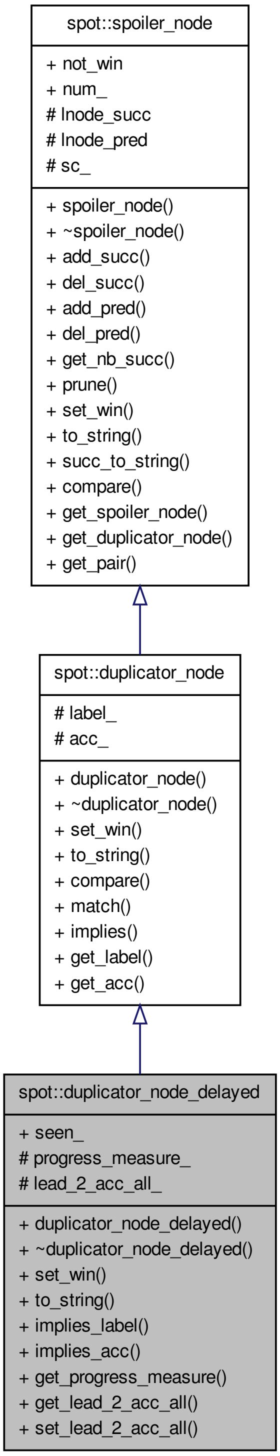
- tgbaalgos/reductgba_sim.hh

7.31 spot::duplicator_node_delayed Class Reference

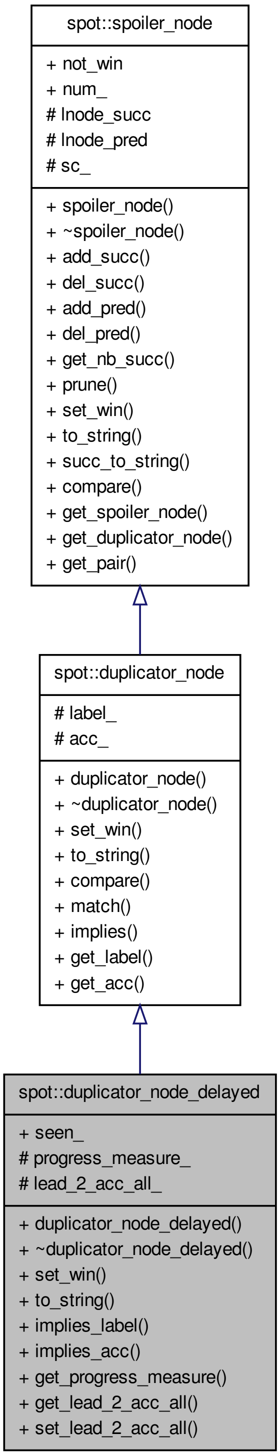
Duplicator node of parity game graph for delayed simulation.

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::duplicator_node_delayed:



Collaboration diagram for spot::duplicator_node_delayed:



Public Member Functions

- duplicator_node_delayed (const state ∗d_node, const state ∗s_node, bdd l, bdd a, int num)
- ∼duplicator_node_delayed ()
- bool set_win ()

  Return true if the progress_measure has changed.

- virtual std::string to_string (const tgba ∗a)
- bool implies_label (bdd l)
- bool implies_acc (bdd a)
- int get_progress_measure ()
- bool get_lead_2_acc_all ()
- bool set_lead_2_acc_all (bdd acc=bddfalse)
- virtual bool compare (spoiler_node ∗n)
- bool match (bdd l, bdd a)
- bool implies (bdd l, bdd a)
- bdd get_label () const
- bdd get_acc () const
- bool add_succ (spoiler_node ∗n)

  Add a successor. Return true if n wasn't yet in the list of successor, false eitherwise.

- void del_succ (spoiler_node ∗n)
- virtual void add_pred (spoiler_node ∗n)
- virtual void del_pred ()
- int get_nb_succ ()
- bool prune ()
- virtual std::string succ_to_string ()
- const state ∗ get_spoiler_node ()
- const state ∗ get_duplicator_node ()
- state_couple ∗ get_pair ()

Public Attributes

- bool seen_
- bool not_win
- int num_

Protected Attributes

- int progress_measure_
- bool lead_2_acc_all_
- bdd label_
- bdd acc_
- sn_v ∗ lnode_succ
- sn_v ∗ lnode_pred
- state_couple ∗ sc_

7.31.1 Detailed Description

Duplicator node of parity game graph for delayed simulation.

7.31.2 Constructor & Destructor Documentation

7.31.2.1 spot::duplicator_node_delayed::duplicator_node_delayed (const state ∗ *d_node,* const state ∗ *s_node,* bdd *l,* bdd *a,* int *num*)

7.31.2.2 spot::duplicator_node_delayed::∼duplicator_node_delayed ( )

7.31.3 Member Function Documentation

7.31.3.1 virtual void spot::spoiler_node::add_pred (spoiler_node ∗ *n*) `[virtual, inherited]`

7.31.3.2 bool spot::spoiler_node::add_succ (spoiler_node ∗ *n*) `[inherited]`

Add a successor. Return true if *n* wasn't yet in the list of successor, false eitherwise.

7.31.3.3 virtual bool spot::duplicator_node::compare (spoiler_node ∗ *n*) `[virtual, inherited]`

Reimplemented from spot::spoiler_node.

7.31.3.4 virtual void spot::spoiler_node::del_pred ( ) `[virtual, inherited]`

7.31.3.5 void spot::spoiler_node::del_succ (spoiler_node ∗ *n*) `[inherited]`

7.31.3.6 bdd spot::duplicator_node::get_acc ( ) const `[inherited]`

7.31.3.7 const state∗ spot::spoiler_node::get_duplicator_node ( ) `[inherited]`

7.31.3.8 bdd spot::duplicator_node::get_label ( ) const `[inherited]`

7.31.3.9 bool spot::duplicator_node_delayed::get_lead_2_acc_all ( )

7.31.3.10 int spot::spoiler_node::get_nb_succ ( ) `[inherited]`

7.31.3.11 state_couple∗ spot::spoiler_node::get_pair ( ) `[inherited]`

7.31.3.12 int spot::duplicator_node_delayed::get_progress_measure ( )

7.31.3.13 const state∗ spot::spoiler_node::get_spoiler_node ( ) `[inherited]`

7.31.3.14 bool spot::duplicator_node::implies (bdd *l*, bdd *a*) `[inherited]`

7.31.3.15 bool spot::duplicator_node_delayed::implies_acc (bdd *a*)

7.31.3.16 bool spot::duplicator_node_delayed::implies_label (bdd *l*)

7.31.3.17 bool spot::duplicator_node::match (bdd *l*, bdd *a*) `[inherited]`

7.31.3.18 bool spot::spoiler_node::prune ( ) `[inherited]`

7.31.3.19 bool spot::duplicator_node_delayed::set_lead_2_acc_all (bdd *acc* = `bddfalse`)

7.31.3.20 bool spot::duplicator_node_delayed::set_win ( ) `[virtual]`

Return true if the progress_measure has changed.

Reimplemented from spot::duplicator_node.

7.31.3.21 virtual std::string spot::spoiler_node::succ_to_string ( ) `[virtual, inherited]`

7.31.3.22 virtual std::string spot::duplicator_node_delayed::to_string (const tgba ∗ *a*) `[virtual]`

Reimplemented from spot::duplicator_node.

7.31.4 Member Data Documentation

7.31.4.1 bdd spot::duplicator_node::acc_ `[protected, inherited]`

7.31.4.2 bdd spot::duplicator_node::label_ `[protected, inherited]`

7.31.4.3 bool spot::duplicator_node_delayed::lead_2_acc_all_ `[protected]`

7.31.4.4 sn_v∗ spot::spoiler_node::lnode_pred `[protected, inherited]`

7.31.4.5 sn_v∗ spot::spoiler_node::lnode_succ `[protected, inherited]`

7.31.4.6 bool spot::spoiler_node::not_win `[inherited]`

7.31.4.7 int spot::spoiler_node::num_ `[inherited]`

7.31.4.8 int spot::duplicator_node_delayed::progress_measure_ `[protected]`

7.31.4.9 state_couple∗ spot::spoiler_node::sc_ `[protected, inherited]`

7.31.4.10 bool spot::duplicator_node_delayed::seen_

The documentation for this class was generated from the following file:

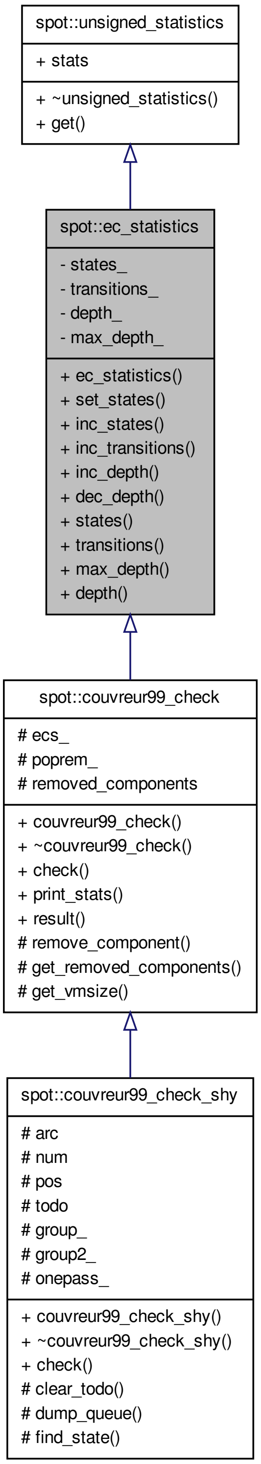
- tgbaalgos/reductgba_sim.hh

7.32 spot::ec_statistics Class Reference

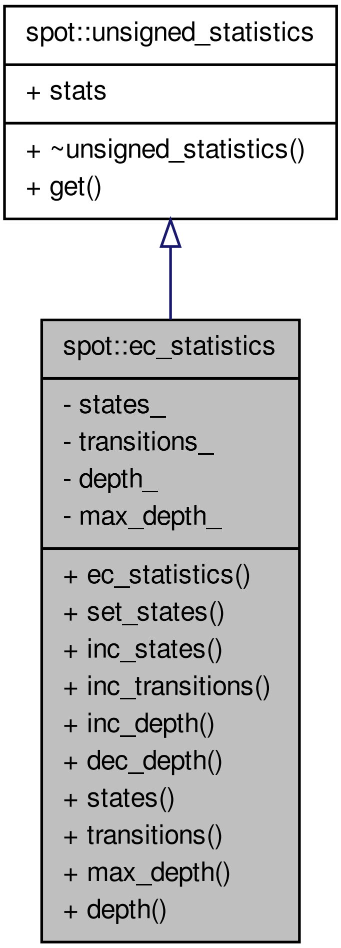
Emptiness-check statistics.

`#include <tgbaalgos/emptiness_stats.hh>`

Inheritance diagram for spot::ec_statistics:



Collaboration diagram for spot::ec_statistics:



Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- ec_statistics ()
- void set_states (unsigned n)
- void inc_states ()
- void inc_transitions ()
- void inc_depth (unsigned n=1)

- void dec_depth (unsigned n=1)
- unsigned states () const
- unsigned transitions () const
- unsigned max_depth () const
- unsigned depth () const
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

Private Attributes

- unsigned states_
- unsigned transitions_

  number of disctint visited states

- unsigned depth_

  number of visited transitions

- unsigned max_depth_

  maximal depth of the stack(s)

7.32.1 Detailed Description

Emptiness-check statistics. Implementations of spot::emptiness_check may also implement this interface. Try to dynamic_cast the spot::emptiness_check pointer to know whether these statistics are available.

7.32.2 Member Typedef Documentation

7.32.2.1 typedef std::map<const char∗, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map `[inherited]`

7.32.2.2 typedef unsigned(unsigned_statistics::∗ spot::unsigned_statistics::unsigned_fun)() const `[inherited]`

7.32.3 Constructor & Destructor Documentation

7.32.3.1 spot::ec_statistics::ec_statistics ( ) `[inline]`

References spot::unsigned_statistics::stats.

7.32.4 Member Function Documentation

7.32.4.1 void spot::ec_statistics::dec_depth (unsigned *n* = `1`) `[inline]`

References depth_.

7.32.4.2 unsigned spot::ec_statistics::depth ( ) const `[inline]`

References depth_.

7.32.4.3 unsigned spot::unsigned_statistics::get (const char ∗ *str*) const `[inline, inherited]`

References spot::unsigned_statistics::stats.

7.32.4.4 void spot::ec_statistics::inc_depth (unsigned *n* = `1`) `[inline]`

References depth_, and max_depth_.

7.32.4.5 void spot::ec_statistics::inc_states ( ) `[inline]`

References states_.

7.32.4.6 void spot::ec_statistics::inc_transitions ( ) `[inline]`

References transitions_.

7.32.4.7 unsigned spot::ec_statistics::max_depth ( ) const `[inline]`

References max_depth_.

7.32.4.8 void spot::ec_statistics::set_states (unsigned *n*) `[inline]`

References states_.

7.32.4.9 unsigned spot::ec_statistics::states ( ) const `[inline]`

References states_.

7.32.4.10 unsigned spot::ec_statistics::transitions ( ) const `[inline]`

References transitions_.

7.32.5 Member Data Documentation

7.32.5.1 unsigned spot::ec_statistics::depth_ `[private]`

number of visited transitions

Referenced by dec_depth(), depth(), and inc_depth().

7.32.5.2 unsigned spot::ec_statistics::max_depth_ `[private]`

maximal depth of the stack(s)

Referenced by inc_depth(), and max_depth().

7.32.5.3 unsigned spot::ec_statistics::states_ `[private]`

Referenced by inc_states(), set_states(), and states().

7.32.5.4 stats_map spot::unsigned_statistics::stats `[inherited]`

Referenced by spot::acss_statistics::acss_statistics(), spot::ars_statistics::ars_statistics(), ec_statistics(), spot::unsigned_statistics::get(), and spot::unsigned_statistics_copy::seteq().

7.32.5.5 unsigned spot::ec_statistics::transitions_ `[private]`

number of disctint visited states

Referenced by inc_transitions(), and transitions().

The documentation for this class was generated from the following file:

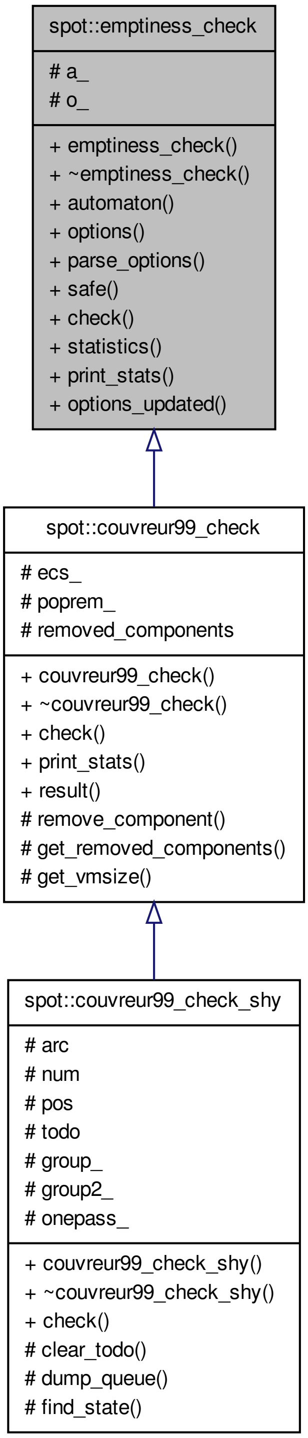
- tgbaalgos/emptiness_stats.hh

7.33 spot::emptiness_check Class Reference

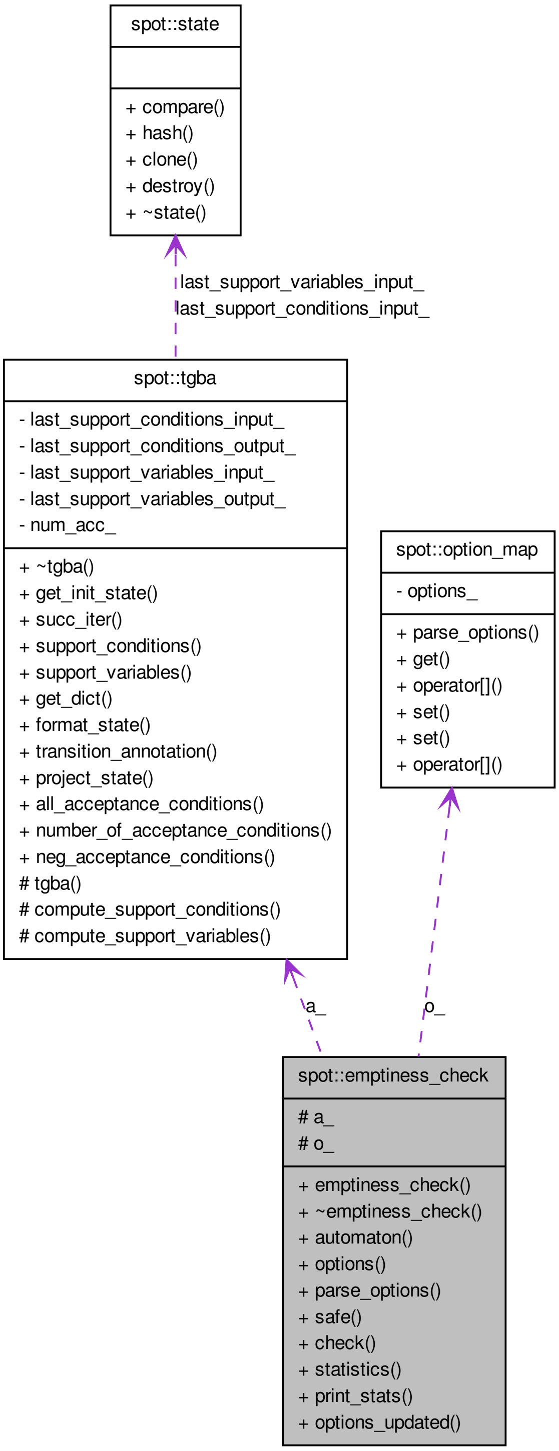
Common interface to emptiness check algorithms.

`#include <tgbaalgos/emptiness.hh>`

Inheritance diagram for spot::emptiness_check:



Collaboration diagram for spot::emptiness_check:



Public Member Functions

- emptiness_check (const tgba ∗a, option_map o=option_map())
- virtual ∼emptiness_check ()
- const tgba ∗ automaton () const

  The automaton that this emptiness-check inspects.

- const option_map & options () const

  Return the options parametrizing how the emptiness check is realized.

- const char ∗ parse_options (char ∗options)

  Modify the algorithm options.

- virtual bool safe () const

  Return false iff accepting_run() can return 0 for non-empty automata.

- virtual emptiness_check_result ∗ check ()=0

  Check whether the automaton contain an accepting run.

- virtual const unsigned_statistics ∗ statistics () const

  Return statistics, if available.

- virtual std::ostream & print_stats (std::ostream &os) const

  Print statistics, if any.

- virtual void options_updated (const option_map &old)

  Notify option updates.

Protected Attributes

- const tgba ∗ a_

  The automaton.

- option_map o_

  The options.

7.33.1 Detailed Description

Common interface to emptiness check algorithms.

7.33.2 Constructor & Destructor Documentation

7.33.2.1 spot::emptiness_check::emptiness_check (const tgba ∗ *a*, option_map *o* = option_map *()*) `[inline]`

7.33.2.2 virtual spot::emptiness_check::∼emptiness_check ( ) `[virtual]`

7.33.3 Member Function Documentation

7.33.3.1 const tgba∗ spot::emptiness_check::automaton ( ) const `[inline]`

The automaton that this emptiness-check inspects.

References a_.

7.33.3.2 virtual emptiness_check_result∗ spot::emptiness_check::check ( ) `[pure virtual]`

Check whether the automaton contain an accepting run.

Return 0 if the automaton accepts no run. Return an instance of emptiness_check_result otherwise. This instance might allow to obtain one sample acceptance run. The result has to be destroyed before the emptiness_check instance that generated it.

Some emptiness_check algorithms may allow check() to be called several time, but generally you should not assume that.

Some emptiness_check algorithms, especially those using bit state hashing may return 0 even if the automaton is not empty.

See also

safe()

7.33.3.3 const option_map& spot::emptiness_check::options ( ) const `[inline]`

Return the options parametrizing how the emptiness check is realized.

References o_.

7.33.3.4 virtual void spot::emptiness_check::options_updated (const option_map & *old*) `[virtual]`

Notify option updates.

7.33.3.5 const char∗ spot::emptiness_check::parse_options (char ∗ *options*)

Modify the algorithm options.

7.33.3.6 virtual std::ostream& spot::emptiness_check::print_stats (std::ostream & *os*) const `[virtual]`

Print statistics, if any.

7.33.3.7 virtual bool spot::emptiness_check::safe ( ) const `[virtual]`

Return false iff accepting_run() can return 0 for non-empty automata.

7.33.3.8 virtual const unsigned_statistics∗ spot::emptiness_check::statistics ( ) const `[virtual]`

Return statistics, if available.

7.33.4 Member Data Documentation

7.33.4.1 const tgba∗ spot::emptiness_check::a_ `[protected]`

The automaton.

Referenced by automaton().

7.33.4.2 option_map spot::emptiness_check::o_ `[protected]`

The options.

Referenced by options().

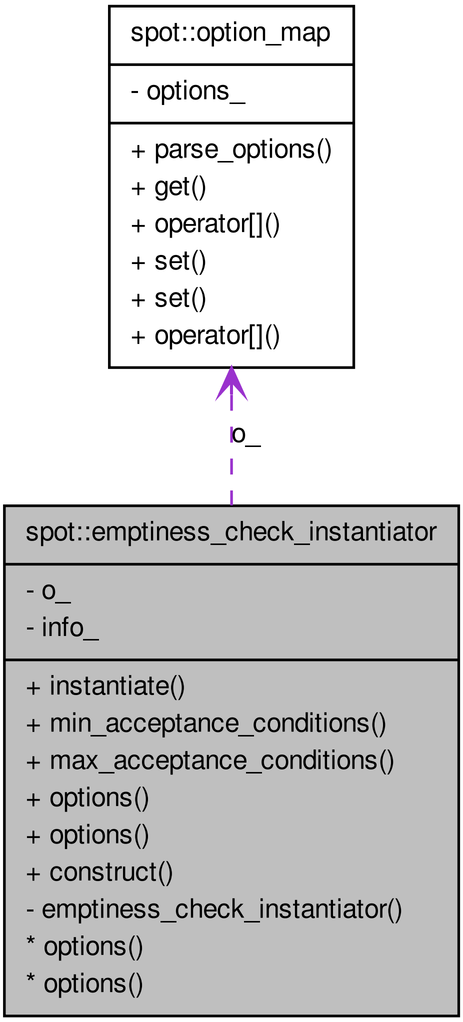
The documentation for this class was generated from the following file:

- tgbaalgos/emptiness.hh

7.34 spot::emptiness_check_instantiator Class Reference

`#include <tgbaalgos/emptiness.hh>`

Collaboration diagram for spot::emptiness_check_instantiator:



Public Member Functions

- emptiness_check ∗ instantiate (const tgba ∗a) const

  Actually instantiate the emptiness check, for a.

- unsigned int min_acceptance_conditions () const

  Minimum number of acceptance conditions supported by the emptiness check.

- unsigned int max_acceptance_conditions () const

  Maximum number of acceptance conditions supported by the emptiness check.

  - const option_map & options () const
  - option_map & options ()

Static Public Member Functions

- static emptiness_check_instantiator ∗ construct (const char ∗name, const char ∗∗err)

  Create an emptiness-check instantiator, given the name of an emptiness check.

Private Member Functions

- emptiness_check_instantiator (option_map o, void ∗i)

Private Attributes

- option_map o_
- void ∗ info_

7.34.1 Constructor & Destructor Documentation

7.34.1.1 spot::emptiness_check_instantiator::emptiness_check_instantiator (option_map *o*, void ∗ *i*) `[private]`

7.34.2 Member Function Documentation

7.34.2.1 static emptiness_check_instantiator∗ spot::emptiness_check_instantiator::construct (const char ∗ *name*, const char ∗∗ *err*) `[static]`

Create an emptiness-check instantiator, given the name of an emptiness check.

name should have the form `"name"` or `"name(options)"`.

On error, the function returns 0. If the name of the algorithm was unknown, `*err` will be set to `name`. If some fragment of the options could not be parsed, `*err` will point to that fragment.

7.34.2.2 emptiness_check∗ spot::emptiness_check_instantiator::instantiate (const tgba ∗ *a*) const

Actually instantiate the emptiness check, for *a*.

7.34.2.3 unsigned int spot::emptiness_check_instantiator::max_acceptance_conditions ( ) const

Maximum number of acceptance conditions supported by the emptiness check.

Returns

`-1U` if no upper bound exists.

7.34.2.4 unsigned int spot::emptiness_check_instantiator::min_acceptance_conditions ( ) const

Minimum number of acceptance conditions supported by the emptiness check.

7.34.2.5 const option_map& spot::emptiness_check_instantiator::options ( ) const [inline]

Accessor to the options.

References o_.

7.34.2.6 option_map& spot::emptiness_check_instantiator::options ( ) [inline]

References o_.

7.34.3 Member Data Documentation

7.34.3.1 void* spot::emptiness_check_instantiator::info_ [private]

7.34.3.2 option_map spot::emptiness_check_instantiator::o_ [private]

Referenced by options().

The documentation for this class was generated from the following file:

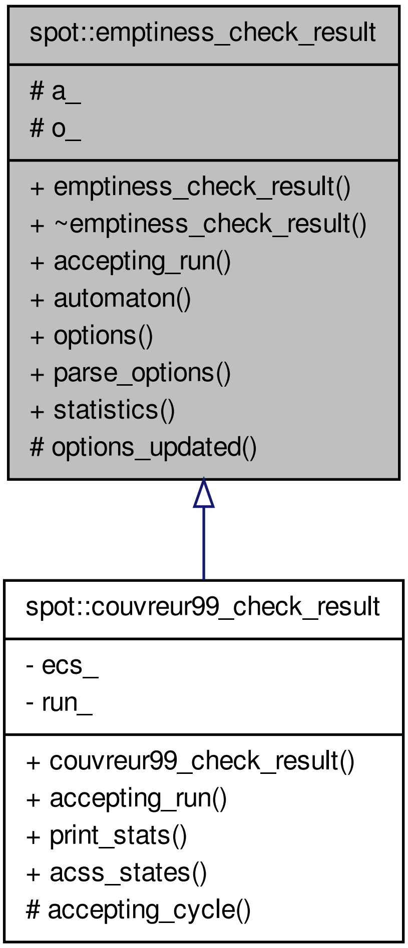
- tgbaalgos/emptiness.hh

7.35 spot::emptiness_check_result Class Reference

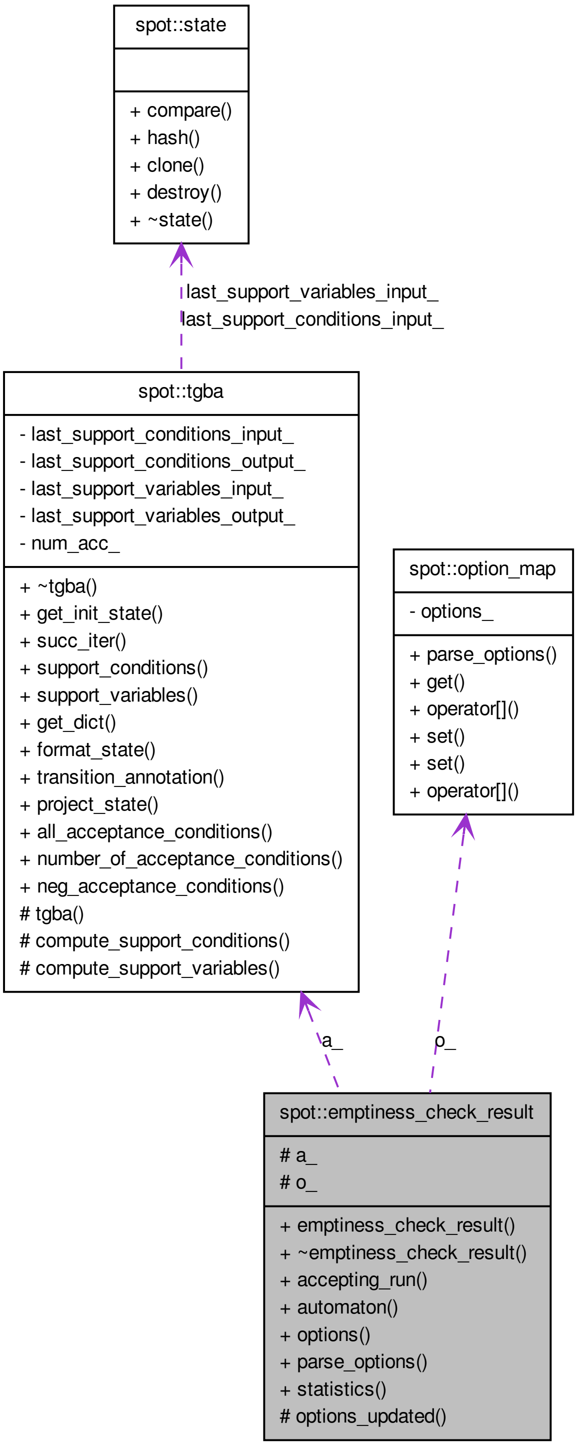
The result of an emptiness check.

`#include <tgbaalgos/emptiness.hh>`

Inheritance diagram for spot::emptiness_check_result:



Collaboration diagram for spot::emptiness_check_result:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::option_map
- options_
+ parse_options()
+ get()
+ operator[]()
+ set()
+ set()
+ operator[]()
a_
o_
spot::emptiness_check_result
# a_
# o_
+ emptiness_check_result()
+ ~emptiness_check_result()
+ accepting_run()
+ automaton()
+ options()
+ parse_options()
+ statistics()
# options_updated()

Public Member Functions

- emptiness_check_result (const tgba ∗a, option_map o=option_map())
- virtual ∼emptiness_check_result ()
- virtual tgba_run ∗ accepting_run ()

  Return a run accepted by the automata passed to the emptiness check.

- const tgba ∗ automaton () const

  The automaton on which an accepting_run() was found.

- const option_map & options () const

  Return the options parametrizing how the accepting run is computed.

- const char ∗ parse_options (char ∗options)

  Modify the algorithm options.

- virtual const unsigned_statistics ∗ statistics () const

  Return statistics, if available.

Protected Member Functions

- virtual void options_updated (const option_map &old)

  Notify option updates.

Protected Attributes

- const tgba ∗ a_

  The automaton.

- option_map o_

  The options.

7.35.1 Detailed Description

The result of an emptiness check. Instances of these class should not last longer than the instances of emptiness_check that produced them as they may reference data internal to the check.

7.35.2 Constructor & Destructor Documentation

7.35.2.1 spot::emptiness_check_result::emptiness_check_result (const tgba ∗ *a*, option_map *o* = option_map *()*) `[inline]`

7.35.2.2 virtual spot::emptiness_check_result::∼emptiness_check_result ( ) `[inline, virtual]`

7.35.3 Member Function Documentation

7.35.3.1 virtual tgba_run∗ spot::emptiness_check_result::accepting_run ( ) `[virtual]`

Return a run accepted by the automata passed to the emptiness check.

This method might actually compute the acceptance run. (Not all emptiness check algorithms actually produce a counter-example as a side-effect of checking emptiness, some need some post-processing.)

This can also return 0 if the emptiness check algorithm cannot produce a counter example (that does not mean there is no counter-example; the mere existence of an instance of this class asserts the existence of a counter-example).

7.35.3.2 const tgba∗ spot::emptiness_check_result::automaton ( ) const `[inline]`

The automaton on which an accepting_run() was found.

References a_.

7.35.3.3 const option_map& spot::emptiness_check_result::options ( ) const `[inline]`

Return the options parametrizing how the accepting run is computed.

References o_.

7.35.3.4 virtual void spot::emptiness_check_result::options_updated (const option_map & *old*) `[protected, virtual]`

Notify option updates.

7.35.3.5 const char∗ spot::emptiness_check_result::parse_options (char ∗ *options*)

Modify the algorithm options.

7.35.3.6 virtual const unsigned_statistics∗ spot::emptiness_check_result::statistics ( ) const `[virtual]`

Return statistics, if available.

7.35.4 Member Data Documentation

7.35.4.1 const tgba∗ spot::emptiness_check_result::a_ `[protected]`

The automaton.

Referenced by automaton().

7.35.4.2 option_map spot::emptiness_check_result::o_ `[protected]`

The options.

Referenced by options().

The documentation for this class was generated from the following file:

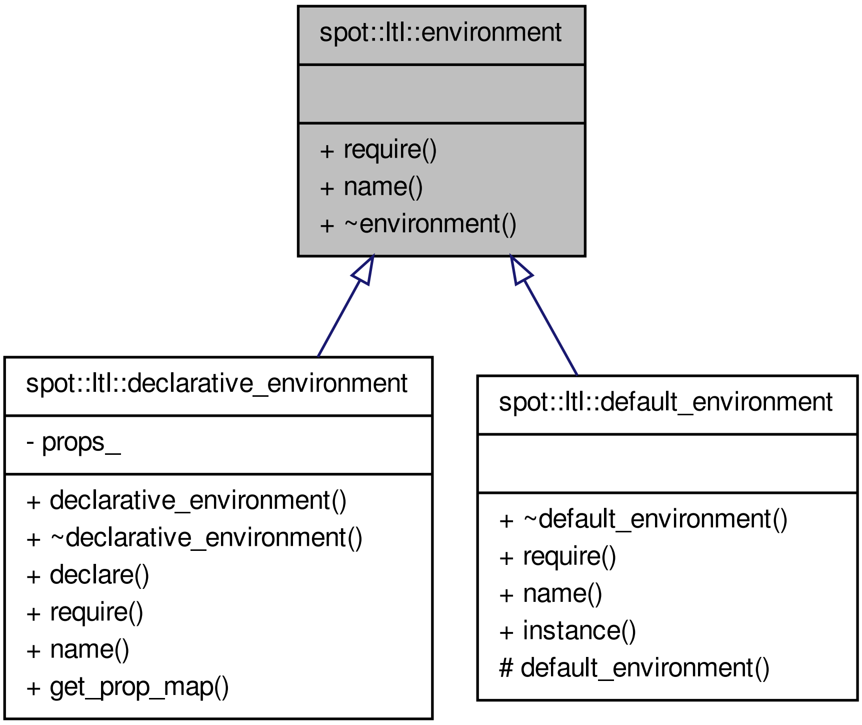
- tgbaalgos/emptiness.hh

7.36 spot::ltl::environment Class Reference

An environment that describes atomic propositions.

`#include <ltlenv/environment.hh>`

Inheritance diagram for spot::ltl::environment:



Public Member Functions

- virtual formula ∗ require (const std::string &prop_str)=0

  Obtain the formula associated to prop_str.

- virtual const std::string & name ()=0

  Get the name of the environment.

- virtual ∼environment ()

7.36.1 Detailed Description

An environment that describes atomic propositions.

7.36.2 Constructor & Destructor Documentation

7.36.2.1 virtual spot::ltl::environment::∼environment ( ) `[inline, virtual]`

7.36.3 Member Function Documentation

7.36.3.1 virtual const std::string& spot::ltl::environment::name ( ) `[pure virtual]`

Get the name of the environment.

Implemented in spot::ltl::declarative_environment, and spot::ltl::default_environment.

7.36.3.2 virtual formula∗ spot::ltl::environment::require (const std::string & *prop_str*) `[pure virtual]`

Obtain the formula associated to *prop_str*.

Usually *prop_str*, is the name of an atomic proposition, and spot::ltl::require simply returns the associated spot::ltl::atomic_prop.

Note this is not a `const` method. Some environments will "create" the atomic proposition when requested.

We return a spot::ltl::formula instead of an spot::ltl::atomic_prop, because this will allow nifty tricks (e.g., we could name formulae in an environment, and let the parser build a larger tree from these).

Returns

0 iff *prop_str* is not part of the environment, or the associated spot::ltl::formula otherwise.

Implemented in spot::ltl::declarative_environment, and spot::ltl::default_environment.

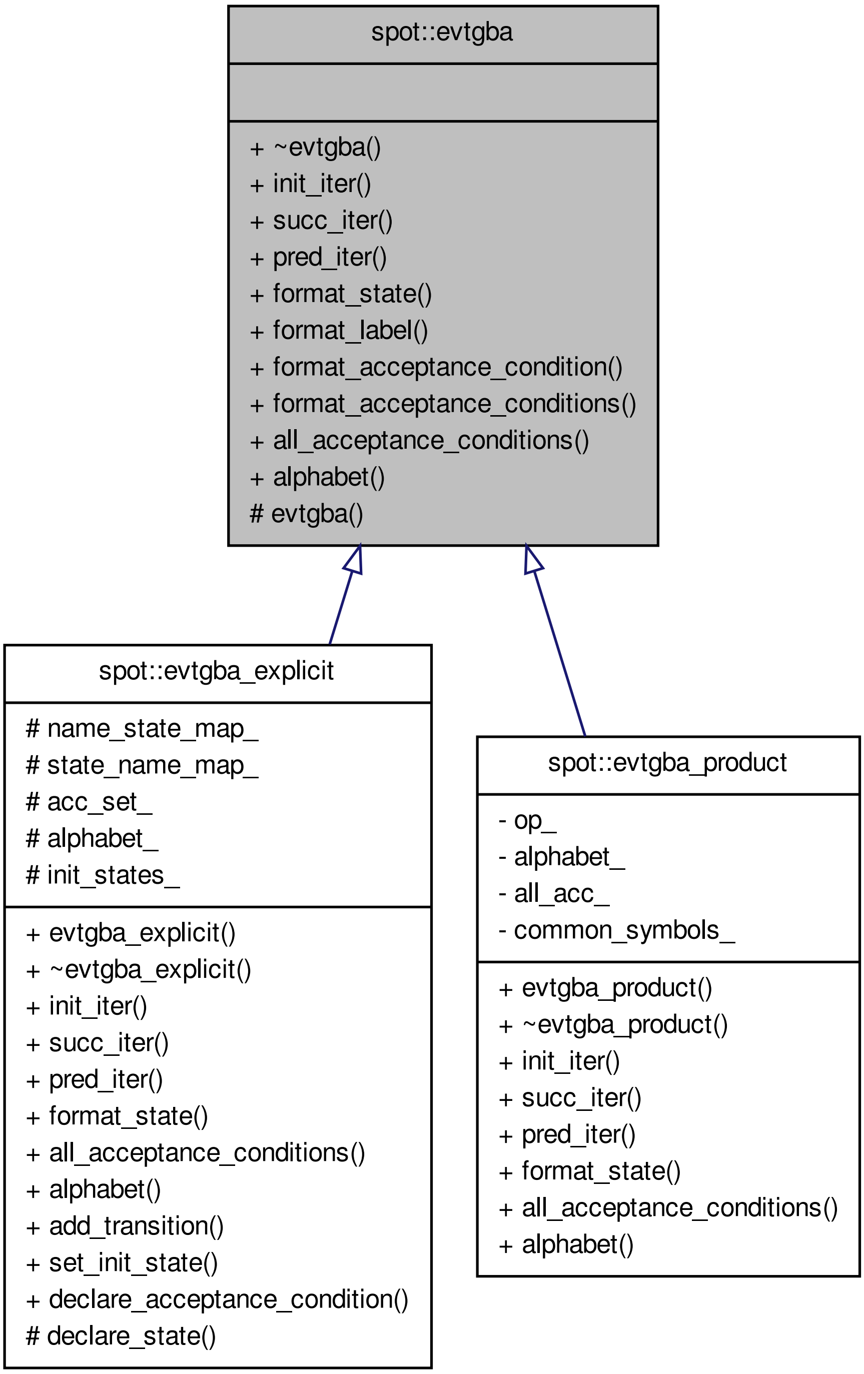
The documentation for this class was generated from the following file:

- ltlenv/environment.hh

7.37 spot::evtgba Class Reference

`#include <evtgba/evtgba.hh>`

Inheritance diagram for spot::evtgba:



Public Member Functions

- virtual ∼evtgba ()
- virtual evtgba_iterator ∗ init_iter () const =0
- virtual evtgba_iterator ∗ succ_iter (const state ∗s) const =0
- virtual evtgba_iterator ∗ pred_iter (const state ∗s) const =0
- virtual std::string format_state (const state ∗state) const =0

  Format the state as a string for printing.

- virtual std::string format_label (const symbol ∗symbol) const
- virtual std::string format_acceptance_condition (const symbol ∗symbol) const
- virtual std::string format_acceptance_conditions (const symbol_set &symset) const
- virtual const symbol_set & all_acceptance_conditions () const =0

  Return the set of all acceptance conditions used by this automaton.

- virtual const symbol_set & alphabet () const =0

Protected Member Functions

- evtgba ()

7.37.1 Constructor & Destructor Documentation

7.37.1.1 spot::evtgba::evtgba ( ) `[protected]`

7.37.1.2 virtual spot::evtgba::∼evtgba ( ) `[virtual]`

7.37.2 Member Function Documentation

7.37.2.1 virtual const symbol_set& spot::evtgba::all_acceptance_conditions ( ) const `[pure virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implemented in spot::evtgba_explicit, and spot::evtgba_product.

7.37.2.2 virtual const symbol_set& spot::evtgba::alphabet ( ) const `[pure virtual]`

Implemented in spot::evtgba_explicit, and spot::evtgba_product.

7.37.2.3 virtual std::string spot::evtgba::format_acceptance_condition (const symbol ∗ *symbol*) const `[virtual]`

7.37.2.4 virtual std::string spot::evtgba::format_acceptance_conditions (const symbol_set & *symset*) const `[virtual]`

7.37.2.5 virtual std::string spot::evtgba::format_label (const symbol ∗ *symbol*) const `[virtual]`

7.37.2.6 virtual std::string spot::evtgba::format_state (const state ∗ *state*) const `[pure virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implemented in spot::evtgba_explicit, and spot::evtgba_product.

7.37.2.7 virtual evtgba_iterator∗ spot::evtgba::init_iter ( ) const `[pure virtual]`

Implemented in spot::evtgba_explicit, and spot::evtgba_product.

7.37.2.8 virtual evtgba_iterator∗ spot::evtgba::pred_iter (const state ∗ *s*) const `[pure virtual]`

Implemented in spot::evtgba_explicit, and spot::evtgba_product.

7.37.2.9 virtual evtgba_iterator∗ spot::evtgba::succ_iter (const state ∗ *s*) const `[pure virtual]`

Implemented in spot::evtgba_explicit, and spot::evtgba_product.

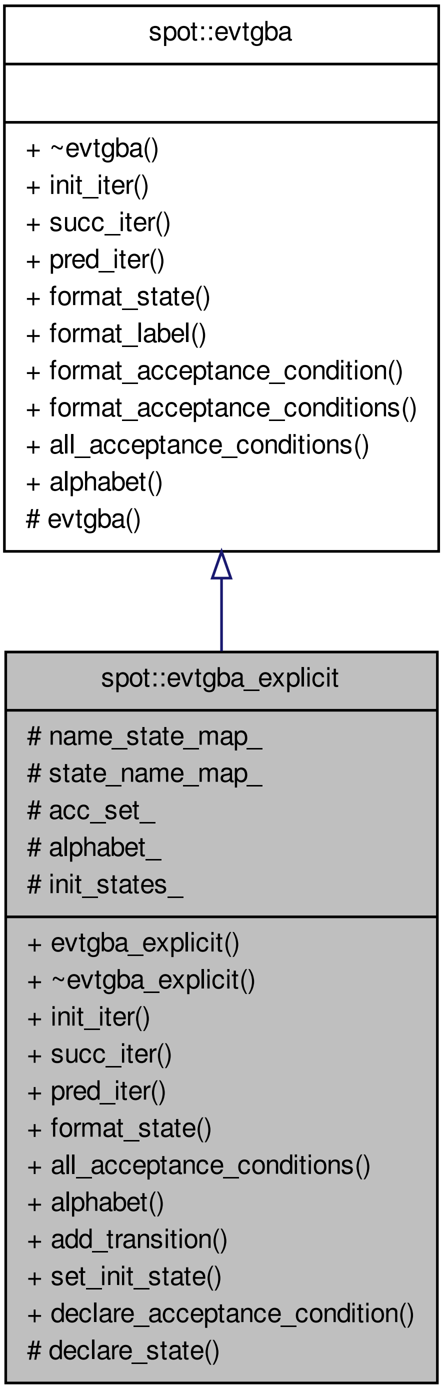
The documentation for this class was generated from the following file:

- evtgba/evtgba.hh

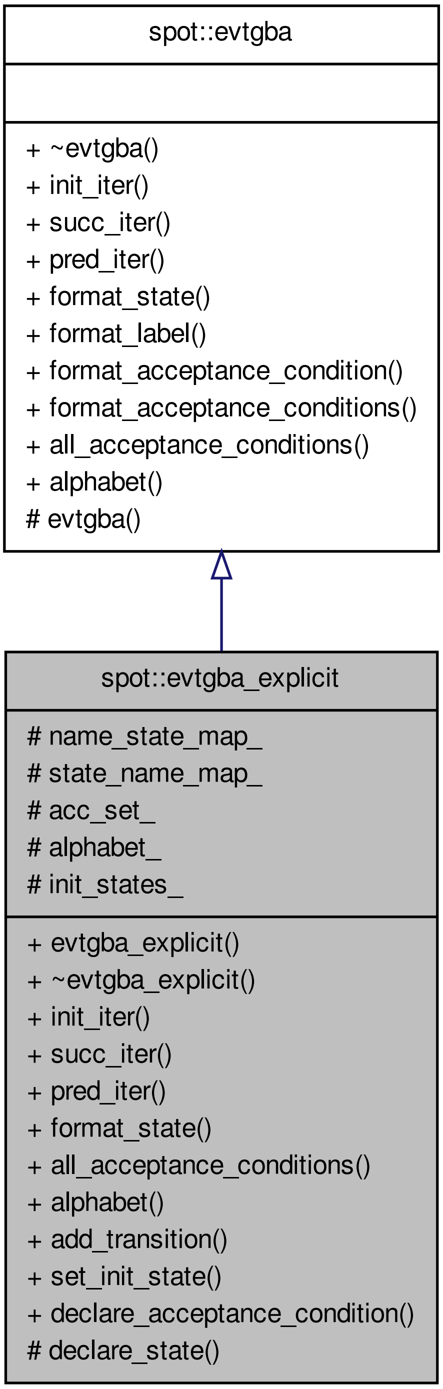
7.38 spot::evtgba_explicit Class Reference

`#include <evtgba/explicit.hh>`

Inheritance diagram for spot::evtgba_explicit:



Collaboration diagram for spot::evtgba_explicit:



Classes

- struct state
- struct transition

  Explicit transitions (used by spot::evtgba_explicit).

Public Types

- typedef std::list< transition ∗ > transition_list

Public Member Functions

- evtgba_explicit ()
- virtual ∼evtgba_explicit ()
- virtual evtgba_iterator ∗ init_iter () const
- virtual evtgba_iterator ∗ succ_iter (const spot::state ∗s) const
- virtual evtgba_iterator ∗ pred_iter (const spot::state ∗s) const
- virtual std::string format_state (const spot::state ∗state) const

  Format the state as a string for printing.

- virtual const symbol_set & all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual const symbol_set & alphabet () const
- transition ∗ add_transition (const std::string &source, const rsymbol &label, rsymbol_set acc, const std::string &dest)
- void set_init_state (const std::string &name)

  Designate name as initial state.

- void declare_acceptance_condition (const rsymbol &acc)
- virtual std::string format_label (const symbol ∗symbol) const
- virtual std::string format_acceptance_condition (const symbol ∗symbol) const
- virtual std::string format_acceptance_conditions (const symbol_set &symset) const

Protected Types

- typedef Sgi::hash_map< const std::string, evtgba_explicit::state ∗, string_hash > ns_map
- typedef Sgi::hash_map< const evtgba_explicit::state ∗, std::string, ptr_hash< evtgba_explicit::state > > sn_map

Protected Member Functions

- state ∗ declare_state (const std::string &name)

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- symbol_set acc_set_
- symbol_set alphabet_
- transition_list init_states_

7.38.1 Member Typedef Documentation

7.38.1.1 typedef Sgi::hash_map<const std::string, evtgba_explicit::state∗, string_hash> spot::evtgba_explicit::ns_map `[protected]`

7.38.1.2 typedef Sgi::hash_map<const evtgba_explicit::state∗, std::string, ptr_hash<evtgba_explicit::state> > spot::evtgba_explicit::sn_map `[protected]`

7.38.1.3 typedef std::list<transition∗> spot::evtgba_explicit::transition_list

7.38.2 Constructor & Destructor Documentation

7.38.2.1 spot::evtgba_explicit::evtgba_explicit ( )

7.38.2.2 virtual spot::evtgba_explicit::∼evtgba_explicit ( ) `[virtual]`

7.38.3 Member Function Documentation

7.38.3.1 transition∗ spot::evtgba_explicit::add_transition (const std::string & *source*, const rsymbol & *label*, rsymbol_set *acc*, const std::string & *dest*)

7.38.3.2 virtual const symbol_set& spot::evtgba_explicit::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::evtgba.

7.38.3.3 virtual const symbol_set& spot::evtgba_explicit::alphabet ( ) const `[virtual]`

Implements spot::evtgba.

7.38.3.4 void spot::evtgba_explicit::declare_acceptance_condition (const rsymbol & *acc*)

7.38.3.5 state∗ spot::evtgba_explicit::declare_state (const std::string & *name*) `[protected]`

7.38.3.6 virtual std::string spot::evtgba::format_acceptance_condition (const symbol ∗ *symbol*) const `[virtual, inherited]`

7.38.3.7 virtual std::string spot::evtgba::format_acceptance_conditions (const symbol_set & *symset*) const `[virtual, inherited]`

7.38.3.8 virtual std::string spot::evtgba::format_label (const symbol ∗ *symbol*) const `[virtual, inherited]`

7.38.3.9 virtual std::string spot::evtgba_explicit::format_state (const spot::state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::evtgba.

7.38.3.10 virtual evtgba_iterator∗ spot::evtgba_explicit::init_iter ( ) const `[virtual]`

Implements spot::evtgba.

7.38.3.11 virtual evtgba_iterator∗ spot::evtgba_explicit::pred_iter (const spot::state ∗ *s*) const `[virtual]`

Implements [spot::evtgba](#).

7.38.3.12 void spot::evtgba_explicit::set_init_state (const std::string & *name*)

Designate *name* as initial state.

Can be called multiple times in case there is several initial states.

7.38.3.13 virtual evtgba_iterator∗ spot::evtgba_explicit::succ_iter (const spot::state ∗ *s*) const `[virtual]`

Implements spot::evtgba.

7.38.4 Member Data Documentation

7.38.4.1 symbol_set spot::evtgba_explicit::acc_set_ `[protected]`

7.38.4.2 symbol_set spot::evtgba_explicit::alphabet_ `[protected]`

7.38.4.3 transition_list spot::evtgba_explicit::init_states_ `[protected]`

7.38.4.4 ns_map spot::evtgba_explicit::name_state_map_ `[protected]`

7.38.4.5 sn_map spot::evtgba_explicit::state_name_map_ `[protected]`

The documentation for this class was generated from the following file:

- evtgba/explicit.hh

7.39 spot::evtgba_iterator Class Reference

`#include <evtgba/evtgbaiter.hh>`

Public Member Functions

- virtual ~evtgba_iterator ()
- virtual void first ()=0
- virtual void next ()=0
- virtual bool done () const =0
- virtual const state ∗ current_state () const =0
- virtual const symbol ∗ current_label () const =0
- virtual symbol_set current_acceptance_conditions () const =0

7.39.1 Constructor & Destructor Documentation

7.39.1.1 virtual spot::evtgba_iterator::~evtgba_iterator ( ) `[inline, virtual]`

7.39.2 Member Function Documentation

7.39.2.1 virtual symbol_set spot::evtgba_iterator::current_acceptance_conditions ( ) const `[pure virtual]`

7.39.2.2 virtual const symbol∗ spot::evtgba_iterator::current_label ( ) const `[pure virtual]`

7.39.2.3 virtual const state∗ spot::evtgba_iterator::current_state ( ) const `[pure virtual]`

7.39.2.4 virtual bool spot::evtgba_iterator::done ( ) const `[pure virtual]`

7.39.2.5 virtual void spot::evtgba_iterator::first ( ) `[pure virtual]`

7.39.2.6 virtual void spot::evtgba_iterator::next ( ) `[pure virtual]`

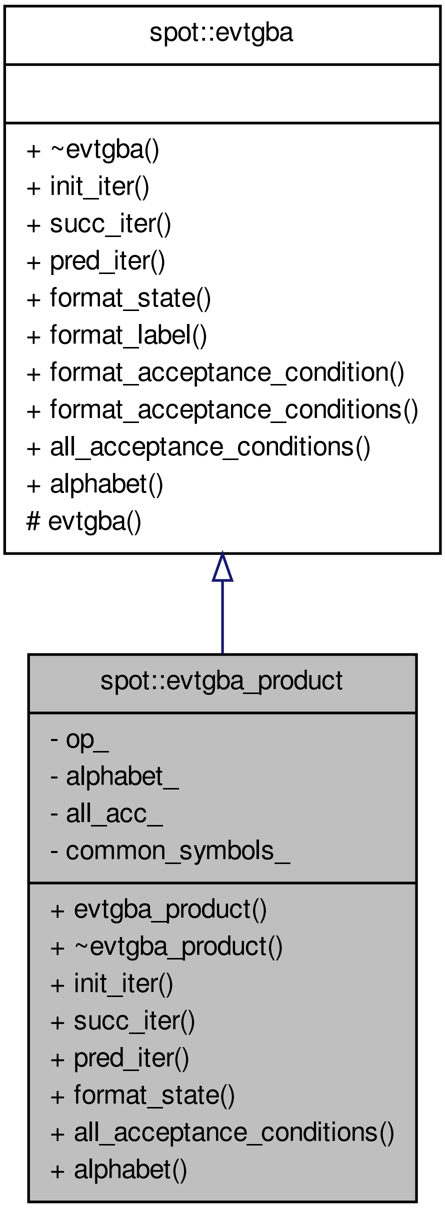
The documentation for this class was generated from the following file:

- evtgba/evtgbaiter.hh

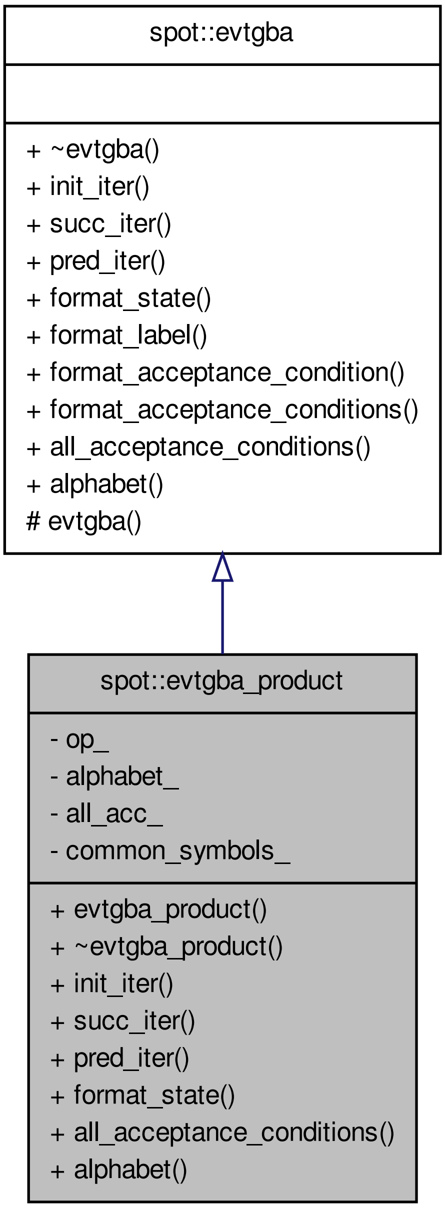
7.40 spot::evtgba_product Class Reference

`#include <evtgba/product.hh>`

Inheritance diagram for spot::evtgba_product:



Collaboration diagram for spot::evtgba_product:



Public Types

- typedef std::vector< const evtgba ∗ > evtgba_product_operands
- typedef std::map< const symbol ∗, std::set< int > > common_symbol_table

Public Member Functions

- evtgba_product (const evtgba_product_operands &op)
- virtual ∼evtgba_product ()
- virtual evtgba_iterator ∗ init_iter () const
- virtual evtgba_iterator ∗ succ_iter (const state ∗s) const
- virtual evtgba_iterator ∗ pred_iter (const state ∗s) const
- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual const symbol_set & all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual const symbol_set & alphabet () const
- virtual std::string format_label (const symbol ∗symbol) const
- virtual std::string format_acceptance_condition (const symbol ∗symbol) const
- virtual std::string format_acceptance_conditions (const symbol_set &symset) const

Private Attributes

- const evtgba_product_operands op_
- symbol_set alphabet_
- symbol_set all_acc_
- common_symbol_table common_symbols_

7.40.1 Member Typedef Documentation

7.40.1.1 typedef std::map<const symbol∗, std::set<int> > spot::evtgba_product::common_symbol_table

7.40.1.2 typedef std::vector<const evtgba∗> spot::evtgba_product::evtgba_product_operands

7.40.2 Constructor & Destructor Documentation

7.40.2.1 spot::evtgba_product::evtgba_product (const evtgba_product_operands & *op*)

7.40.2.2 virtual spot::evtgba_product::∼evtgba_product ( ) `[virtual]`

7.40.3 Member Function Documentation

7.40.3.1 virtual const symbol_set& spot::evtgba_product::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::evtgba.

7.40.3.2 virtual const symbol_set& spot::evtgba_product::alphabet ( ) const `[virtual]`

Implements spot::evtgba.

7.40.3.3 virtual std::string spot::evtgba::format_acceptance_condition (const symbol ∗ *symbol*) const `[virtual, inherited]`

7.40.3.4 virtual std::string spot::evtgba::format_acceptance_conditions (const symbol_set & *symset*) const `[virtual, inherited]`

7.40.3.5 virtual std::string spot::evtgba::format_label (const symbol ∗ *symbol*) const `[virtual, inherited]`

7.40.3.6 virtual std::string spot::evtgba_product::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::evtgba.

7.40.3.7 virtual evtgba_iterator∗ spot::evtgba_product::init_iter ( ) const `[virtual]`

Implements spot::evtgba.

7.40.3.8 virtual evtgba_iterator∗ spot::evtgba_product::pred_iter (const state ∗ *s*) const `[virtual]`

Implements spot::evtgba.

7.40.3.9 virtual evtgba_iterator∗ spot::evtgba_product::succ_iter (const state ∗ *s*) const `[virtual]`

Implements spot::evtgba.

7.40.4 Member Data Documentation

7.40.4.1 symbol_set spot::evtgba_product::all_acc_ `[private]`

7.40.4.2 symbol_set spot::evtgba_product::alphabet_ `[private]`

7.40.4.3 common_symbol_table spot::evtgba_product::common_symbols_ `[private]`

7.40.4.4 const evtgba_product_operands spot::evtgba_product::op_ `[private]`

The documentation for this class was generated from the following file:

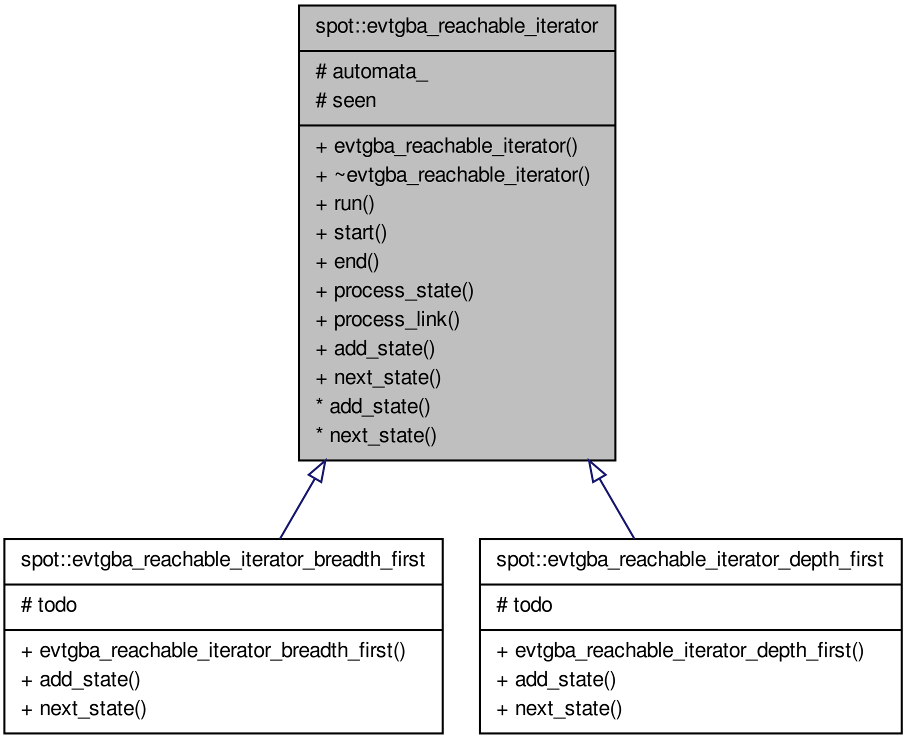
- evtgba/product.hh

7.41 spot::evtgba_reachable_iterator Class Reference

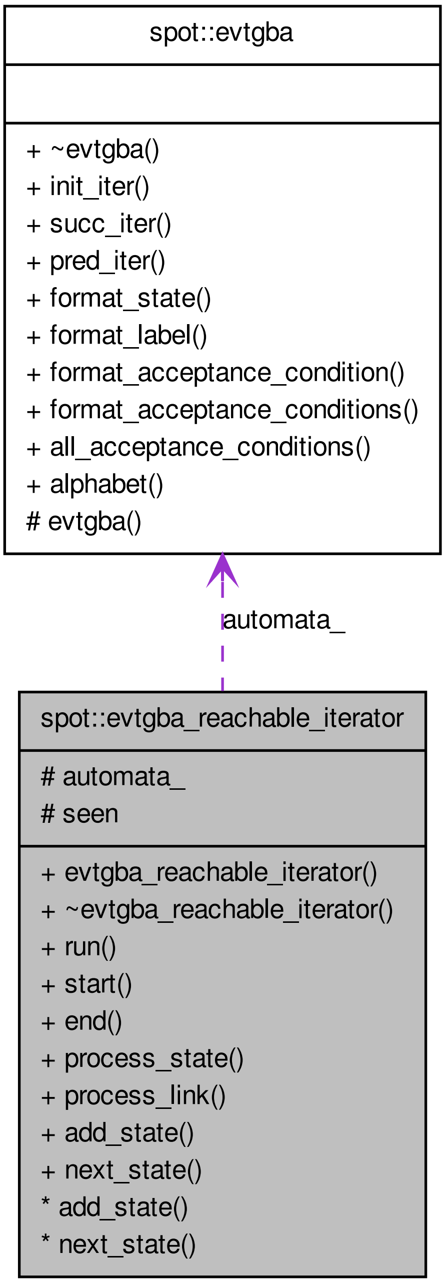
Iterate over all reachable states of a spot::evtgba.

`#include <evtgbaalgos/reachiter.hh>`

Inheritance diagram for spot::evtgba_reachable_iterator:


spot::evtgba_reachable_iterator
# automata_
# seen
+ evtgba_reachable_iterator()
+ ~evtgba_reachable_iterator()
+ run()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::evtgba_reachable_iterator_breadth_first
# todo
+ evtgba_reachable_iterator_breadth_first()
+ add_state()
+ next_state()
spot::evtgba_reachable_iterator_depth_first
# todo
+ evtgba_reachable_iterator_depth_first()
+ add_state()
+ next_state()

Collaboration diagram for spot::evtgba_reachable_iterator:



Public Member Functions

- evtgba_reachable_iterator (const evtgba ∗a)
- virtual ∼evtgba_reachable_iterator ()
- void run ()

  Iterate over all reachable states of a spot::evtgba.

- virtual void start (int n)

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const state ∗s, int n, evtgba_iterator ∗si)
- virtual void process_link (int in, int out, const evtgba_iterator ∗si)

Todo list management.

Called by run() to register newly discovered states.

spot::evtgba_reachable_iterator_depth_first and spot::evtgba_reachable_iterator_breadth_first offer two precanned implementations for these functions.

- virtual void add_state (const state ∗s)=0
- virtual const state ∗ next_state ()=0

  Called by run() to obtain the.

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Attributes

- const evtgba ∗ automata_

  The spot::evtgba to explore.

- seen_map seen

  States already seen.

7.41.1 Detailed Description

Iterate over all reachable states of a spot::evtgba.

7.41.2 Member Typedef Documentation

7.41.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::evtgba_reachable_iterator::seen_map `[protected]`

7.41.3 Constructor & Destructor Documentation

7.41.3.1 spot::evtgba_reachable_iterator::evtgba_reachable_iterator (const evtgba ∗ *a*)

7.41.3.2 virtual spot::evtgba_reachable_iterator::∼evtgba_reachable_iterator ( ) `[virtual]`

7.41.4 Member Function Documentation

7.41.4.1 virtual void spot::evtgba_reachable_iterator::add_state (const state ∗ *s*) `[pure virtual]`

Implemented in spot::evtgba_reachable_iterator_depth_first, and spot::evtgba_reachable_iterator_breadth_first.

7.41.4.2 virtual void spot::evtgba_reachable_iterator::end ( ) `[virtual]`

Called by run() once all states have been explored.

7.41.4.3 virtual const state∗ spot::evtgba_reachable_iterator::next_state ( ) `[pure virtual]`

Called by run() to obtain the.

Implemented in spot::evtgba_reachable_iterator_depth_first, and spot::evtgba_reachable_iterator_breadth_first.

7.41.4.4 virtual void spot::evtgba_reachable_iterator::process_link (int *in,* int *out,* const evtgba_iterator ∗ *si*) `[virtual]`

Called by run() to process a transition.

Parameters

- ***in*** The source state number.
- ***out*** The destination state number.
- ***si*** The spot::evtgba_iterator positionned on the current transition.

7.41.4.5 virtual void spot::evtgba_reachable_iterator::process_state (const state ∗ *s,* int *n,* evtgba_iterator ∗ *si*) `[virtual]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** An unique number assigned to *s*.
- ***si*** The spot::evtgba_iterator for *s*.

7.41.4.6 void spot::evtgba_reachable_iterator::run ( )

Iterate over all reachable states of a spot::evtgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterate over state.

7.41.4.7 virtual void spot::evtgba_reachable_iterator::start (int *n*) `[virtual]`

Called by run() before starting its iteration.

Parameters

- ***n*** The number of initial states.

7.41.5 Member Data Documentation

7.41.5.1 const evtgba∗ spot::evtgba_reachable_iterator::automata_ `[protected]`

The spot::evtgba to explore.

7.41.5.2 seen_map spot::evtgba_reachable_iterator::seen `[protected]`

States already seen.

The documentation for this class was generated from the following file:

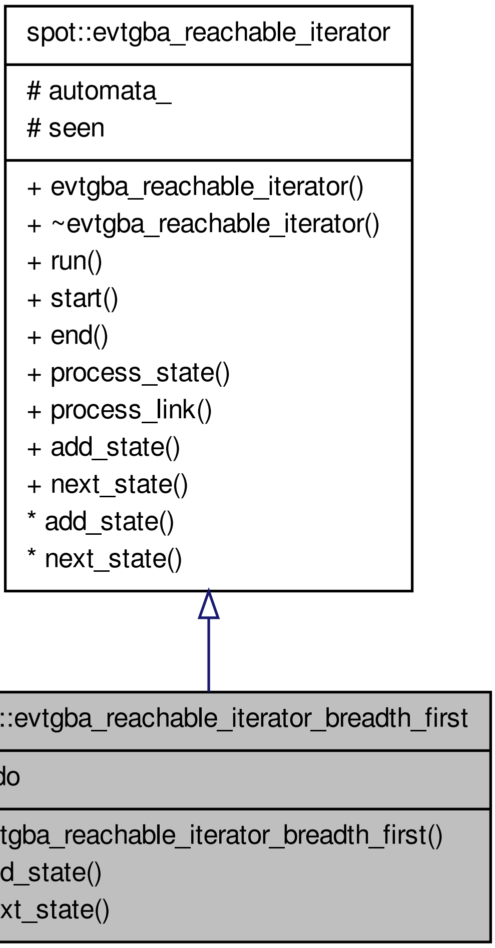
- evtgbaalgos/reachiter.hh

7.42 spot::evtgba_reachable_iterator_breadth_first Class Reference

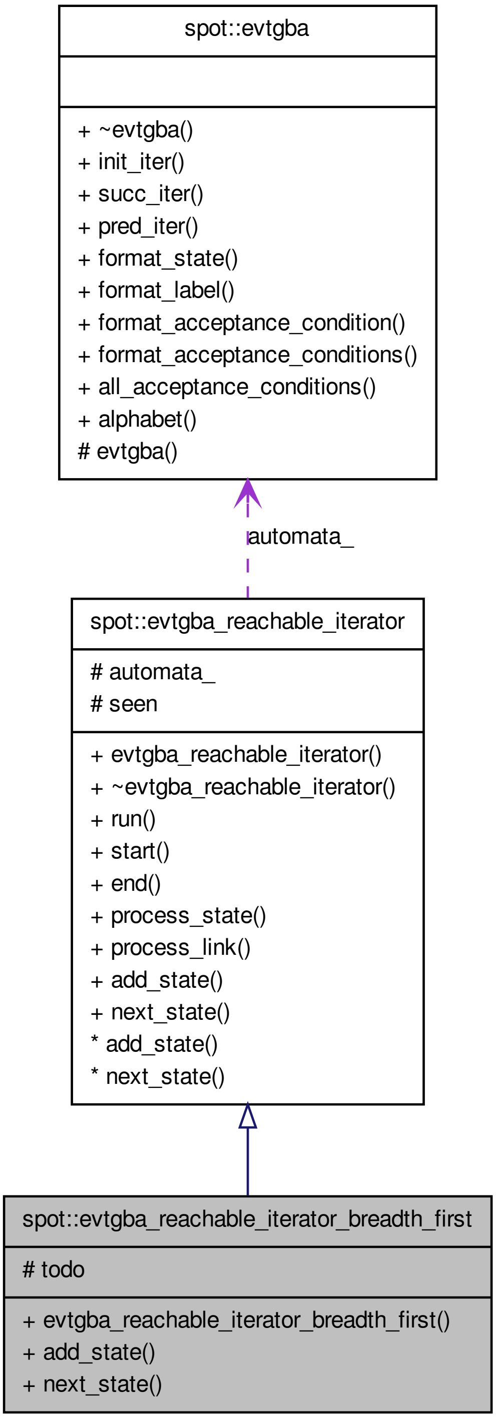
An implementation of spot::evtgba_reachable_iterator that browses states breadth first.

`#include <evtgbaalgos/reachiter.hh>`

Inheritance diagram for spot::evtgba_reachable_iterator_breadth_first:


spot::evtgba_reachable_iterator
# automata_
# seen
+ evtgba_reachable_iterator()
+ ~evtgba_reachable_iterator()
+ run()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::evtgba_reachable_iterator_breadth_first
# todo
+ evtgba_reachable_iterator_breadth_first()
+ add_state()
+ next_state()

Collaboration diagram for spot::evtgba_reachable_iterator_breadth_first:



Public Member Functions

- evtgba_reachable_iterator_breadth_first (const evtgba ∗a)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the.
- void run ()

  Iterate over all reachable states of a spot::evtgba.
- virtual void start (int n)

  Called by run() before starting its iteration.
- virtual void end ()

  Called by run() once all states have been explored.
- virtual void process_state (const state ∗s, int n, evtgba_iterator ∗si)
- virtual void process_link (int in, int out, const evtgba_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Attributes

- std::deque< const state ∗ > todo

  A queue of states yet to explore.
- const evtgba ∗ automata_

  The spot::evtgba to explore.
- seen_map seen

  States already seen.

7.42.1 Detailed Description

An implementation of spot::evtgba_reachable_iterator that browses states breadth first.

7.42.2 Member Typedef Documentation

7.42.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::evtgba_reachable_iterator::seen_map `[protected, inherited]`

7.42.3 Constructor & Destructor Documentation

7.42.3.1 spot::evtgba_reachable_iterator_breadth_first::evtgba_reachable_iterator_breadth_first (const evtgba ∗ *a*)

7.42.4 Member Function Documentation

7.42.4.1 virtual void spot::evtgba_reachable_iterator_breadth_first::add_state (const state ∗ *s*) `[virtual]`

Implements spot::evtgba_reachable_iterator.

7.42.4.2 virtual void spot::evtgba_reachable_iterator::end ( ) `[virtual, inherited]`

Called by run() once all states have been explored.

7.42.4.3 virtual const state∗ spot::evtgba_reachable_iterator_breadth_first::next_state ( ) `[virtual]`

Called by run() to obtain the.

Implements spot::evtgba_reachable_iterator.

7.42.4.4 virtual void spot::evtgba_reachable_iterator::process_link (int *in*, int *out*, const evtgba_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

in The source state number.
out The destination state number.
si The spot::evtgba_iterator positionned on the current transition.

7.42.4.5 virtual void spot::evtgba_reachable_iterator::process_state (const state ∗ *s*, int *n*, evtgba_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a state.

Parameters

s The current state.
n An unique number assigned to *s*.
si The spot::evtgba_iterator for *s*.

7.42.4.6 void spot::evtgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::evtgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterate over state.

7.42.4.7 virtual void spot::evtgba_reachable_iterator::start (int *n*) `[virtual, inherited]`

Called by run() before starting its iteration.

Parameters

n The number of initial states.

7.42.5 Member Data Documentation

7.42.5.1 const evtgba∗ spot::evtgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::evtgba to explore.

7.42.5.2 seen_map spot::evtgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.42.5.3 std::deque<const state∗> spot::evtgba_reachable_iterator_breadth_first::todo `[protected]`

A queue of states yet to explore.

The documentation for this class was generated from the following file:

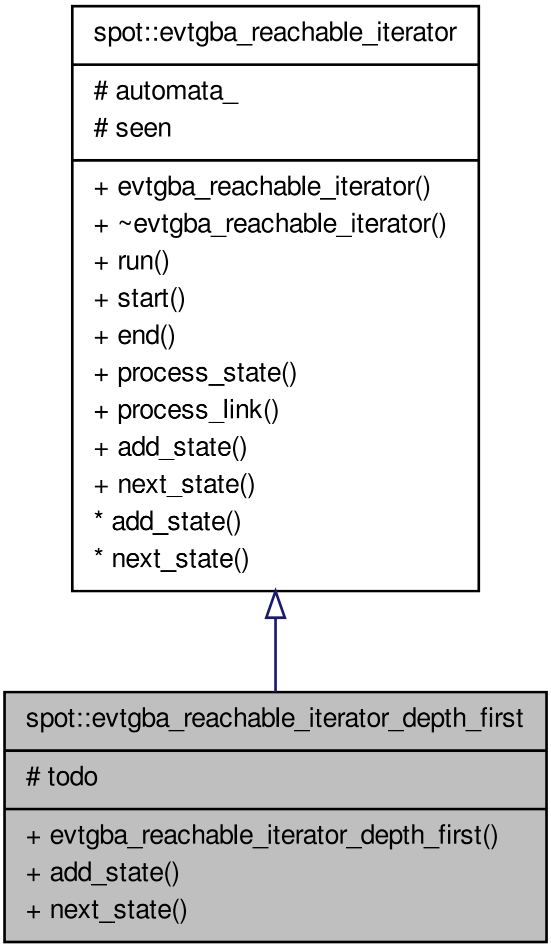
- evtgbaalgos/reachiter.hh

7.43 spot::evtgba_reachable_iterator_depth_first Class Reference

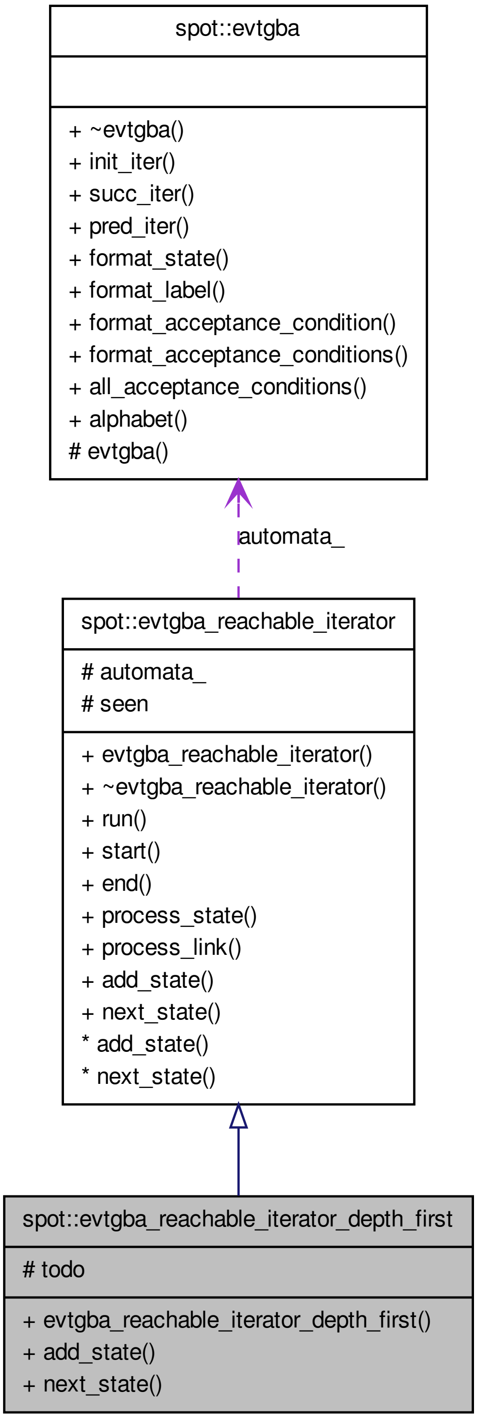
An implementation of spot::evtgba_reachable_iterator that browses states depth first.

`#include <evtgbaalgos/reachiter.hh>`

Inheritance diagram for spot::evtgba_reachable_iterator_depth_first:


spot::evtgba_reachable_iterator
# automata_
# seen
+ evtgba_reachable_iterator()
+ ~evtgba_reachable_iterator()
+ run()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::evtgba_reachable_iterator_depth_first
# todo
+ evtgba_reachable_iterator_depth_first()
+ add_state()
+ next_state()

Collaboration diagram for spot::evtgba_reachable_iterator_depth_first:



Public Member Functions

- evtgba_reachable_iterator_depth_first (const evtgba ∗a)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the.

- void run ()

  Iterate over all reachable states of a spot::evtgba.

- virtual void start (int n)

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const state ∗s, int n, evtgba_iterator ∗si)
- virtual void process_link (int in, int out, const evtgba_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Attributes

- std::stack< const state ∗ > todo

  A stack of states yet to explore.

- const evtgba ∗ automata_

  The spot::evtgba to explore.

- seen_map seen

  States already seen.

7.43.1 Detailed Description

An implementation of spot::evtgba_reachable_iterator that browses states depth first.

7.43.2 Member Typedef Documentation

7.43.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::evtgba_reachable_iterator::seen_map `[protected, inherited]`

7.43.3 Constructor & Destructor Documentation

7.43.3.1 spot::evtgba_reachable_iterator_depth_first::evtgba_reachable_iterator_depth_first (const evtgba ∗ *a*)

7.43.4 Member Function Documentation

7.43.4.1 virtual void spot::evtgba_reachable_iterator_depth_first::add_state (const state ∗ *s*) `[virtual]`

Implements spot::evtgba_reachable_iterator.

7.43.4.2 virtual void spot::evtgba_reachable_iterator::end ( ) `[virtual, inherited]`

Called by run() once all states have been explored.

7.43.4.3 virtual const state∗ spot::evtgba_reachable_iterator_depth_first::next_state ( ) `[virtual]`

Called by run() to obtain the.

Implements spot::evtgba_reachable_iterator.

7.43.4.4 virtual void spot::evtgba_reachable_iterator::process_link (int *in*, int *out*, const evtgba_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

in The source state number.
out The destination state number.
si The spot::evtgba_iterator positionned on the current transition.

7.43.4.5 virtual void spot::evtgba_reachable_iterator::process_state (const state ∗ *s*, int *n*, evtgba_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a state.

Parameters

s The current state.
n An unique number assigned to *s*.
si The spot::evtgba_iterator for *s*.

7.43.4.6 void spot::evtgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::evtgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterate over state.

7.43.4.7 virtual void spot::evtgba_reachable_iterator::start (int *n*) `[virtual, inherited]`

Called by run() before starting its iteration.

Parameters

n The number of initial states.

7.43.5 Member Data Documentation

7.43.5.1 const evtgba∗ spot::evtgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::evtgba to explore.

7.43.5.2 seen_map spot::evtgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.43.5.3 std::stack<const state∗> spot::evtgba_reachable_iterator_depth_first::todo `[protected]`

A stack of states yet to explore.

The documentation for this class was generated from the following file:

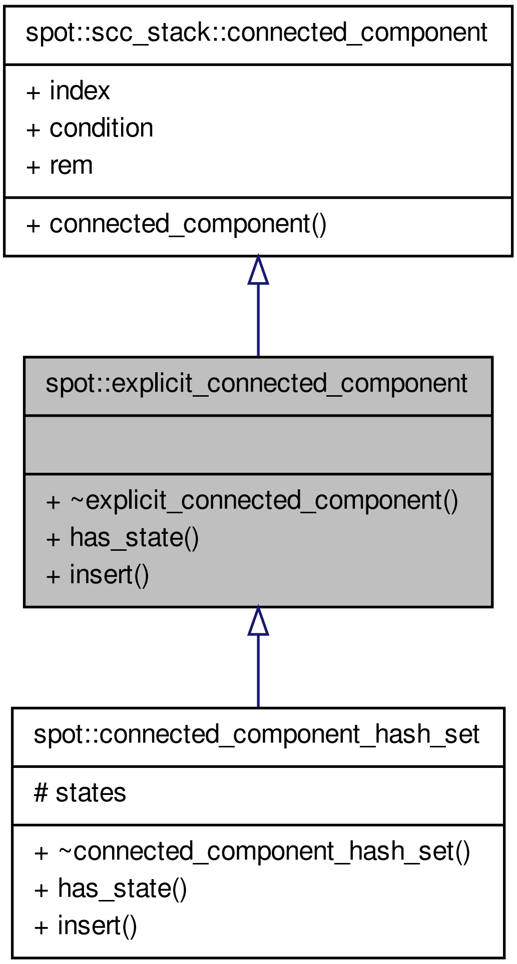
- evtgbaalgos/reachiter.hh

7.44 spot::explicit_connected_component Class Reference

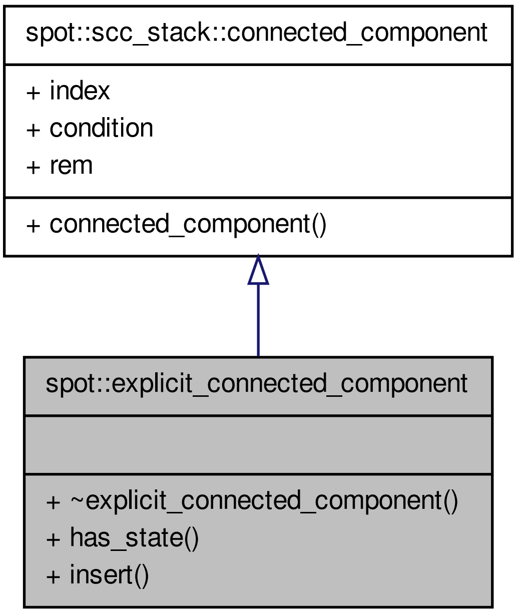
An SCC storing all its states explicitly.

`#include <tgbaalgos/gtec/explscc.hh>`

Inheritance diagram for spot::explicit_connected_component:


spot::scc_stack::connected_component
+ index
+ condition
+ rem
+ connected_component()
spot::explicit_connected_component
+ ~explicit_connected_component()
+ has_state()
+ insert()
spot::connected_component_hash_set
# states
+ ~connected_component_hash_set()
+ has_state()
+ insert()

Collaboration diagram for spot::explicit_connected_component:


spot::scc_stack::connected_component
+ index
+ condition
+ rem
+ connected_component()
spot::explicit_connected_component
+ ~explicit_connected_component()
+ has_state()
+ insert()

Public Member Functions

- virtual ∼explicit_connected_component ()
- virtual const state ∗ has_state (const state ∗s) const =0

  Check if the SCC contains states s.

- virtual void insert (const state ∗s)=0

  Insert a new state in the SCC.

Public Attributes

- int index

  Index of the SCC.

- bdd condition
- std::list< const state ∗ > rem

7.44.1 Detailed Description

An SCC storing all its states explicitly.

7.44.2 Constructor & Destructor Documentation

7.44.2.1 virtual spot::explicit_connected_component::~explicit_connected_component ( ) `[inline, virtual]`

7.44.3 Member Function Documentation

7.44.3.1 virtual const state∗ spot::explicit_connected_component::has_state (const state ∗ *s*) const `[pure virtual]`

Check if the SCC contains states *s*.

Return the representative of *s* in the SCC, and destroy *s* if it is different (acting like numbered_state_heap::filter), or 0 otherwise.

Implemented in spot::connected_component_hash_set.

7.44.3.2 virtual void spot::explicit_connected_component::insert (const state ∗ *s*) `[pure virtual]`

Insert a new state in the SCC.

Implemented in spot::connected_component_hash_set.

7.44.4 Member Data Documentation

7.44.4.1 bdd spot::scc_stack::connected_component::condition `[inherited]`

The bdd condition is the union of all acceptance conditions of transitions which connect the states of the connected component.

7.44.4.2 int spot::scc_stack::connected_component::index `[inherited]`

Index of the SCC.

7.44.4.3 std::list<const state∗> spot::scc_stack::connected_component::rem `[inherited]`

The documentation for this class was generated from the following file:

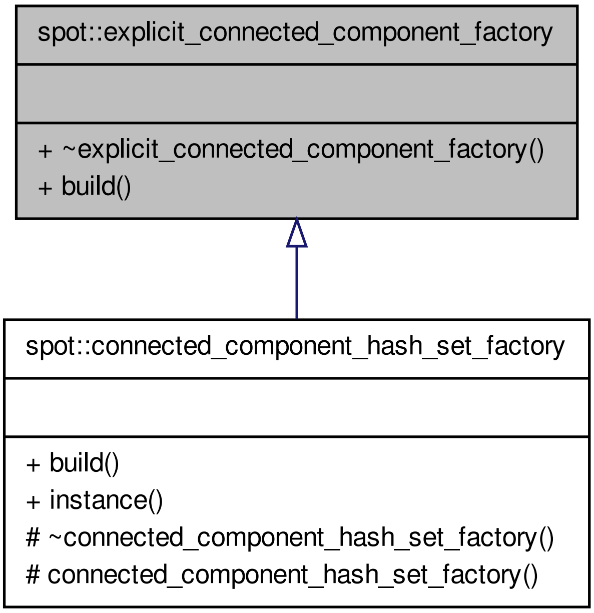
- tgbaalgos/gtec/explscc.hh

7.45 spot::explicit_connected_component_factory Class Reference

Abstract factory for explicit_connected_component.

`#include <tgbaalgos/gtec/explscc.hh>`

Inheritance diagram for spot::explicit_connected_component_factory:


spot::explicit_connected_component_factory
+ ~explicit_connected_component_factory()
+ build()
spot::connected_component_hash_set_factory
+ build()
+ instance()
# ~connected_component_hash_set_factory()
# connected_component_hash_set_factory()

Public Member Functions

- virtual ~explicit_connected_component_factory ()
- virtual explicit_connected_component $*$ build () const =0

  Create an explicit_connected_component.

7.45.1 Detailed Description

Abstract factory for explicit_connected_component.

7.45.2 Constructor & Destructor Documentation

7.45.2.1 virtual spot::explicit_connected_component_factory::~explicit_connected_component_factory ( ) `[inline, virtual]`

7.45.3 Member Function Documentation

7.45.3.1 virtual explicit_connected_component* spot::explicit_connected_component_factory::build ( ) const [pure virtual]

Create an explicit_connected_component.

Implemented in spot::connected_component_hash_set_factory.

The documentation for this class was generated from the following file:

- tgbaalgos/gtec/explscc.hh

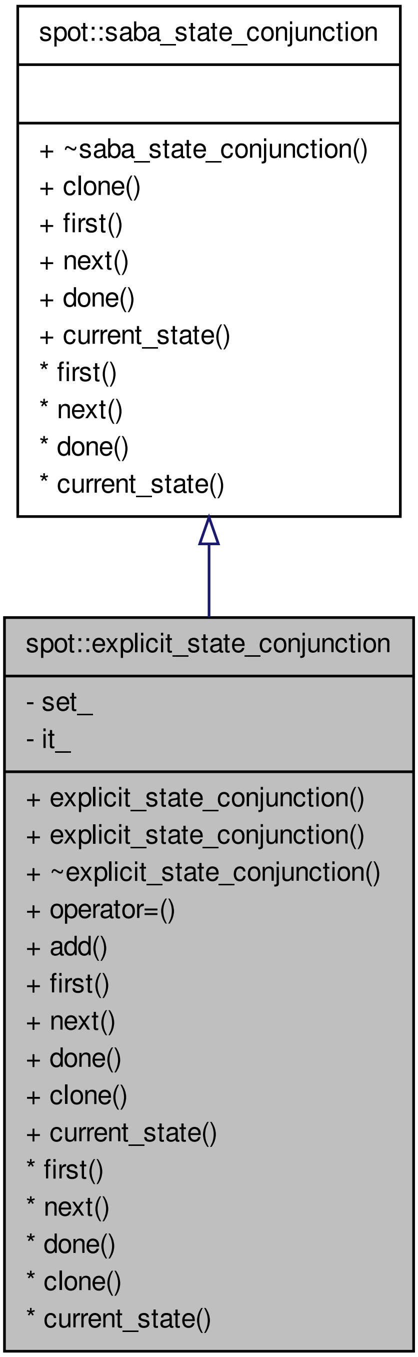
7.46 spot::explicit_state_conjunction Class Reference

Basic implementation of saba_state_conjunction.

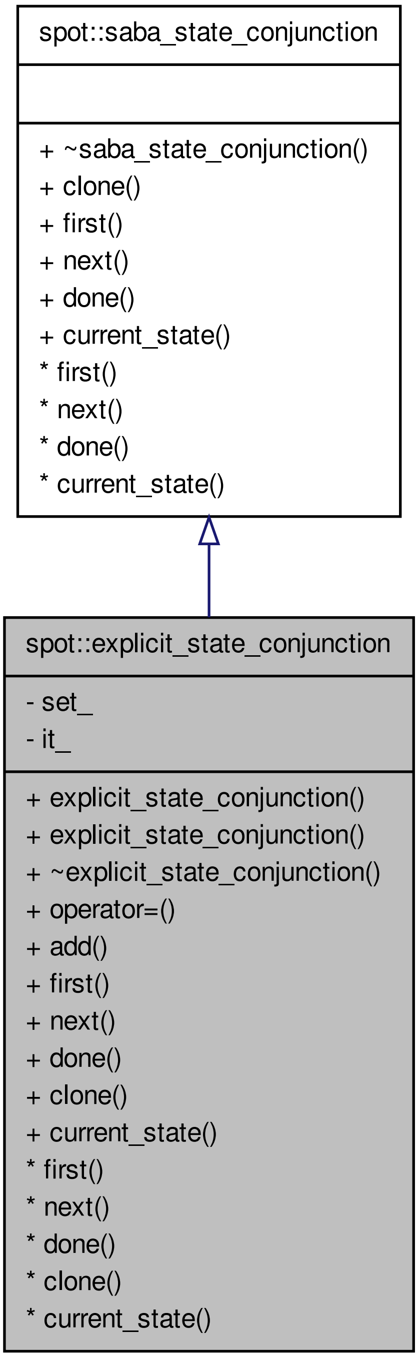
This class provides a basic implementation to iterate over a conjunction of states of a saba.

`#include <saba/explicitstateconjunction.hh>`

Inheritance diagram for spot::explicit_state_conjunction:



Collaboration diagram for spot::explicit_state_conjunction:



Public Member Functions

- explicit_state_conjunction ()
- explicit_state_conjunction (const explicit_state_conjunction ∗other)
- virtual ∼explicit_state_conjunction ()
- explicit_state_conjunction ∗ operator= (const explicit_state_conjunction &o)
- void add (saba_state ∗state)

Iteration

- virtual void first ()

  Position the iterator on the first successor of the conjunction (if any).
- virtual void next ()

  Jump to the next successor (if any).
- virtual bool done () const

  Check whether the iteration over a conjunction of states is finished.

Inspection

- explicit_state_conjunction ∗ clone () const

  Duplicate a this conjunction.
- virtual saba_state ∗ current_state () const

Private Types

- typedef Sgi::hash_set< shared_saba_state, spot::saba_state_shared_ptr_hash, spot::saba_state_shared_ptr_equal > saba_state_set_t

Private Attributes

- saba_state_set_t set_
- saba_state_set_t::iterator it_

7.46.1 Detailed Description

Basic implementation of saba_state_conjunction.

This class provides a basic implementation to iterate over a conjunction of states of a saba.

7.46.2 Member Typedef Documentation

7.46.2.1 typedef Sgi::hash_set<shared_saba_state, spot::saba_state_shared_ptr_hash, spot::saba_state_shared_ptr_equal> spot::explicit_state_conjunction::saba_state_set_t `[private]`

7.46.3 Constructor & Destructor Documentation

7.46.3.1 spot::explicit_state_conjunction::explicit_state_conjunction ( )

7.46.3.2 spot::explicit_state_conjunction::explicit_state_conjunction (const explicit_state_conjunction ∗ *other*)

7.46.3.3 virtual spot::explicit_state_conjunction::∼explicit_state_conjunction ( ) `[virtual]`

7.46.4 Member Function Documentation

7.46.4.1 void spot::explicit_state_conjunction::add (saba_state ∗ *state*)

Add a new state in the conjunction. The class becomes owner of *state*.

7.46.4.2 explicit_state_conjunction∗ spot::explicit_state_conjunction::clone ( ) const `[virtual]`

Duplicate a this conjunction.

Implements spot::saba_state_conjunction.

7.46.4.3 virtual saba_state∗ spot::explicit_state_conjunction::current_state ( ) const `[virtual]`

Return the a new instance on the current state. This is the caller responsibility to delete the returned state.

Implements spot::saba_state_conjunction.

7.46.4.4 virtual bool spot::explicit_state_conjunction::done ( ) const `[virtual]`

Check whether the iteration over a conjunction of states is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

Implements spot::saba_state_conjunction.

7.46.4.5 virtual void spot::explicit_state_conjunction::first ( ) `[virtual]`

Position the iterator on the first successor of the conjunction (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implements spot::saba_state_conjunction.

7.46.4.6 virtual void spot::explicit_state_conjunction::next ( ) `[virtual]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implements spot::saba_state_conjunction.

7.46.4.7 explicit_state_conjunction∗ spot::explicit_state_conjunction::operator= (const explicit_state_conjunction & *o*)

7.46.5 Member Data Documentation

7.46.5.1 saba_state_set_t::iterator spot::explicit_state_conjunction::it_ `[private]`

7.46.5.2 saba_state_set_t spot::explicit_state_conjunction::set_ `[private]`

The documentation for this class was generated from the following file:

- saba/explicitstateconjunction.hh

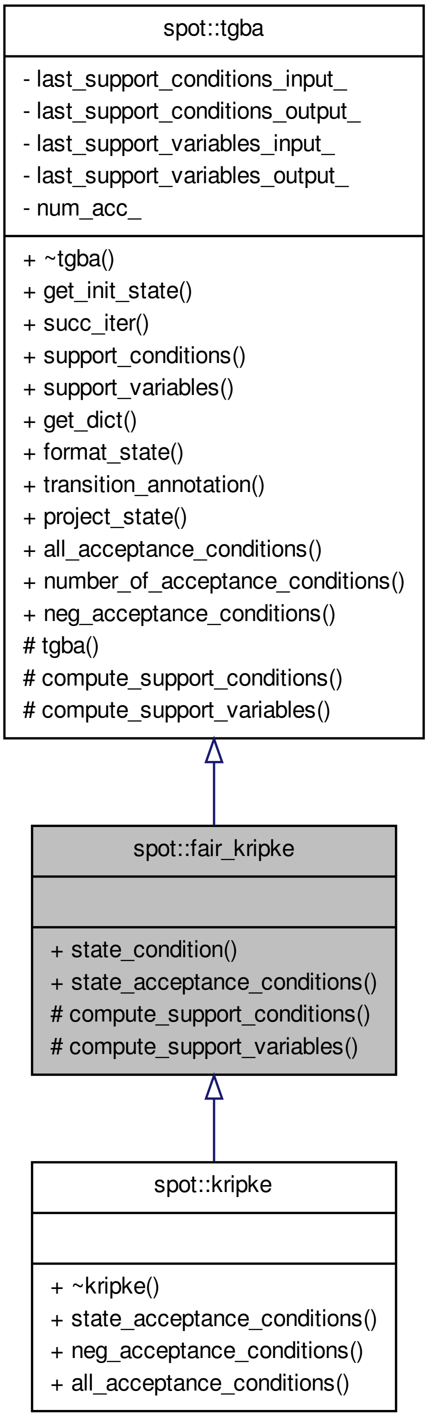
7.47 spot::fair_kripke Class Reference

Interface for a Fair Kripke structure.

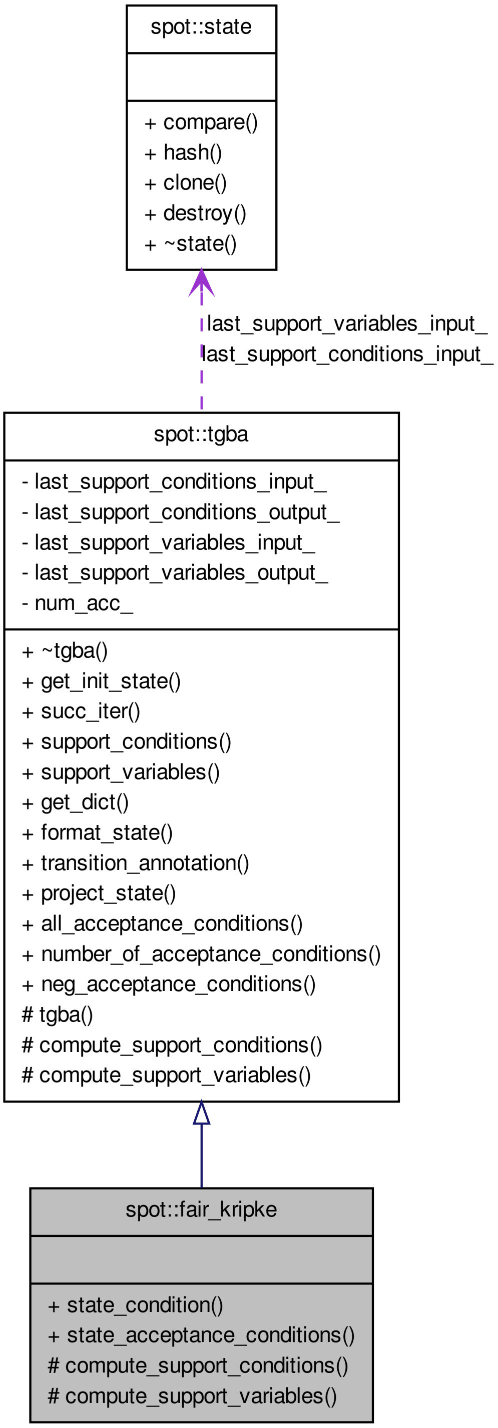
A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition, and a set of acceptance conditions.

`#include <kripke/fairkripke.hh>`

Inheritance diagram for spot::fair_kripke:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::fair_kripke
+ state_condition()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
spot::kripke
+ ~kripke()
+ state_acceptance_conditions()
+ neg_acceptance_conditions()
+ all_acceptance_conditions()

Collaboration diagram for spot::fair_kripke:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::fair_kripke
+ state_condition()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()

Public Member Functions

- virtual bdd state_condition (const state ∗s) const =0

  The condition that label the state s.

- virtual bdd state_acceptance_conditions (const state ∗s) const =0

  The set of acceptance conditions that label the state s.

- virtual state ∗ get_init_state () const =0

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const =0

  Get an iterator over the successors of local_state.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual bdd_dict ∗ get_dict () const =0

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const =0

  Format the state as a string for printing.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const =0

  Return the set of all acceptance conditions used by this automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

- virtual bdd neg_acceptance_conditions () const =0

  Return the conjuction of all negated acceptance variables.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗s) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗s) const

  Do the actual computation of tgba::support_variables().

7.47.1 Detailed Description

Interface for a Fair Kripke structure.

A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition, and a set of acceptance conditions. Such a structure can be seen as spot::tgba by pushing all labels to the outgoing transitions.

A programmer that develops an instance of Fair Kripke structure needs just provide an implementation for the following methods:

- kripke::get_init_state()
- kripke::succ_iter()
- kripke::state_condition()
- kripke::state_acceptance_conditions()
- kripke::format_state()
- and optionally kripke::transition_annotation()

The other methods of the tgba interface are supplied by this class and need not be defined.

See also spot::fair_kripke_succ_iterator.

7.47.2 Member Function Documentation

7.47.2.1 virtual bdd spot::tgba::all_acceptance_conditions ( ) const `[pure virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implemented in spot::kripke, spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.47.2.2 virtual bdd spot::fair_kripke::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.47.2.3 virtual bdd spot::fair_kripke::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.47.2.4 virtual std::string spot::tgba::format_state (const state ∗ *state*) const `[pure virtual, inherited]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implemented in spot::future_conditions_collector, spot::taa_tgba, spot::taa_tgba_labelled< label, label_hash >, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_explicit_string, spot::tgba_explicit_formula, spot::tgba_explicit_number, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, spot::tgba_union, spot::taa_tgba_labelled< const ltl::formula ∗, ltl::formula_ptr_hash >, and spot::taa_tgba_labelled< std::string, string_hash >.

7.47.2.5 virtual bdd_dict∗ spot::tgba::get_dict ( ) const `[pure virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.47.2.6 virtual state∗ spot::tgba::get_init_state ( ) const `[pure virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_product_init, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, spot::tgba_sba_proxy, and spot::tgba_union.

7.47.2.7 virtual bdd spot::tgba::neg_acceptance_conditions ( ) const `[pure virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implemented in spot::kripke, spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.47.2.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.47.2.9 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

> 0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.47.2.10 virtual bdd spot::fair_kripke::state_acceptance_conditions (const state ∗ *s*) const `[pure virtual]`

The set of acceptance conditions that label the state *s*.

Implemented in spot::kripke.

7.47.2.11 virtual bdd spot::fair_kripke::state_condition (const state ∗ *s*) const `[pure virtual]`

The condition that label the state *s*.

This should be a conjunction of atomic propositions.

7.47.2.12 virtual tgba_succ_iterator∗ spot::tgba::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[pure virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.47.2.13 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.47.2.14 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.47.2.15 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

The documentation for this class was generated from the following file:

- kripke/fairkripke.hh

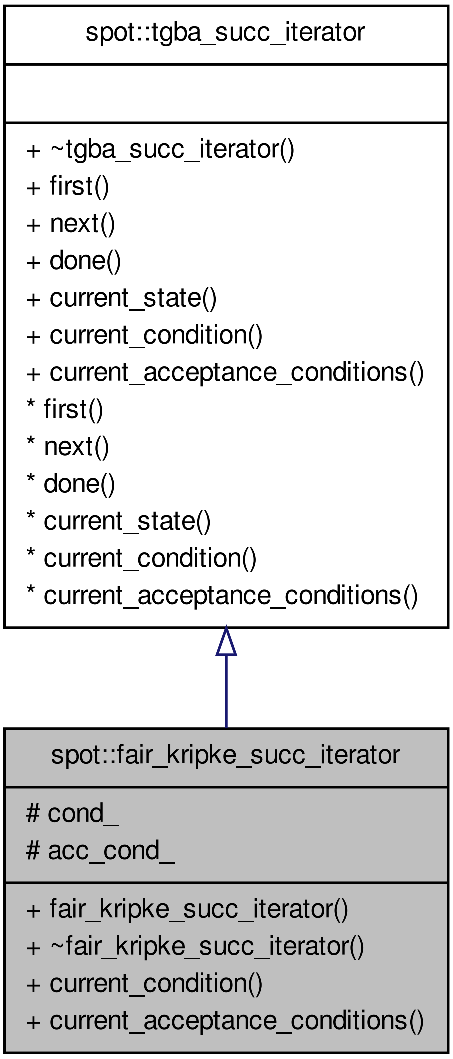
7.48 spot::fair_kripke_succ_iterator Class Reference

Iterator code for a Fair Kripke structure.

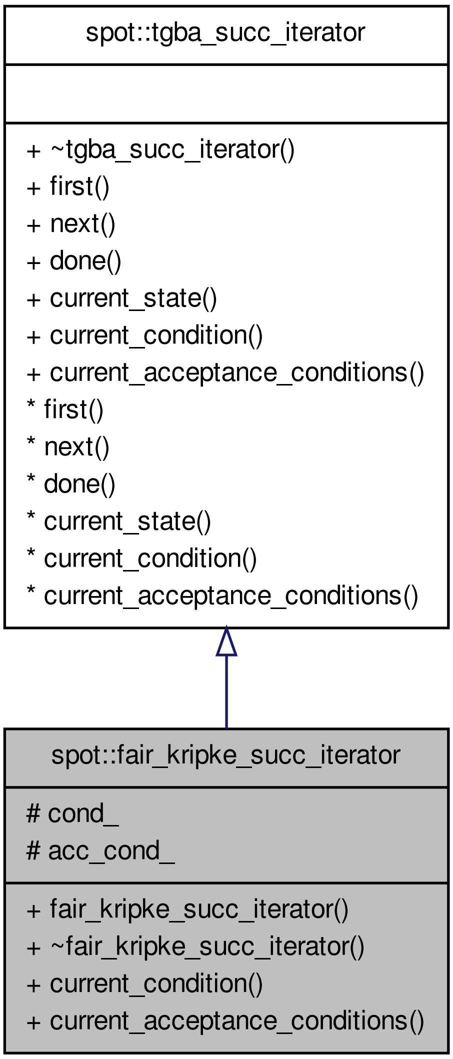
This iterator can be used to simplify the writing of an iterator on a Fair Kripke structure (or lookalike).

`#include <kripke/fairkripke.hh>`

Inheritance diagram for spot::fair_kripke_succ_iterator:



Collaboration diagram for spot::fair_kripke_succ_iterator:



Public Member Functions

- fair_kripke_succ_iterator (const bdd &cond, const bdd &acc_cond)

  Constructor.

- virtual ~fair_kripke_succ_iterator ()
- virtual bdd current_condition () const

  Get the condition on the transition leading to this successor.

- virtual bdd current_acceptance_conditions () const

  Get the acceptance conditions on the transition leading to this successor.

Iteration

- virtual void first ()=0

  Position the iterator on the first successor (if any).
- virtual void next ()=0

  Jump to the next successor (if any).
- virtual bool done () const =0

  Check whether the iteration is finished.

Inspection

- virtual state ∗ current_state () const =0

  Get the state of the current successor.

Protected Attributes

- bdd cond_
- bdd acc_cond_

7.48.1 Detailed Description

Iterator code for a Fair Kripke structure.

This iterator can be used to simplify the writing of an iterator on a Fair Kripke structure (or lookalike). If you inherit from this iterator, you should only redefine

- fair_kripke_succ_iterator::first()
- fair_kripke_succ_iterator::next()
- fair_kripke_succ_iterator::done()
- fair_kripke_succ_iterator::current_state()

This class implements fair_kripke_succ_iterator::current_condition(), and fair_kripke_succ_iterator::current_acceptance_conditions().

7.48.2 Constructor & Destructor Documentation

7.48.2.1 spot::fair_kripke_succ_iterator::fair_kripke_succ_iterator (const bdd & *cond*, const bdd & *acc_cond*)

Constructor.

The *cond* and *acc_cond* arguments will be those returned by fair_kripke_succ_iterator::current_condition(), and fair_kripke_succ_iterator::current_acceptance_conditions().

7.48.2.2 virtual spot::fair_kripke_succ_iterator::~fair_kripke_succ_iterator ( ) `[virtual]`

7.48.3 Member Function Documentation

7.48.3.1 virtual bdd spot::fair_kripke_succ_iterator::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.48.3.2 virtual bdd spot::fair_kripke_succ_iterator::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.48.3.3 virtual state∗ spot::tgba_succ_iterator::current_state ( ) const `[pure virtual, inherited]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.48.3.4 virtual bool spot::tgba_succ_iterator::done ( ) const `[pure virtual, inherited]`

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.48.3.5 virtual void spot::tgba_succ_iterator::first ( ) `[pure virtual, inherited]`

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.48.3.6 virtual void spot::tgba_succ_iterator::next ( ) `[pure virtual, inherited]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.48.4 Member Data Documentation

7.48.4.1 bdd spot::fair_kripke_succ_iterator::acc_cond_ `[protected]`

7.48.4.2 bdd spot::fair_kripke_succ_iterator::cond_ `[protected]`

The documentation for this class was generated from the following file:

- kripke/fairkripke.hh

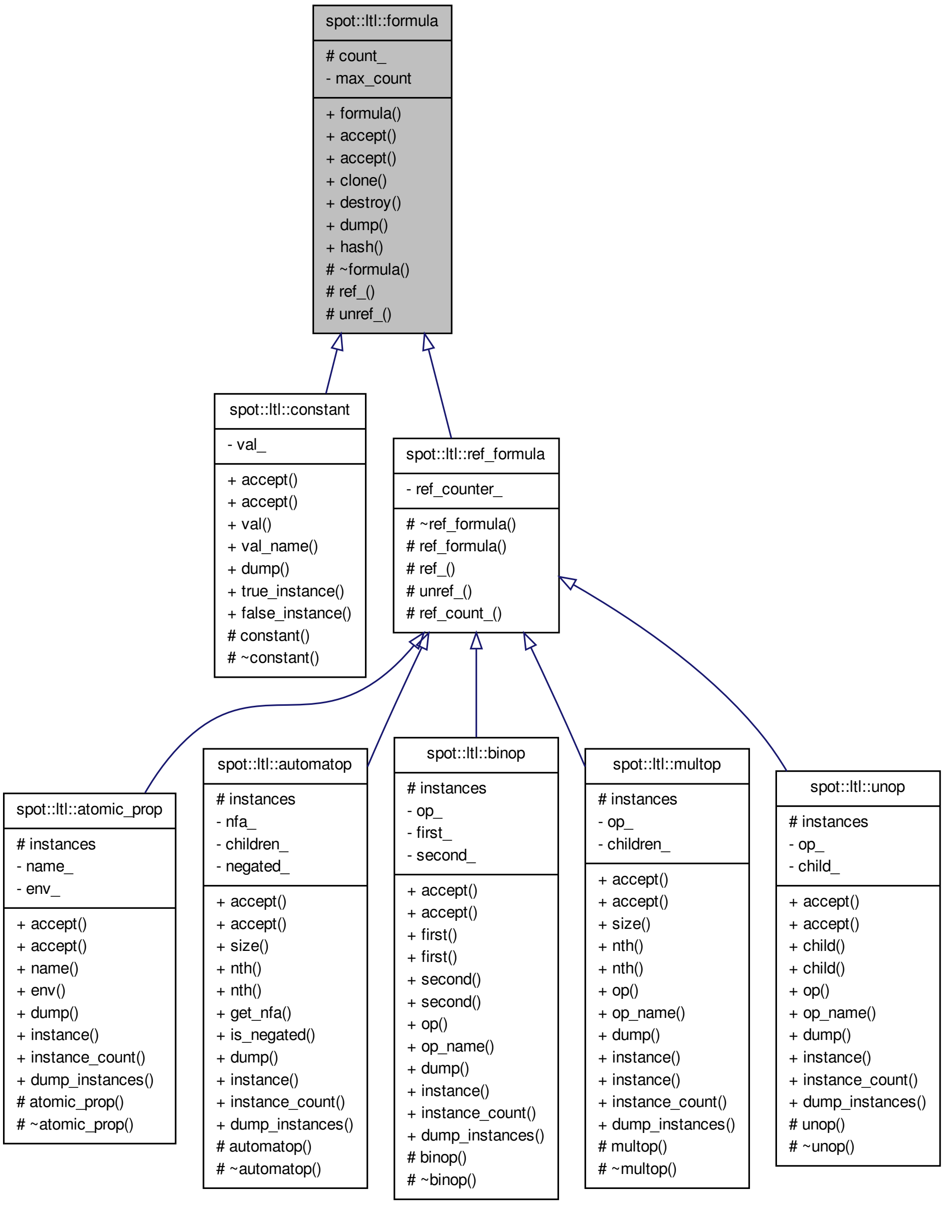
7.49 spot::ltl::formula Class Reference

An LTL formula.

The only way you can work with a formula is to build a spot::ltl::visitor or spot::ltl::const_visitor.

`#include <ltlast/formula.hh>`

Inheritance diagram for spot::ltl::formula:



Public Member Functions

- formula ()
- virtual void accept (visitor &v)=0

  Entry point for vspot::ltl::visitor instances.

- virtual void accept (const_visitor &v) const =0

Entry point for vspot::ltl::const_visitor instances.

- formula ∗ clone () const

  clone this node

- void destroy () const

  release this node

- virtual std::string dump () const =0

  Return a canonic representation of the formula.

- size_t hash () const

  Return a hash key for the formula.

Protected Member Functions

- virtual ∼formula ()
- virtual void ref_ ()

  increment reference counter if any

- virtual bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Protected Attributes

- size_t count_

  The hash key of this formula.

Static Private Attributes

- static size_t max_count

  Number of formulae created so far.

7.49.1 Detailed Description

An LTL formula.

The only way you can work with a formula is to build a spot::ltl::visitor or spot::ltl::const_visitor.

7.49.2 Constructor & Destructor Documentation

7.49.2.1 spot::ltl::formula::formula ( ) `[inline]`

7.49.2.2 virtual spot::ltl::formula::∼formula ( ) `[protected, virtual]`

7.49.3 Member Function Documentation

7.49.3.1 virtual void spot::ltl::formula::accept (visitor & *v*) `[pure virtual]`

Entry point for vspot::ltl::visitor instances.

Implemented in spot::ltl::atomic_prop, spot::ltl::automatop, spot::ltl::binop, spot::ltl::constant, spot::ltl::multop, and spot::ltl::unop.

7.49.3.2 virtual void spot::ltl::formula::accept (const_visitor & *v*) const `[pure virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implemented in spot::ltl::atomic_prop, spot::ltl::automatop, spot::ltl::binop, spot::ltl::constant, spot::ltl::multop, and spot::ltl::unop.

7.49.3.3 formula∗ spot::ltl::formula::clone ( ) const

clone this node

This increments the reference counter of this node (if one is used).

7.49.3.4 void spot::ltl::formula::destroy ( ) const

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.49.3.5 virtual std::string spot::ltl::formula::dump ( ) const `[pure virtual]`

Return a canonic representation of the formula.

Implemented in spot::ltl::atomic_prop, spot::ltl::automatop, spot::ltl::binop, spot::ltl::constant, spot::ltl::multop, and spot::ltl::unop.

Referenced by spot::ltl::formula_ptr_less_than::operator()().

7.49.3.6 size_t spot::ltl::formula::hash ( ) const `[inline]`

Return a hash key for the formula.

References count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.49.3.7 virtual void spot::ltl::formula::ref_ ( ) `[protected, virtual]`

increment reference counter if any

Reimplemented in spot::ltl::ref_formula.

7.49.3.8 virtual bool spot::ltl::formula::unref_ ( ) `[protected, virtual]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented in spot::ltl::ref_formula.

7.49.4 Member Data Documentation

7.49.4.1 size_t spot::ltl::formula::count_ `[protected]`

The hash key of this formula.

Referenced by hash().

7.49.4.2 size_t spot::ltl::formula::max_count `[static, private]`

Number of formulae created so far.

The documentation for this class was generated from the following file:

- ltlast/formula.hh

7.50 spot::ltl::formula_ptr_hash Struct Reference

Hash Function for `const formula*`.

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `const formula*`.

`#include <ltlast/formula.hh>`

Public Member Functions

- size_t operator() (const formula ∗that) const

7.50.1 Detailed Description

Hash Function for `const formula*`.

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `const formula*`. For instance here is how one could declare a map of `const::formula*`.

```
// Remember how many times each formula has been seen.
Sgi::hash_map<const spot::ltl::formula*, int,
              const spot::ltl::formula_ptr_hash> seen;
```

7.50.2 Member Function Documentation

7.50.2.1 size_t spot::ltl::formula_ptr_hash::operator() (const formula ∗ *that*) const `[inline]`

References spot::ltl::formula::hash().

The documentation for this struct was generated from the following file:

- ltlast/formula.hh

7.51 spot::ltl::formula_ptr_less_than Struct Reference

Strict Weak Ordering for `const formula*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `const formula*`.

`#include <ltlast/formula.hh>`

Public Member Functions

- bool operator() (const formula ∗left, const formula ∗right) const

7.51.1 Detailed Description

Strict Weak Ordering for `const formula*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `const formula*`. For instance here is how one could declare a map of `const::formula*`.

```
// Remember how many times each formula has been seen.
std::map<const spot::ltl::formula*, int,
         spot::formula_ptr_less_than> seen;
```

7.51.2 Member Function Documentation

7.51.2.1 bool spot::ltl::formula_ptr_less_than::operator() (const formula ∗ *left*, const formula ∗ *right*) const `[inline]`

References spot::ltl::formula::dump(), and spot::ltl::formula::hash().

The documentation for this struct was generated from the following file:

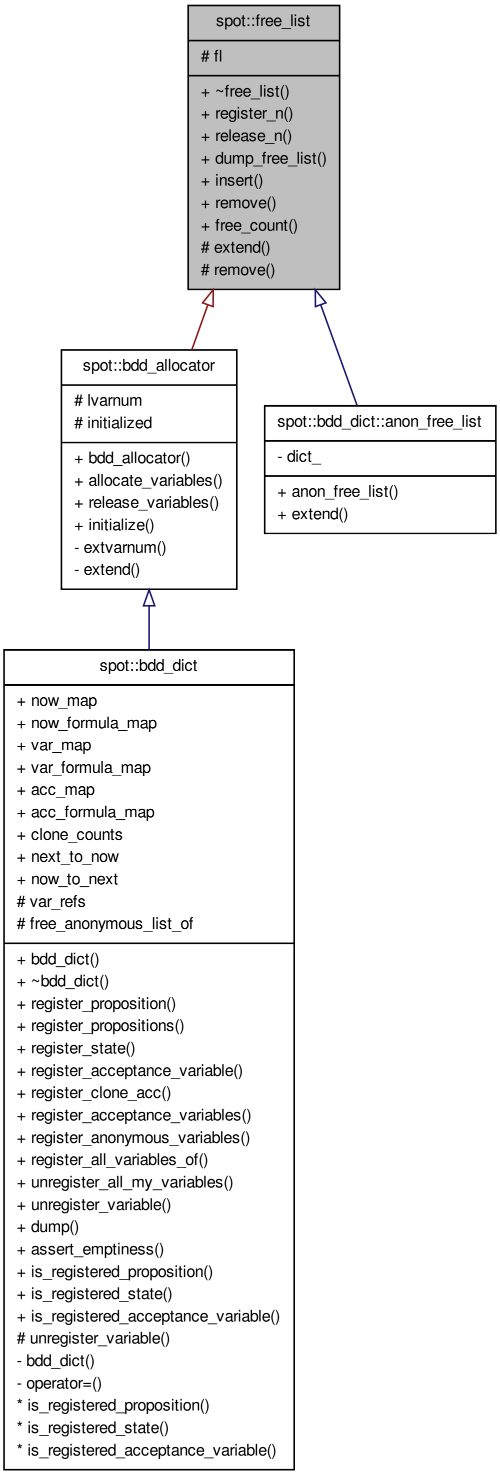
- ltlast/formula.hh

7.52 spot::free_list Class Reference

Manage list of free integers.

`#include <misc/freelist.hh>`

Inheritance diagram for spot::free_list:



Public Member Functions

- virtual ~free_list ()
- int register_n (int n)

  Find n consecutive integers.
- void release_n (int base, int n)

  Release n consecutive integers starting at base.
- std::ostream & dump_free_list (std::ostream &os) const

  Dump the list to os for debugging.
- void insert (int base, int n)

  Extend the list by inserting a new pos-lenght pair.
- void remove (int base, int n=0)

  Remove n consecutive entries from the list, starting at base.
- int free_count () const

  Return the number of free integers on the list.

Protected Types

- typedef std::pair< int, int > pos_lenght_pair

  Such pairs describe `second` free integer starting at `first`.
- typedef std::list< pos_lenght_pair > free_list_type

Protected Member Functions

- virtual int extend (int n)=0
- void remove (free_list_type::iterator i, int base, int n)

  Remove n consecutive entries from the list, starting at base.

Protected Attributes

- free_list_type fl

  Tracks unused BDD variables.

7.52.1 Detailed Description

Manage list of free integers.

7.52.2 Member Typedef Documentation

7.52.2.1 typedef std::list<pos_lenght_pair> spot::free_list::free_list_type `[protected]`

7.52.2.2 typedef std::pair<int, int> spot::free_list::pos_lenght_pair `[protected]`

Such pairs describe `second` free integer starting at `first`.

7.52.3 Constructor & Destructor Documentation

7.52.3.1 virtual spot::free_list::~free_list ( ) `[virtual]`

7.52.4 Member Function Documentation

7.52.4.1 std::ostream& spot::free_list::dump_free_list (std::ostream & *os*) const

Dump the list to *os* for debugging.

7.52.4.2 virtual int spot::free_list::extend (int *n*) `[protected, pure virtual]`

Allocate *n* integer.

This function is called by register_n() when the free list is empty or if *n* consecutive integers could not be found. It should allocate more integers, possibly changing the list, and return the first integer on a range of n consecutive integer requested by the user.

Implemented in spot::bdd_allocator, and spot::bdd_dict::anon_free_list.

7.52.4.3 int spot::free_list::free_count ( ) const

Return the number of free integers on the list.

7.52.4.4 void spot::free_list::insert (int *base*, int *n*)

Extend the list by inserting a new pos-lenght pair.

7.52.4.5 int spot::free_list::register_n (int *n*)

Find *n* consecutive integers.

Browse the list of free integers until *n* consecutive integers are found. Extend the list (using extend()) otherwise.

Returns

the first integer of the range

7.52.4.6 void spot::free_list::release_n (int *base*, int *n*)

Release *n* consecutive integers starting at *base*.

7.52.4.7 void spot::free_list::remove (int *base*, int *n* = *0*)

Remove *n* consecutive entries from the list, starting at *base*.

7.52.4.8 void spot::free_list::remove (free_list_type::iterator *i*, int *base*, int *n*) `[protected]`

Remove *n* consecutive entries from the list, starting at *base*.

7.52.5 Member Data Documentation

7.52.5.1 free_list_type spot::free_list::fl `[protected]`

Tracks unused BDD variables.

The documentation for this class was generated from the following file:

- misc/freelist.hh

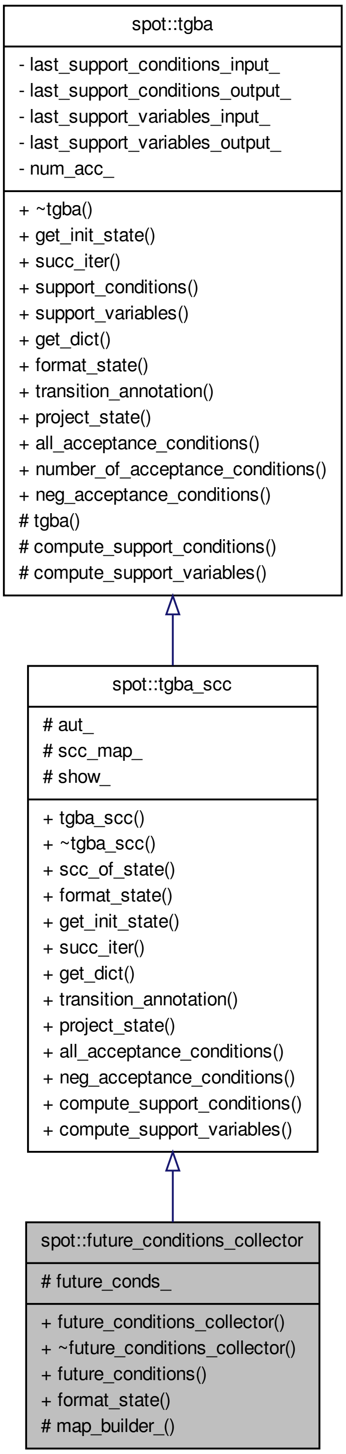
7.53 spot::future_conditions_collector Class Reference

Wrap a tgba to offer information about upcoming conditions.

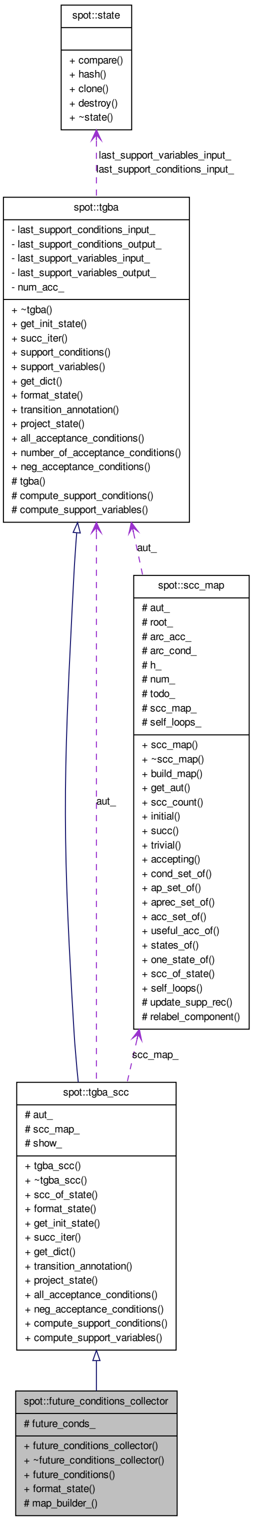
This class is a spot::tgba wrapper that simply add a new method, future_conditions(), to any spot::tgba.

`#include <tgba/futurecondcol.hh>`

Inheritance diagram for spot::future_conditions_collector:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_scc
# aut_
# scc_map_
# show_
+ tgba_scc()
+ ~tgba_scc()
+ scc_of_state()
+ format_state()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ compute_support_conditions()
+ compute_support_variables()
spot::future_conditions_collector
# future_conds_
+ future_conditions_collector()
+ ~future_conditions_collector()
+ future_conditions()
+ format_state()
# map_builder_()

Collaboration diagram for spot::future_conditions_collector:



Public Types

- typedef scc_map::cond_set cond_set
- typedef std::vector< cond_set > fc_map

Public Member Functions

- future_conditions_collector (const tgba ∗aut, bool show=false)

  Create a future_conditions_collector wrapper for aut.

- virtual ∼future_conditions_collector ()
- const cond_set & future_conditions (const spot::state ∗s) const

  Returns the set of future conditions visible after s.

- virtual std::string format_state (const state ∗state) const

  Format a state for output.

- unsigned scc_of_state (const spot::state ∗s) const

  Returns the number of the SCC s belongs to.

- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- void map_builder_ (unsigned s)

Protected Attributes

- fc_map future_conds_
- const tgba ∗ aut_
- scc_map scc_map_
- bool show_

7.53.1 Detailed Description

Wrap a tgba to offer information about upcoming conditions.

This class is a spot::tgba wrapper that simply add a new method, future_conditions(), to any spot::tgba. This new method returns a set of conditions that can be seen on a transitions accessible (maybe indirectly) from the given state.

7.53.2 Member Typedef Documentation

7.53.2.1 typedef scc_map::cond_set spot::future_conditions_collector::cond_set

7.53.2.2 typedef std::vector<cond_set> spot::future_conditions_collector::fc_map

7.53.3 Constructor & Destructor Documentation

7.53.3.1 spot::future_conditions_collector::future_conditions_collector (const tgba ∗ *aut,* bool *show* = `false`)

Create a future_conditions_collector wrapper for *aut*.

If *show* is set to true, then the format_state() method will include the set of conditions computed for the given state in its output string.

7.53.3.2 virtual spot::future_conditions_collector::~future_conditions_collector ( ) `[virtual]`

7.53.4 Member Function Documentation

7.53.4.1 virtual bdd spot::tgba_scc::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.53.4.2 virtual bdd spot::tgba_scc::compute_support_conditions (const state * *state*) const `[virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.53.4.3 virtual bdd spot::tgba_scc::compute_support_variables (const state * *state*) const `[virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.53.4.4 virtual std::string spot::future_conditions_collector::format_state (const state * *state*) const `[virtual]`

Format a state for output.

If the constructor was called with *show* set to true, then this method will include the set of conditions computed for *state* by future_conditions() in the output string.

Reimplemented from spot::tgba_scc.

7.53.4.5 const cond_set& spot::future_conditions_collector::future_conditions (const spot::state * *s*) const

Returns the set of future conditions visible after *s*.

7.53.4.6 virtual bdd_dict∗ spot::tgba_scc::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.53.4.7 virtual state∗ spot::tgba_scc::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.53.4.8 void spot::future_conditions_collector::map_builder_ (unsigned *s*) `[protected]`

7.53.4.9 virtual bdd spot::tgba_scc::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.53.4.10 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.53.4.11 virtual state∗ spot::tgba_scc::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.53.4.12 unsigned spot::tgba_scc::scc_of_state (const spot::state ∗ *s*) const `[inherited]`

Returns the number of the SCC *s* belongs to.

7.53.4.13 virtual tgba_succ_iterator∗ spot::tgba_scc::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.53.4.14 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.53.4.15 bdd spot::tgba::support_variables (const state * *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.53.4.16 virtual std::string spot::tgba_scc::transition_annotation (const tgba_succ_iterator * *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t	a non-done tgba_succ_iterator for this automata

Reimplemented from spot::tgba.

7.53.5 Member Data Documentation

7.53.5.1 const tgba* spot::tgba_scc::aut_ `[protected, inherited]`

7.53.5.2 fc_map spot::future_conditions_collector::future_conds_ `[protected]`

7.53.5.3 scc_map spot::tgba_scc::scc_map_ `[protected, inherited]`

7.53.5.4 bool spot::tgba_scc::show_ `[protected, inherited]`

The documentation for this class was generated from the following file:

- tgba/futurecondcol.hh

7.54 spot::gspn_exception Class Reference

An exception used to forward GSPN errors.

`#include <gspn/common.hh>`

Public Member Functions

- gspn_exception (const std::string &where, int err)
- int get_err () const
- std::string get_where () const

Private Attributes

- int err_
- std::string where_

7.54.1 Detailed Description

An exception used to forward GSPN errors.

7.54.2 Constructor & Destructor Documentation

7.54.2.1 spot::gspn_exception::gspn_exception (const std::string & *where*, int *err*) `[inline]`

7.54.3 Member Function Documentation

7.54.3.1 int spot::gspn_exception::get_err ( ) const `[inline]`

References err_.

7.54.3.2 std::string spot::gspn_exception::get_where ( ) const `[inline]`

References where_.

7.54.4 Member Data Documentation

7.54.4.1 int spot::gspn_exception::err_ `[private]`

Referenced by get_err().

7.54.4.2 std::string spot::gspn_exception::where_ `[private]`

Referenced by get_where().

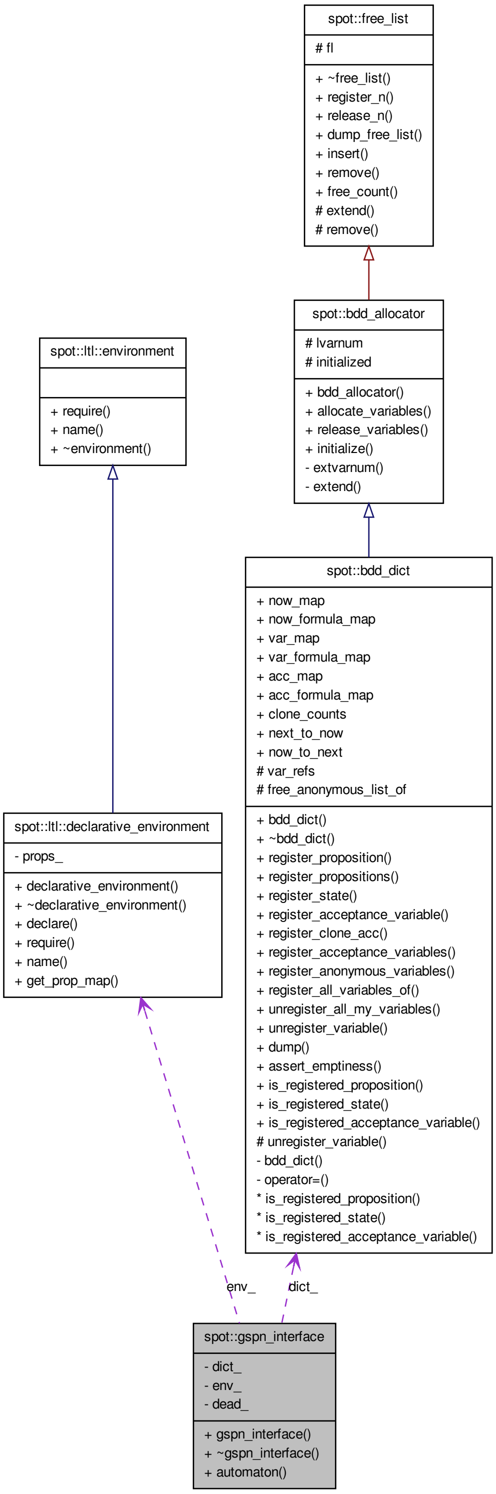
The documentation for this class was generated from the following file:

- gspn/common.hh

7.55 spot::gspn_interface Class Reference

`#include <gspn/gspn.hh>`

Collaboration diagram for spot::gspn_interface:



Public Member Functions

- gspn_interface (int argc, char ∗∗argv, bdd_dict ∗dict, ltl::declarative_environment &env, const std::string &dead="true")
- ∼gspn_interface ()
- tgba ∗ automaton () const

Private Attributes

- bdd_dict ∗ dict_
- ltl::declarative_environment & env_
- const std::string dead_

7.55.1 Constructor & Destructor Documentation

7.55.1.1 spot::gspn_interface::gspn_interface (int *argc*, char ∗∗ *argv*, bdd_dict ∗ *dict*, ltl::declarative_environment & *env*, const std::string & *dead* = `"true"`)

7.55.1.2 spot::gspn_interface::∼gspn_interface ( )

7.55.2 Member Function Documentation

7.55.2.1 tgba∗ spot::gspn_interface::automaton ( ) const

7.55.3 Member Data Documentation

7.55.3.1 const std::string spot::gspn_interface::dead_ `[private]`

7.55.3.2 bdd_dict∗ spot::gspn_interface::dict_ `[private]`

7.55.3.3 ltl::declarative_environment& spot::gspn_interface::env_ `[private]`

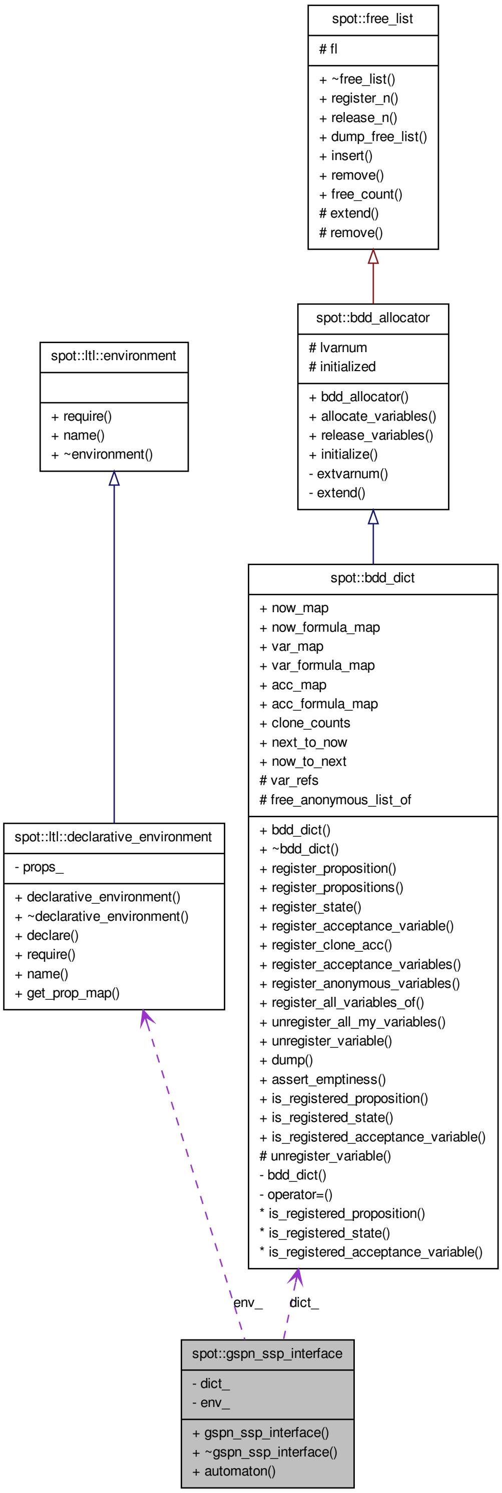
The documentation for this class was generated from the following file:

- gspn/gspn.hh

7.56 spot::gspn_ssp_interface Class Reference

```
#include <gspn/ssp.hh>
```

Collaboration diagram for spot::gspn_ssp_interface:



Public Member Functions

- gspn_ssp_interface (int argc, char ∗∗argv, bdd_dict ∗dict, const ltl::declarative_environment &env, bool inclusion=false, bool doublehash=true, bool pushfront=false)
- ∼gspn_ssp_interface ()
- tgba ∗ automaton (const tgba ∗operand) const

Private Attributes

- bdd_dict ∗ dict_
- const ltl::declarative_environment & env_

7.56.1 Constructor & Destructor Documentation

7.56.1.1 spot::gspn_ssp_interface::gspn_ssp_interface (int *argc*, char ∗∗ *argv*, bdd_dict ∗ *dict*, const ltl::declarative_environment & *env*, bool *inclusion* = `false`, bool *doublehash* = `true`, bool *pushfront* = `false`)

7.56.1.2 spot::gspn_ssp_interface::∼gspn_ssp_interface ( )

7.56.2 Member Function Documentation

7.56.2.1 tgba∗ spot::gspn_ssp_interface::automaton (const tgba ∗ *operand*) const

7.56.3 Member Data Documentation

7.56.3.1 bdd_dict∗ spot::gspn_ssp_interface::dict_ `[private]`

7.56.3.2 const ltl::declarative_environment& spot::gspn_ssp_interface::env_ `[private]`

The documentation for this class was generated from the following file:

- gspn/ssp.hh

7.57 spot::identity_hash< T > Struct Template Reference

A hash function that returns identity.

`#include <misc/hash.hh>`

Public Member Functions

- size_t operator() (const T &s) const

7.57.1 Detailed Description

template<typename T> struct spot::identity_hash< T >

A hash function that returns identity.

7.57.2 Member Function Documentation

7.57.2.1 template<typename T > size_t spot::identity_hash< T >::operator() (const T & *s*) const `[inline]`

The documentation for this struct was generated from the following file:

- misc/hash.hh

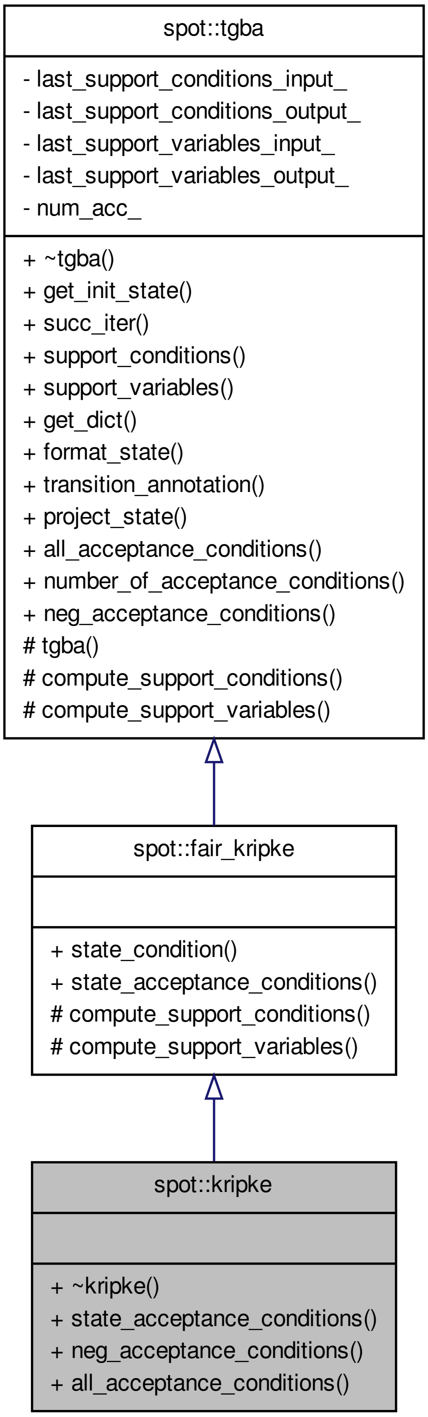
7.58 spot::kripke Class Reference

Interface for a Kripke structure

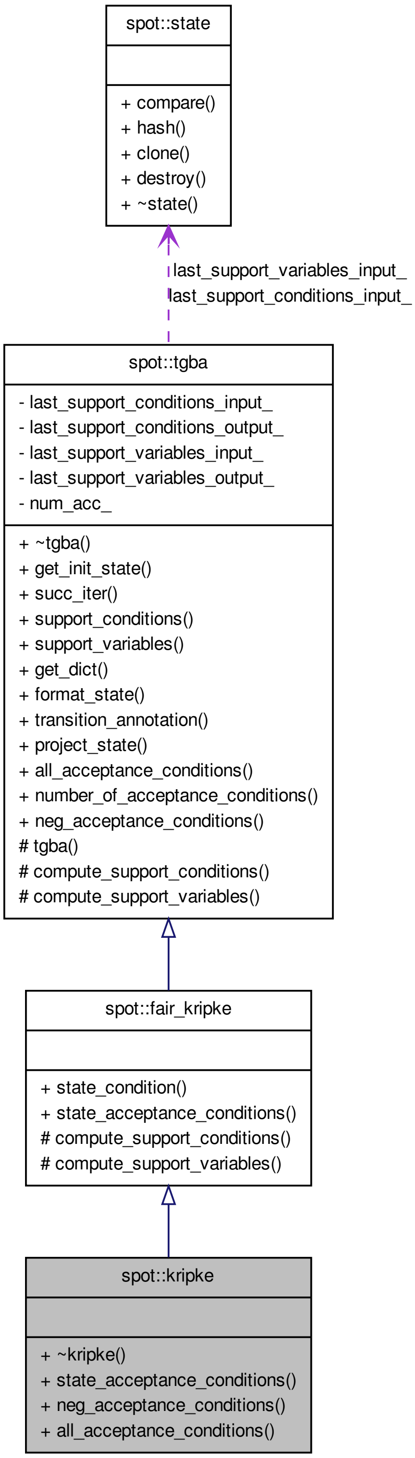
A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition.

`#include <kripke/kripke.hh>`

Inheritance diagram for spot::kripke:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::fair_kripke
+ state_condition()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
spot::kripke
+ ~kripke()
+ state_acceptance_conditions()
+ neg_acceptance_conditions()
+ all_acceptance_conditions()

Collaboration diagram for spot::kripke:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::fair_kripke
+ state_condition()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
spot::kripke
+ ~kripke()
+ state_acceptance_conditions()
+ neg_acceptance_conditions()
+ all_acceptance_conditions()

Public Member Functions

- virtual ∼kripke ()
- virtual bdd state_acceptance_conditions (const state ∗) const

  The set of acceptance conditions that label the state s.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd state_condition (const state ∗s) const =0

  The condition that label the state s.

- virtual state ∗ get_init_state () const =0

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const =0

  Get an iterator over the successors of local_state.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual bdd_dict ∗ get_dict () const =0

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const =0

  Format the state as a string for printing.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗s) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗s) const

  Do the actual computation of tgba::support_variables().

7.58.1 Detailed Description

Interface for a Kripke structure

A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition. Such a structure can be seen as spot::tgba without any acceptance condition.

A programmer that develops an instance of Kripke structure needs just provide an implementation for the following methods:

- kripke::get_init_state()
- kripke::succ_iter()
- kripke::state_condition()
- kripke::format_state()
- and optionally kripke::transition_annotation()

The other methods of the tgba interface (like those dealing with acceptance conditions) are supplied by this kripke class and need not be defined.

See also spot::kripke_succ_iterator.

7.58.2 Constructor & Destructor Documentation

7.58.2.1 virtual spot::kripke::∼kripke ( ) `[virtual]`

7.58.3 Member Function Documentation

7.58.3.1 virtual bdd spot::kripke::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.58.3.2 virtual bdd spot::fair_kripke::compute_support_conditions (const state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.58.3.3 virtual bdd spot::fair_kripke::compute_support_variables (const state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.58.3.4 virtual std::string spot::tgba::format_state (const state ∗ *state*) const `[pure virtual, inherited]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implemented in spot::future_conditions_collector, spot::taa_tgba, spot::taa_tgba_labelled< label, label_hash >, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_explicit_string, spot::tgba_explicit_formula, spot::tgba_explicit_number, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, spot::tgba_union, spot::taa_tgba_labelled< const ltl::formula ∗, ltl::formula_ptr_hash >, and spot::taa_tgba_labelled< std::string, string_hash >.

7.58.3.5 virtual bdd_dict∗ spot::tgba::get_dict ( ) const `[pure virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.58.3.6 virtual state∗ spot::tgba::get_init_state ( ) const `[pure virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_product_init, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, spot::tgba_sba_proxy, and spot::tgba_union.

7.58.3.7 virtual bdd spot::kripke::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.58.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.58.3.9 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.58.3.10 virtual bdd spot::kripke::state_acceptance_conditions (const state ∗ *s*) const `[virtual]`

The set of acceptance conditions that label the state *s*.

Implements spot::fair_kripke.

7.58.3.11 virtual bdd spot::fair_kripke::state_condition (const state ∗ *s*) const `[pure virtual, inherited]`

The condition that label the state *s*.

This should be a conjunction of atomic propositions.

7.58.3.12 virtual tgba_succ_iterator∗ spot::tgba::succ_iter (const state ∗ *local_state,* const state ∗ *global_state* = *0,* const tgba ∗ *global_automaton* = *0*) const `[pure virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.58.3.13 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.58.3.14 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.58.3.15 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

The documentation for this class was generated from the following file:

- kripke/kripke.hh

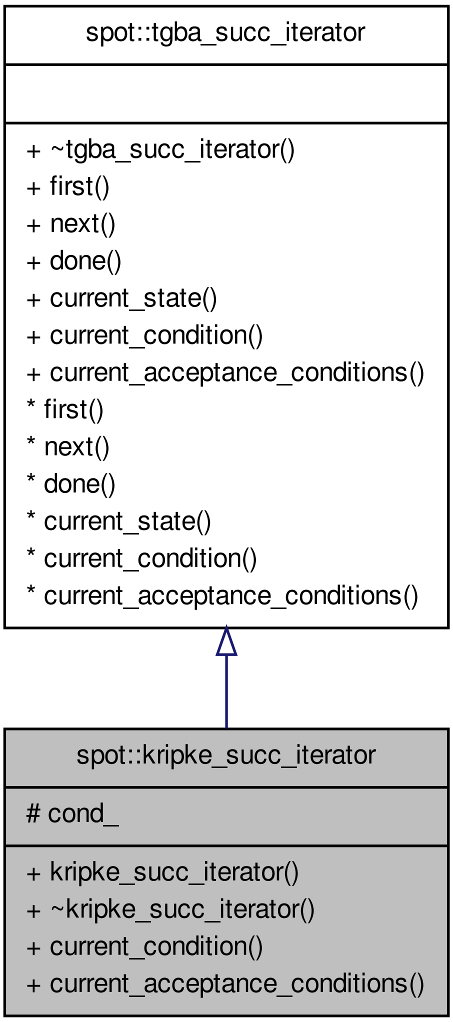
7.59 spot::kripke_succ_iterator Class Reference

Iterator code for Kripke structure

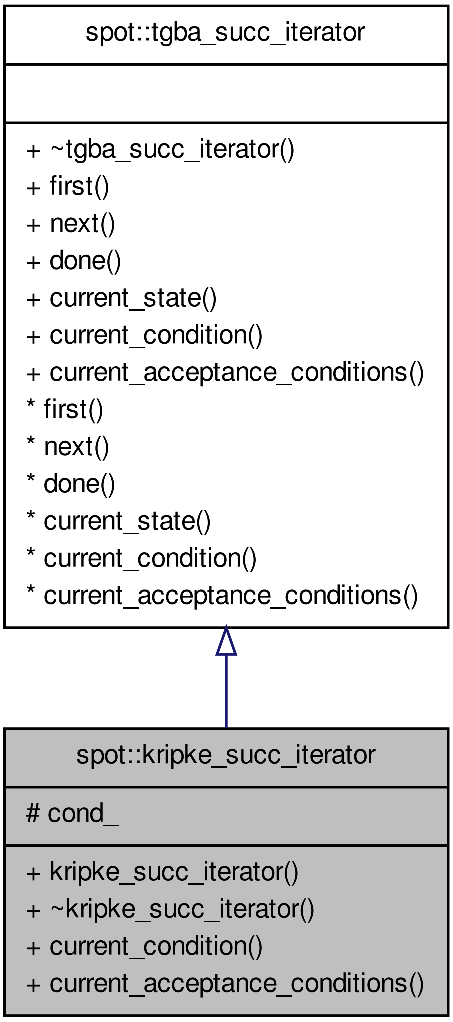
This iterator can be used to simplify the writing of an iterator on a Kripke structure (or lookalike).

`#include <kripke/kripke.hh>`

Inheritance diagram for spot::kripke_succ_iterator:



Collaboration diagram for spot::kripke_succ_iterator:



Public Member Functions

- kripke_succ_iterator (const bdd &cond)

  Constructor.

- virtual ~kripke_succ_iterator ()
- virtual bdd current_condition () const

  Get the condition on the transition leading to this successor.

- virtual bdd current_acceptance_conditions () const

Get the acceptance conditions on the transition leading to this successor.

Iteration

- virtual void first ()=0
  Position the iterator on the first successor (if any).
- virtual void next ()=0
  Jump to the next successor (if any).
- virtual bool done () const =0
  Check whether the iteration is finished.

Inspection

- virtual state ∗ current_state () const =0
  Get the state of the current successor.

Protected Attributes

- bdd cond_

7.59.1 Detailed Description

Iterator code for Kripke structure

This iterator can be used to simplify the writing of an iterator on a Kripke structure (or lookalike). If you inherit from this iterator, you should only redefine

- kripke_succ_iterator::first()
- kripke_succ_iterator::next()
- kripke_succ_iterator::done()
- kripke_succ_iterator::current_state()

This class implements kripke_succ_iterator::current_condition(), and kripke_succ_iterator::current_acceptance_conditions().

7.59.2 Constructor & Destructor Documentation

7.59.2.1 spot::kripke_succ_iterator::kripke_succ_iterator (const bdd & *cond*)

Constructor.

The *cond* argument will be the one returned by kripke_succ_iterator::current_condition().

7.59.2.2 virtual spot::kripke_succ_iterator::∼kripke_succ_iterator ( ) `[virtual]`

7.59.3 Member Function Documentation

7.59.3.1 virtual bdd spot::kripke_succ_iterator::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.59.3.2 virtual bdd spot::kripke_succ_iterator::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.59.3.3 virtual state∗ spot::tgba_succ_iterator::current_state ( ) const `[pure virtual, inherited]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.59.3.4 virtual bool spot::tgba_succ_iterator::done ( ) const `[pure virtual, inherited]`

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.59.3.5 virtual void spot::tgba_succ_iterator::first ( ) `[pure virtual, inherited]`

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.59.3.6 virtual void spot::tgba_succ_iterator::next ( ) `[pure virtual, inherited]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.59.4 Member Data Documentation

7.59.4.1 bdd spot::kripke_succ_iterator::cond_ `[protected]`

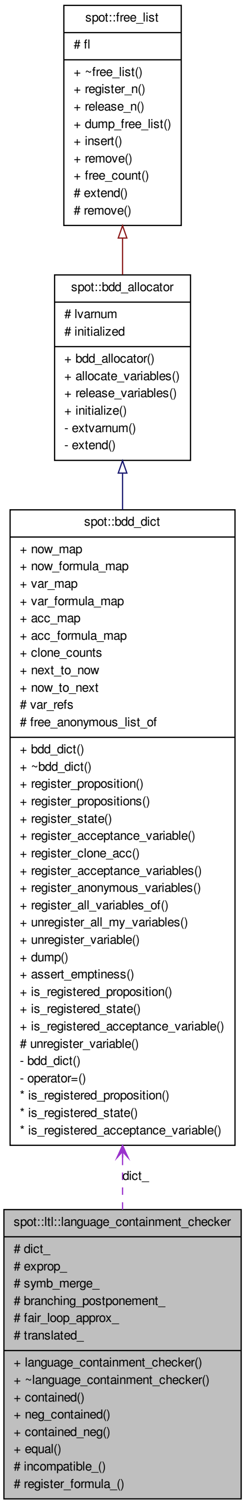
The documentation for this class was generated from the following file:

- kripke/kripke.hh

7.60 spot::ltl::language_containment_checker Class Reference

`#include <ltlvisit/contain.hh>`

Collaboration diagram for spot::ltl::language_containment_checker:



Classes

- struct record_

Public Member Functions

- language_containment_checker (bdd_dict ∗dict, bool exprop, bool symb_merge, bool branching_postponement, bool fair_loop_approx)
- ~language_containment_checker ()
- bool contained (const formula ∗l, const formula ∗g)

  Check whether L(l) is a subset of L(g).
- bool neg_contained (const formula ∗l, const formula ∗g)

  Check whether L(!l) is a subset of L(g).
- bool contained_neg (const formula ∗l, const formula ∗g)

  Check whether L(l) is a subset of L(!g).
- bool equal (const formula ∗l, const formula ∗g)

  Check whether L(l) = L(g).

Protected Member Functions

- bool incompatible_ (record_ ∗l, record_ ∗g)
- record_ ∗ register_formula_ (const formula ∗f)

Protected Attributes

- bdd_dict ∗ dict_
- bool exprop_
- bool symb_merge_
- bool branching_postponement_
- bool fair_loop_approx_
- trans_map translated_

Private Types

- typedef Sgi::hash_map< const formula ∗, record_, formula_ptr_hash > trans_map

7.60.1 Member Typedef Documentation

7.60.1.1 typedef Sgi::hash_map<const formula∗, record_, formula_ptr_hash> spot::ltl::language_containment_checker::trans_map `[private]`

7.60.2 Constructor & Destructor Documentation

7.60.2.1 spot::ltl::language_containment_checker::language_containment_checker (bdd_dict ∗ *dict*, bool *exprop*, bool *symb_merge*, bool *branching_postponement*, bool *fair_loop_approx*)

This class uses spot::ltl_to_tgba_fm to translate LTL formulae. See that class for the meaning of these options.

7.60.2.2 spot::ltl::language_containment_checker::∼language_containment_checker ( )

7.60.3 Member Function Documentation

7.60.3.1 bool spot::ltl::language_containment_checker::contained (const formula ∗ *l*, const formula ∗ *g*)

Check whether L(l) is a subset of L(g).

7.60.3.2 bool spot::ltl::language_containment_checker::contained_neg (const formula ∗ *l*, const formula ∗ *g*)

Check whether L(l) is a subset of L(!g).

7.60.3.3 bool spot::ltl::language_containment_checker::equal (const formula ∗ *l*, const formula ∗ *g*)

Check whether L(l) = L(g).

7.60.3.4 bool spot::ltl::language_containment_checker::incompatible_ (record_ ∗ *l*, record_ ∗ *g*) `[protected]`

7.60.3.5 bool spot::ltl::language_containment_checker::neg_contained (const formula ∗ *l*, const formula ∗ *g*)

Check whether L(!l) is a subset of L(g).

7.60.3.6 record_∗ spot::ltl::language_containment_checker::register_formula_ (const formula ∗ *f*) `[protected]`

7.60.4 Member Data Documentation

7.60.4.1 bool spot::ltl::language_containment_checker::branching_postponement_ `[protected]`

7.60.4.2 bdd_dict∗ spot::ltl::language_containment_checker::dict_ `[protected]`

7.60.4.3 bool spot::ltl::language_containment_checker::exprop_ `[protected]`

7.60.4.4 bool spot::ltl::language_containment_checker::fair_loop_approx_ `[protected]`

7.60.4.5 bool spot::ltl::language_containment_checker::symb_merge_ `[protected]`

7.60.4.6 trans_map spot::ltl::language_containment_checker::translated_ `[protected]`

The documentation for this class was generated from the following file:

- ltlvisit/contain.hh

7.61 spot::minato_isop::local_vars Struct Reference

Internal variables for minato_isop.

Public Types

- enum { FirstStep, SecondStep, ThirdStep, FourthStep }

Public Member Functions

- local_vars (bdd f_min, bdd f_max, bdd vars)

Public Attributes

- bdd f_min
- bdd f_max
- enum spot::minato_isop::local_vars:: { ... } step
- bdd vars
- bdd v1
- bdd f0_min
- bdd f0_max
- bdd f1_min
- bdd f1_max
- bdd g0
- bdd g1

7.61.1 Detailed Description

Internal variables for minato_isop.

7.61.2 Member Enumeration Documentation

7.61.2.1 anonymous enum

Enumerator:

FirstStep

SecondStep

ThirdStep

FourthStep

7.61.3 Constructor & Destructor Documentation

7.61.3.1 spot::minato_isop::local_vars::local_vars (bdd *f_min,* bdd *f_max,* bdd *vars*) `[inline]`

7.61.4 Member Data Documentation

7.61.4.1 bdd spot::minato_isop::local_vars::f0_max

7.61.4.2 bdd spot::minato_isop::local_vars::f0_min

7.61.4.3 bdd spot::minato_isop::local_vars::f1_max

7.61.4.4 bdd spot::minato_isop::local_vars::f1_min

7.61.4.5 bdd spot::minato_isop::local_vars::f_max

7.61.4.6 bdd spot::minato_isop::local_vars::f_min

7.61.4.7 bdd spot::minato_isop::local_vars::g0

7.61.4.8 bdd spot::minato_isop::local_vars::g1

7.61.4.9 enum { ... } spot::minato_isop::local_vars::step

7.61.4.10 bdd spot::minato_isop::local_vars::v1

7.61.4.11 bdd spot::minato_isop::local_vars::vars

The documentation for this struct was generated from the following file:

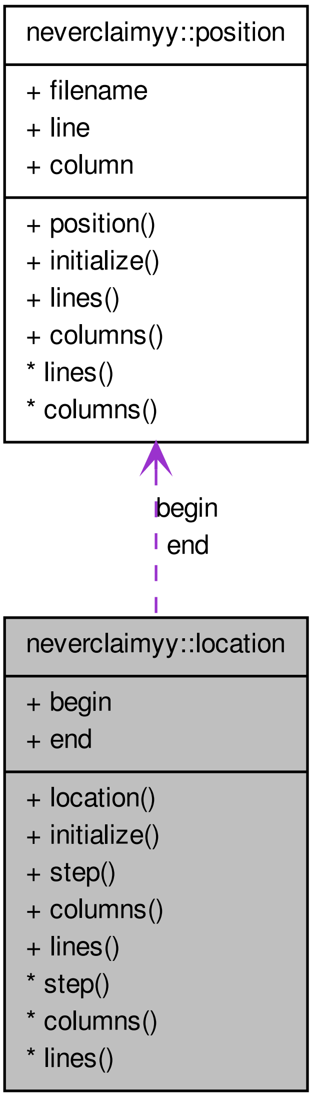
- misc/minato.hh

7.62 neverclaimyy::location Class Reference

Abstract a location.

`#include <neverparse/location.hh>`

Collaboration diagram for neverclaimyy::location:



Public Member Functions

- location ()

  Construct a location.

- void initialize (std::string ∗fn)

  Initialization.

Line and Column related manipulators

- void step ()
  Reset initial location to final location.
- void columns (unsigned int count=1)
  Extend the current location to the COUNT next columns.
- void lines (unsigned int count=1)
  Extend the current location to the COUNT next lines.

Public Attributes

- position begin
  Beginning of the located region.
- position end
  End of the located region.

7.62.1 Detailed Description

Abstract a location.

7.62.2 Constructor & Destructor Documentation

7.62.2.1 neverclaimyy::location::location ( ) `[inline]`

Construct a location.

7.62.3 Member Function Documentation

7.62.3.1 void neverclaimyy::location::columns (unsigned int *count* = 1) `[inline]`

Extend the current location to the COUNT next columns.

Referenced by neverclaimyy::operator+(), and neverclaimyy::operator+=().

7.62.3.2 void neverclaimyy::location::initialize (std::string ∗ *fn*) `[inline]`

Initialization.

7.62.3.3 void neverclaimyy::location::lines (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next lines.

7.62.3.4 void neverclaimyy::location::step ( ) `[inline]`

Reset initial location to final location.

References begin, end, and neverclaimyy::position::initialize().

7.62.4 Member Data Documentation

7.62.4.1 position neverclaimyy::location::begin

Beginning of the located region.

Referenced by step().

7.62.4.2 position neverclaimyy::location::end

End of the located region.

Referenced by neverclaimyy::operator+(), and step().

The documentation for this class was generated from the following file:

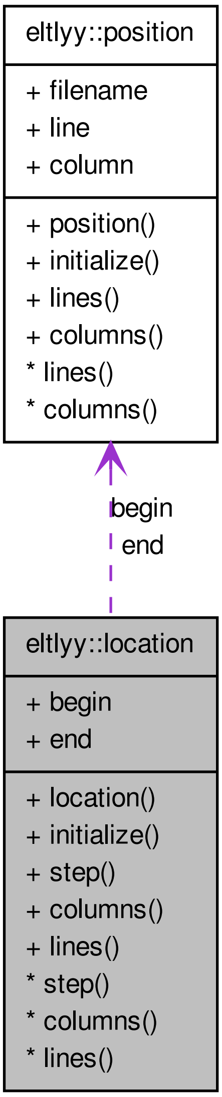
- neverparse/location.hh

7.63 eltlyy::location Class Reference

Abstract a location.

`#include <eltlparse/location.hh>`

Collaboration diagram for eltlyy::location:



Public Member Functions

- location ()

  Construct a location.

- void initialize (std::string ∗fn)

  Initialization.

Line and Column related manipulators

- void step ()

  Reset initial location to final location.

- void columns (unsigned int count=1)

  Extend the current location to the COUNT next columns.

- void lines (unsigned int count=1)

  Extend the current location to the COUNT next lines.

Public Attributes

- position begin

  Beginning of the located region.

- position end

  End of the located region.

7.63.1 Detailed Description

Abstract a location.

7.63.2 Constructor & Destructor Documentation

7.63.2.1 eltlyy::location::location ( ) `[inline]`

Construct a location.

7.63.3 Member Function Documentation

7.63.3.1 void eltlyy::location::columns (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next columns.

Referenced by eltlyy::operator+(), and eltlyy::operator+=().

7.63.3.2 void eltlyy::location::initialize (std::string ∗ *fn*) `[inline]`

Initialization.

7.63.3.3 void eltlyy::location::lines (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next lines.

7.63.3.4 void eltlyy::location::step ( ) `[inline]`

Reset initial location to final location.

References begin, end, and eltlyy::position::initialize().

7.63.4 Member Data Documentation

7.63.4.1 position eltlyy::location::begin

Beginning of the located region.

Referenced by step().

7.63.4.2 position eltlyy::location::end

End of the located region.

Referenced by eltlyy::operator+(), and step().

The documentation for this class was generated from the following file:

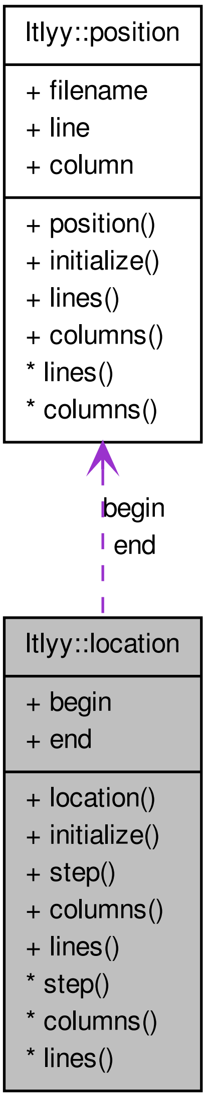
- eltlparse/location.hh

7.64 ltlyy::location Class Reference

Abstract a location.

`#include <ltlparse/location.hh>`

Collaboration diagram for ltlyy::location:



Public Member Functions

- location ()

  Construct a location.

- void initialize (std::string ∗fn)

  Initialization.

Line and Column related manipulators

- void step ()

  Reset initial location to final location.

- void columns (unsigned int count=1)

  Extend the current location to the COUNT next columns.

- void lines (unsigned int count=1)

  Extend the current location to the COUNT next lines.

Public Attributes

- position begin

  Beginning of the located region.

- position end

  End of the located region.

7.64.1 Detailed Description

Abstract a location.

7.64.2 Constructor & Destructor Documentation

7.64.2.1 ltlyy::location::location ( ) `[inline]`

Construct a location.

7.64.3 Member Function Documentation

7.64.3.1 void ltlyy::location::columns (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next columns.

Referenced by ltlyy::operator+(), and ltlyy::operator+=().

7.64.3.2 void ltlyy::location::initialize (std::string ∗ *fn*) `[inline]`

Initialization.

7.64.3.3 void ltlyy::location::lines (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next lines.

7.64.3.4 void ltlyy::location::step ( ) `[inline]`

Reset initial location to final location.

References begin, end, and ltlyy::position::initialize().

7.64.4 Member Data Documentation

7.64.4.1 position ltlyy::location::begin

Beginning of the located region.

Referenced by step().

7.64.4.2 position ltlyy::location::end

End of the located region.

Referenced by ltlyy::operator+(), and step().

The documentation for this class was generated from the following file:

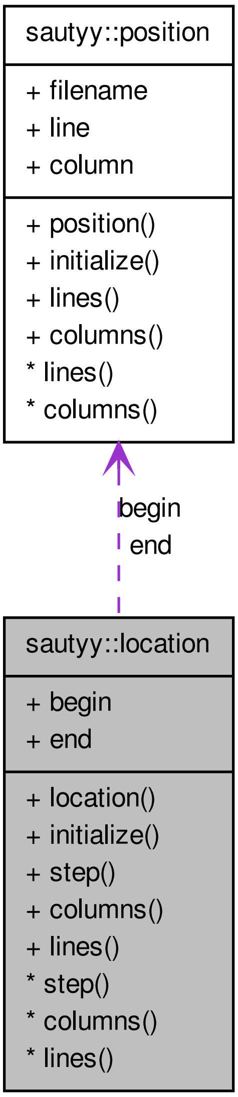
- ltlparse/location.hh

7.65 sautyy::location Class Reference

Abstract a location.

`#include <sautparse/location.hh>`

Collaboration diagram for sautyy::location:



Public Member Functions

- location ()

  Construct a location.

- void initialize (std::string ∗fn)

  Initialization.

Line and Column related manipulators

- void step ()

  Reset initial location to final location.

- void columns (unsigned int count=1)

  Extend the current location to the COUNT next columns.

- void lines (unsigned int count=1)

  Extend the current location to the COUNT next lines.

Public Attributes

- position begin

  Beginning of the located region.

- position end

  End of the located region.

7.65.1 Detailed Description

Abstract a location.

7.65.2 Constructor & Destructor Documentation

7.65.2.1 sautyy::location::location ( ) `[inline]`

Construct a location.

7.65.3 Member Function Documentation

7.65.3.1 void sautyy::location::columns (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next columns.

References begin, and end.

Referenced by sautyy::operator+(), and sautyy::operator+=().

7.65.3.2 void sautyy::location::initialize (std::string ∗ *fn*) `[inline]`

Initialization.

7.65.3.3 void sautyy::location::lines (unsigned int *count* = `1`) `[inline]`

Extend the current location to the COUNT next lines.

References end.

7.65.3.4 void sautyy::location::step ( ) `[inline]`

Reset initial location to final location.

7.65.4 Member Data Documentation

7.65.4.1 position sautyy::location::begin

Beginning of the located region.

Referenced by columns().

7.65.4.2 position sautyy::location::end

End of the located region.

Referenced by columns(), lines(), and sautyy::operator+().

The documentation for this class was generated from the following file:

- sautparse/location.hh

7.66 spot::loopless_modular_mixed_radix_gray_code Class Reference

Loopless modular mixed radix Gray code iteration.

This class is based on the loopless modular mixed radix gray code algorithm described in exercise 77 of "The Art of Computer Programming", Pre-Fascicle 2A (Draft of section 7.2.1.1: generating all n-tuples) by Donald E. Knuth.

`#include <misc/modgray.hh>`

Public Member Functions

- loopless_modular_mixed_radix_gray_code (int n)
- virtual ~loopless_modular_mixed_radix_gray_code ()

iteration over an element in a tuple

The class does not know how to modify the elements of the tuple (Knuth's a_j s). These changes are therefore abstracted using the a_first(), a_next(), and a_last() abstract functions. These need to be implemented in subclasses as appropriate.

- virtual void a_first (int j)=0
  Reset a_j to its initial value.
- virtual void a_next (int j)=0
  Advance a_j to its next value.
- virtual bool a_last (int j) const =0
  Whether a_j is on its last value.

iteration over all the tuples

- void first ()
  Reset the iteration to the first tuple.
- bool last () const
  Whether this the last tuple.
- bool done () const
  Whether all tuple have been explored.
- int next ()
  Update one item of the tuple and return its position.

Protected Attributes

- int n_
- bool done_
- int ∗ a_
- int ∗ f_
- int ∗ m_
- int ∗ s_
- int ∗ non_one_radixes_

7.66.1 Detailed Description

Loopless modular mixed radix Gray code iteration.

This class is based on the loopless modular mixed radix gray code algorithm described in exercise 77 of "The Art of Computer Programming", Pre-Fascicle 2A (Draft of section 7.2.1.1: generating all n-tuples) by Donald E. Knuth. The idea is to enumerate the set of all n-tuples (a_0 ,a_1 ,...,a_{n-1}) where each a_j range over a distinct set (this is the *mixed radix* part), so that only one a_j changes between two successive tuples of the iteration (that is the *Gray code* part), and that this changes occurs always in the same direction, cycling over the set a_j must cover (i.e., *modular*). The algorithm is *loopless* in that computing the next tuple done without any loop, i.e., in constant time.

This class does not need to know the type of the a_j , it will handle them indirectly through three methods: a_first(), a_next(), and a_last(). These methods need to be implemented in a subclass for the particular type of a_j at hand.

The class itself offers four functions to control the iteration over the set of all the (a_0 ,a_1 ,..., a_{n-1}) tuples: first(), next(), last(), and done(). These functions are usually used as follows:

```
for (g.first(); !g.done(); g.next())
   use the tuple
```

How to use the tuple of course depends on the way it as been stored in the subclass.

Finally, let's mention two differences between this algorithm and the one in Knuth's book. This version of the algorithm does not need to know the radixes (i.e., the size of set of each a_j) beforehand: it will discover them on-the-fly when a_last(j) first return true. It will also work with a_j that cannot be changed. (This is achieved by reindexing the elements through `non_one_radixes_`, to consider only the elements with a non-singleton range.)

7.66.2 Constructor & Destructor Documentation

7.66.2.1 spot::loopless_modular_mixed_radix_gray_code::loopless_modular_mixed_radix_gray_code (int *n*)

Constructor.

Parameters

n The size of the tuples to enumerate.

7.66.2.2 virtual spot::loopless_modular_mixed_radix_gray_code::~loopless_modular_mixed_radix_gray_code ( ) `[virtual]`

7.66.3 Member Function Documentation

7.66.3.1 virtual void spot::loopless_modular_mixed_radix_gray_code::a_first (int *j*) `[pure virtual]`

Reset a_j to its initial value.

7.66.3.2 virtual bool spot::loopless_modular_mixed_radix_gray_code::a_last (int *j*) const `[pure virtual]`

Whether a_j is on its last value.

7.66.3.3 virtual void spot::loopless_modular_mixed_radix_gray_code::a_next (int *j*) `[pure virtual]`

Advance a_j to its next value.

This will never be called if a_last(j) is true.

7.66.3.4 bool spot::loopless_modular_mixed_radix_gray_code::done ( ) const `[inline]`

Whether all tuple have been explored.

References done_.

7.66.3.5 void spot::loopless_modular_mixed_radix_gray_code::first ( )

Reset the iteration to the first tuple.

This must be called before calling any of next(), last(), or done().

7.66.3.6 bool spot::loopless_modular_mixed_radix_gray_code::last ( ) const `[inline]`

Whether this the last tuple.

At this point it is still OK to call next(), and then done() will become true.

References f_, and n_.

7.66.3.7 int spot::loopless_modular_mixed_radix_gray_code::next ( )

Update one item of the tuple and return its position.

next() should never be called if done() is true. If it is called on the last tuple (i.e., last() is true), it will return -1. Otherwise it will update one a_j of the tuple through one the a_j handling functions, and return j.

7.66.4 Member Data Documentation

7.66.4.1 int∗ spot::loopless_modular_mixed_radix_gray_code::a_ `[protected]`

7.66.4.2 bool spot::loopless_modular_mixed_radix_gray_code::done_ `[protected]`

Referenced by done().

7.66.4.3 int∗ spot::loopless_modular_mixed_radix_gray_code::f_ `[protected]`

Referenced by last().

7.66.4.4 int∗ spot::loopless_modular_mixed_radix_gray_code::m_ `[protected]`

7.66.4.5 int spot::loopless_modular_mixed_radix_gray_code::n_ `[protected]`

Referenced by last().

7.66.4.6 int∗ spot::loopless_modular_mixed_radix_gray_code::non_one_radixes_ `[protected]`

7.66.4.7 int∗ spot::loopless_modular_mixed_radix_gray_code::s_ `[protected]`

The documentation for this class was generated from the following file:

- misc/modgray.hh

7.67 spot::ltl::ltl_file Class Reference

Read LTL formulae from a file, one by one.

`#include <ltlparse/ltlfile.hh>`

Public Member Functions

- ltl_file (const std::string &filename)
- ltl_file (const char ∗filename)
- formula ∗ next ()

  Return the next parsed LTL formula, and 0 at end of file.

Private Attributes

- std::ifstream in

7.67.1 Detailed Description

Read LTL formulae from a file, one by one.

7.67.2 Constructor & Destructor Documentation

7.67.2.1 spot::ltl::ltl_file::ltl_file (const std::string & *filename*)

7.67.2.2 spot::ltl::ltl_file::ltl_file (const char ∗ *filename*)

7.67.3 Member Function Documentation

7.67.3.1 formula∗ spot::ltl::ltl_file::next ( )

Return the next parsed LTL formula, and 0 at end of file.

7.67.4 Member Data Documentation

7.67.4.1 std::ifstream spot::ltl::ltl_file::in `[private]`

The documentation for this class was generated from the following file:

- ltlparse/ltlfile.hh

7.68 spot::minato_isop Class Reference

Generate an irredundant sum-of-products (ISOP) form of a BDD function.

This algorithm implements a derecursived version the Minato-Morreale algorithm presented in the following paper.

`#include <misc/minato.hh>`

Classes

- struct local_vars

  Internal variables for minato_isop.

Public Member Functions

- minato_isop (bdd input)

  Conctructor.

- minato_isop (bdd input, bdd vars)

  Conctructor.

- bdd next ()

  Compute the next sum term of the ISOP form. Return `bddfalse` *when all terms have been output.*

Private Attributes

- std::stack< local_vars > todo_
- std::stack< bdd > cube_
- bdd ret_

7.68.1 Detailed Description

Generate an irredundant sum-of-products (ISOP) form of a BDD function.

This algorithm implements a derecursived version the Minato-Morreale algorithm presented in the following paper.

```
/// @InProceedings{   minato.92.sasimi,
///   author        = {Shin-ichi Minato},
///   title         = {Fast Generation of Irredundant Sum-of-Products Forms
///                   from Binary Decision Diagrams},
///   booktitle     = {Proceedings of the third Synthesis and Simulation
///                   and Meeting International Interchange workshop
///                   (SASIMI'92)},
///   pages         = {64--73},
///   year          = {1992},
///   address       = {Kobe, Japan},
///   month         = {April}
/// }
///
```

7.68.2 Constructor & Destructor Documentation

7.68.2.1 spot::minato_isop::minato_isop (bdd *input*)

Conctructor.

- input The BDD function to translate in ISOP.

7.68.2.2 spot::minato_isop::minato_isop (bdd *input,* bdd *vars*)

Conctructor.

- input The BDD function to translate in ISOP.
- vars The set of BDD variables to factorize in *input*.

7.68.3 Member Function Documentation

7.68.3.1 bdd spot::minato_isop::next ( )

Compute the next sum term of the ISOP form. Return `bddfalse` when all terms have been output.

7.68.4 Member Data Documentation

7.68.4.1 std::stack<bdd> spot::minato_isop::cube_ `[private]`

7.68.4.2 bdd spot::minato_isop::ret_ `[private]`

7.68.4.3 std::stack<local_vars> spot::minato_isop::todo_ `[private]`

The documentation for this class was generated from the following file:

- misc/minato.hh

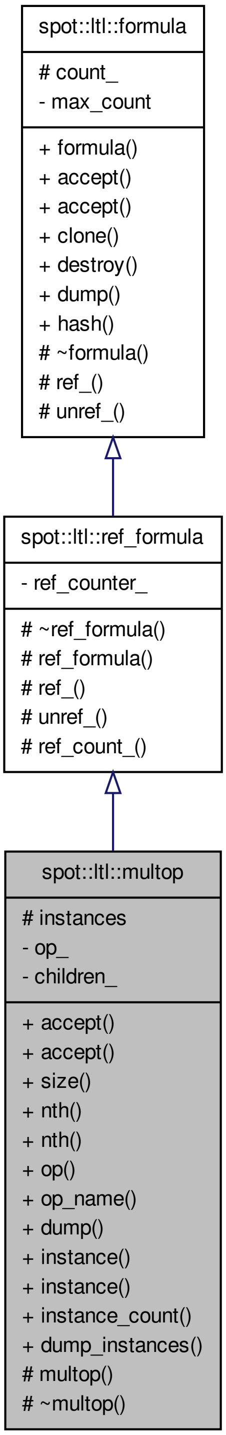
7.69 spot::ltl::multop Class Reference

Multi-operand operators.

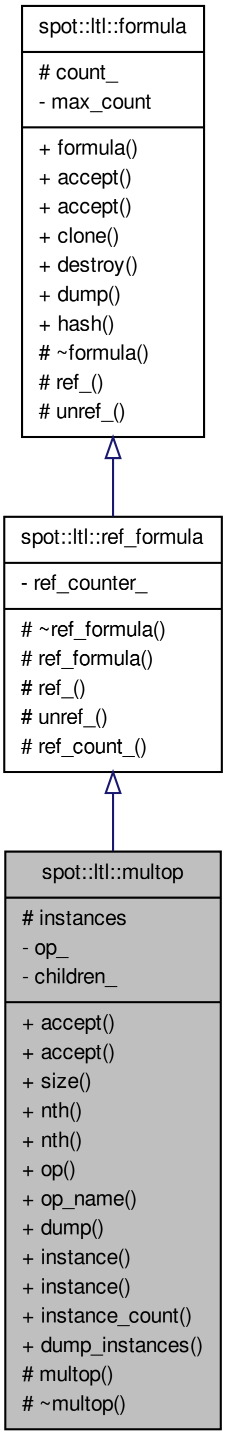
These operators are considered commutative and associative.

`#include <ltlast/multop.hh>`

Inheritance diagram for spot::ltl::multop:



Collaboration diagram for spot::ltl::multop:



Classes

- struct paircmp

  Comparison functor used internally by ltl::multop.

Public Types

- enum type { Or, And }
- typedef std::vector< formula ∗ > vec

  List of formulae.

Public Member Functions

- virtual void accept (visitor &v)

  Entry point for vspot::ltl::visitor instances.

- virtual void accept (const_visitor &v) const

  Entry point for vspot::ltl::const_visitor instances.

- unsigned size () const

  Get the number of children.

- const formula ∗ nth (unsigned n) const

  Get the nth children.

- formula ∗ nth (unsigned n)

  Get the nth children.

- type op () const

  Get the type of this operator.

- const char ∗ op_name () const

  Get the type of this operator, as a string.

- virtual std::string dump () const

  Return a canonic representation of the atomic proposition.

- formula ∗ clone () const

  clone this node

- void destroy () const

  release this node

- size_t hash () const

  Return a hash key for the formula.

Static Public Member Functions

- static formula ∗ instance (type op, formula ∗first, formula ∗second)

  Build a spot::ltl::multop with two children.

- static formula ∗ instance (type op, vec ∗v)

  Build a spot::ltl::multop with many children.

- static unsigned instance_count ()

  Number of instantiated multi-operand operators. For debugging.

- static std::ostream & dump_instances (std::ostream &os)

  Dump all instances. For debugging.

Protected Types

- typedef std::pair< type, vec ∗ > pair
- typedef std::map< pair, multop ∗, paircmp > map

Protected Member Functions

- multop (type op, vec ∗v)
- virtual ∼multop ()
- void ref_ ()

  increment reference counter if any

- bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

- unsigned ref_count_ ()

  Number of references to this formula.

Protected Attributes

- size_t count_

  The hash key of this formula.

Static Protected Attributes

- static map instances

Private Attributes

- type op_
- vec ∗ children_

7.69.1 Detailed Description

Multi-operand operators.

These operators are considered commutative and associative.

7.69.2 Member Typedef Documentation

7.69.2.1 typedef std::map<pair, multop*, paircmp> spot::ltl::multop::map `[protected]`

7.69.2.2 typedef std::pair<type, vec*> spot::ltl::multop::pair `[protected]`

7.69.2.3 typedef std::vector<formula*> spot::ltl::multop::vec

List of formulae.

7.69.3 Member Enumeration Documentation

7.69.3.1 enum spot::ltl::multop::type

Enumerator:

- ***Or***
- ***And***

7.69.4 Constructor & Destructor Documentation

7.69.4.1 spot::ltl::multop::multop (type *op*, vec * *v*) `[protected]`

7.69.4.2 virtual spot::ltl::multop::~multop ( ) `[protected, virtual]`

7.69.5 Member Function Documentation

7.69.5.1 virtual void spot::ltl::multop::accept (visitor & *v*) `[virtual]`

Entry point for vspot::ltl::visitor instances.

Implements spot::ltl::formula.

7.69.5.2 virtual void spot::ltl::multop::accept (const_visitor & *v*) const `[virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implements spot::ltl::formula.

7.69.5.3 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.69.5.4 void spot::ltl::formula::destroy ( ) const `[inherited]`

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.69.5.5 virtual std::string spot::ltl::multop::dump ( ) const `[virtual]`

Return a canonic representation of the atomic proposition.

Implements spot::ltl::formula.

7.69.5.6 static std::ostream& spot::ltl::multop::dump_instances (std::ostream & *os*) `[static]`

Dump all instances. For debugging.

7.69.5.7 size_t spot::ltl::formula::hash ( ) const `[inline, inherited]`

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.69.5.8 static formula∗ spot::ltl::multop::instance (type *op*, vec ∗ *v*) `[static]`

Build a spot::ltl::multop with many children.

Same as the other instance() function, but take a vector of formula in argument. This vector is acquired by the spot::ltl::multop class, the caller should allocate it with `new`, but not use it (especially not destroy it) after it has been passed to spot::ltl::multop.

This functions can perform slight optimizations and may not return an ltl::multop objects. For instance if the vector contain only one unique element, this this formula will be returned as-is.

7.69.5.9 static formula∗ spot::ltl::multop::instance (type *op*, formula ∗ *first*, formula ∗ *second*) `[static]`

Build a spot::ltl::multop with two children.

If one of the children itself is a spot::ltl::multop with the same type, it will be merged. I.e., children if that child will be added, and that child itself will be destroyed. This allows incremental building of n-ary ltl::multop.

This functions can perform slight optimizations and may not return an ltl::multop objects. For instance if `first` and `second` are equal, that formula is returned as-is.

7.69.5.10 static unsigned spot::ltl::multop::instance_count ( ) `[static]`

Number of instantiated multi-operand operators. For debugging.

7.69.5.11 const formula∗ spot::ltl::multop::nth (unsigned *n*) const

Get the nth children.

Starting with $n = 0$.

7.69.5.12 formula∗ spot::ltl::multop::nth (unsigned *n*)

Get the nth children.

Starting with $n = 0$.

7.69.5.13 type spot::ltl::multop::op ( ) const

Get the type of this operator.

7.69.5.14 const char∗ spot::ltl::multop::op_name ( ) const

Get the type of this operator, as a string.

7.69.5.15 void spot::ltl::ref_formula::ref_ ( ) `[protected, virtual, inherited]`

increment reference counter if any

Reimplemented from spot::ltl::formula.

7.69.5.16 unsigned spot::ltl::ref_formula::ref_count_ ( ) `[protected, inherited]`

Number of references to this formula.

7.69.5.17 unsigned spot::ltl::multop::size ( ) const

Get the number of children.

7.69.5.18 bool spot::ltl::ref_formula::unref_ ( ) `[protected, virtual, inherited]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented from spot::ltl::formula.

7.69.6 Member Data Documentation

7.69.6.1 vec∗ spot::ltl::multop::children_ `[private]`

7.69.6.2 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.69.6.3 map spot::ltl::multop::instances `[static, protected]`

7.69.6.4 type spot::ltl::multop::op_ `[private]`

The documentation for this class was generated from the following file:

- ltlast/multop.hh

7.70 spot::ltl::nfa Class Reference

Nondeterministic Finite Automata used by automata operators.

`#include <ltlast/nfa.hh>`

Classes

- struct transition

  Explicit transitions.

Public Types

- typedef std::list< transition ∗ > state
- typedef boost::shared_ptr< formula_tree::node > label
- typedef succ_iterator iterator

  Iterator over the successors of a state.

- typedef boost::shared_ptr< nfa > ptr

Public Member Functions

- nfa ()
- ∼nfa ()
- void add_transition (int src, int dst, const label lbl)
- void set_init_state (int name)
- void set_final (int name)
- const state ∗ get_init_state ()

  Get the initial state of the NFA.

- bool is_final (const state ∗s)

  Tell whether the given state is final or not.

- bool is_loop ()

  Tell whether the NFA is 'loop', i.e. without any final state.

- unsigned arity ()

  Get the 'arity' i.e. max t.cost, for each transition t.

- iterator begin (const state ∗s) const

  Return an iterator on the first succesor (if any) of state.

- iterator end (const state ∗s) const

  Return an iterator just past the last succesor of state.

- int format_state (const state ∗s) const
- const std::string & get_name () const
- void set_name (const std::string &)

Private Types

- typedef Sgi::hash_map< int, state ∗, Sgi::hash< int > > is_map
- typedef Sgi::hash_map< const state ∗, int, ptr_hash< state > > si_map

Private Member Functions

- state ∗ add_state (int name)
- nfa (const nfa &other)
- nfa & operator= (const nfa &other)

Private Attributes

- is_map is_
- si_map si_
- size_t arity_
- std::string name_
- state ∗ init_
- std::set< int > finals_

7.70.1 Detailed Description

Nondeterministic Finite Automata used by automata operators. States are represented by integers. Labels are represented by formula_tree's nodes. Currently, only one initial state is possible.

7.70.2 Member Typedef Documentation

7.70.2.1 typedef Sgi::hash_map<int, state∗, Sgi::hash<int> > spot::ltl::nfa::is_map `[private]`

7.70.2.2 typedef succ_iterator spot::ltl::nfa::iterator

Iterator over the successors of a state.

7.70.2.3 typedef boost::shared_ptr<formula_tree::node> spot::ltl::nfa::label

7.70.2.4 typedef boost::shared_ptr<nfa> spot::ltl::nfa::ptr

7.70.2.5 typedef Sgi::hash_map<const state∗, int, ptr_hash<state> > spot::ltl::nfa::si_map `[private]`

7.70.2.6 typedef std::list<transition∗> spot::ltl::nfa::state

7.70.3 Constructor & Destructor Documentation

7.70.3.1 spot::ltl::nfa::nfa ( )

7.70.3.2 spot::ltl::nfa::∼nfa ( )

7.70.3.3 spot::ltl::nfa::nfa (const nfa & *other*) `[private]`

Explicitly disllow use of implicity generated member functions we don't want.

7.70.4 Member Function Documentation

7.70.4.1 state∗ spot::ltl::nfa::add_state (int *name*) `[private]`

7.70.4.2 void spot::ltl::nfa::add_transition (int *src,* int *dst,* const label *lbl*)

7.70.4.3 unsigned spot::ltl::nfa::arity ( )

Get the 'arity' i.e. max t.cost, for each transition t.

7.70.4.4 iterator spot::ltl::nfa::begin (const state ∗ *s*) const

Return an iterator on the first succesor (if any) of *state*.
The usual way to do this with a `for` loop.

```
for (nfa::iterator i = a.begin(s); i != a.end(s); ++i);
```

7.70.4.5 iterator spot::ltl::nfa::end (const state ∗ *s*) const

Return an iterator just past the last succesor of *state*.

7.70.4.6 int spot::ltl::nfa::format_state (const state ∗ *s*) const

7.70.4.7 const state∗ spot::ltl::nfa::get_init_state ( )

Get the initial state of the NFA.

7.70.4.8 const std::string& spot::ltl::nfa::get_name ( ) const

7.70.4.9 bool spot::ltl::nfa::is_final (const state ∗ *s*)

Tell whether the given state is final or not.

7.70.4.10 bool spot::ltl::nfa::is_loop ( )

Tell whether the NFA is ‘loop’, i.e. without any final state.

7.70.4.11 nfa& spot::ltl::nfa::operator= (const nfa & *other*) `[private]`

7.70.4.12 void spot::ltl::nfa::set_final (int *name*)

7.70.4.13 void spot::ltl::nfa::set_init_state (int *name*)

7.70.4.14 void spot::ltl::nfa::set_name (const std::string &)

7.70.5 Member Data Documentation

7.70.5.1 size_t spot::ltl::nfa::arity_ `[private]`

7.70.5.2 std::set<int> spot::ltl::nfa::finals_ `[private]`

7.70.5.3 state∗ spot::ltl::nfa::init_ `[private]`

7.70.5.4 is_map spot::ltl::nfa::is_ `[private]`

7.70.5.5 std::string spot::ltl::nfa::name_ `[private]`

7.70.5.6 si_map spot::ltl::nfa::si_ `[private]`

The documentation for this class was generated from the following file:

- ltlast/nfa.hh

7.71 spot::nips_exception Class Reference

An exception used to forward NIPS errors.

`#include <nips/common.hh>`

Public Member Functions

- nips_exception (const std::string &where, int err)
- nips_exception (const std::string &where)
- int get_err () const
- std::string get_where () const
- int get_err_defined () const

Private Attributes

- int err_
- std::string where_
- bool err_defined_

7.71.1 Detailed Description

An exception used to forward NIPS errors.

7.71.2 Constructor & Destructor Documentation

7.71.2.1 spot::nips_exception::nips_exception (const std::string & *where*, int *err*) `[inline]`

7.71.2.2 spot::nips_exception::nips_exception (const std::string & *where*) `[inline]`

7.71.3 Member Function Documentation

7.71.3.1 int spot::nips_exception::get_err ( ) const `[inline]`

References err_.

7.71.3.2 int spot::nips_exception::get_err_defined ( ) const `[inline]`

References err_defined_.

7.71.3.3 std::string spot::nips_exception::get_where ( ) const `[inline]`

References where_.

7.71.4 Member Data Documentation

7.71.4.1 int spot::nips_exception::err_ `[private]`

Referenced by get_err().

7.71.4.2 bool spot::nips_exception::err_defined_ `[private]`

Referenced by get_err_defined().

7.71.4.3 std::string spot::nips_exception::where_ `[private]`

Referenced by get_where().

The documentation for this class was generated from the following file:

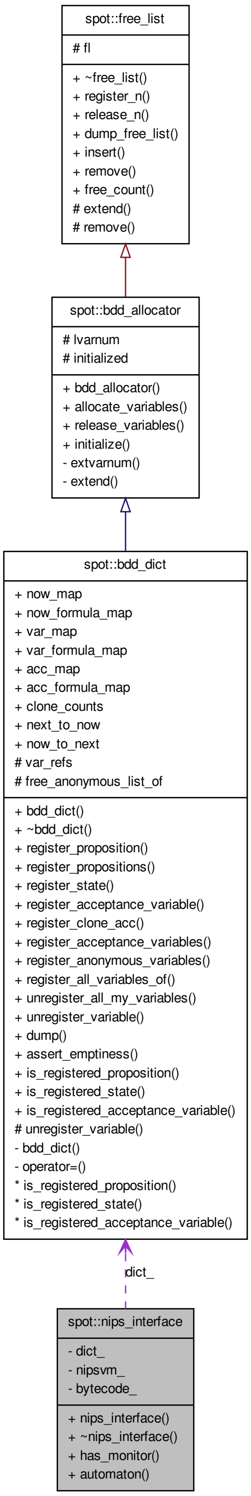
- nips/common.hh

7.72 spot::nips_interface Class Reference

An interface to provide a PROMELA front-end.

`#include <nips/nips.hh>`

Collaboration diagram for spot::nips_interface:



Public Member Functions

- nips_interface (bdd_dict ∗dict, const std::string &filename)
- ∼nips_interface ()
- bool has_monitor () const
- tgba ∗ automaton ()

Private Attributes

- bdd_dict ∗ dict_
- nipsvm_t ∗ nipsvm_
- nipsvm_bytecode_t ∗ bytecode_

7.72.1 Detailed Description

An interface to provide a PROMELA front-end. This interface let to use a Promela model as a BÃ¼chi automata. It uses the NIPS library, which provied a virtual machine for the state-space exploration of a Promela model, therefore, models must be compiled with the NIPS compiler (`http://wwwhome.cs.utwente.nl/~michaelw/nips/`).

With this interface, properties to check aren't defined with the Spot LTL representation, but in defining correctness claims (a monitor) in the Promela model (see chapter 4, The Spin Model Checker: Primer and reference manual, Gerard J.Holzmann).

7.72.2 Constructor & Destructor Documentation

7.72.2.1 spot::nips_interface::nips_interface (bdd_dict ∗ *dict,* const std::string & *filename*)

7.72.2.2 spot::nips_interface::∼nips_interface ( )

7.72.3 Member Function Documentation

7.72.3.1 tgba∗ spot::nips_interface::automaton ( )

7.72.3.2 bool spot::nips_interface::has_monitor ( ) const

7.72.4 Member Data Documentation

7.72.4.1 nipsvm_bytecode_t∗ spot::nips_interface::bytecode_ `[private]`

7.72.4.2 bdd_dict∗ spot::nips_interface::dict_ `[private]`

7.72.4.3 nipsvm_t∗ spot::nips_interface::nipsvm_ `[private]`

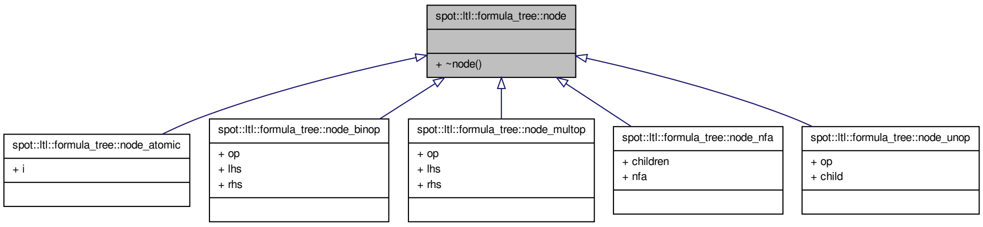
The documentation for this class was generated from the following file:

- nips/nips.hh

7.73 spot::ltl::formula_tree::node Struct Reference

`#include <ltlast/formula_tree.hh>`

Inheritance diagram for spot::ltl::formula_tree::node:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_atomic
+ i
spot::ltl::formula_tree::node_binop
+ op
+ lhs
+ rhs
spot::ltl::formula_tree::node_multop
+ op
+ lhs
+ rhs
spot::ltl::formula_tree::node_nfa
+ children
+ nfa
spot::ltl::formula_tree::node_unop
+ op
+ child

Public Member Functions

- virtual ∼node ()

7.73.1 Constructor & Destructor Documentation

7.73.1.1 virtual spot::ltl::formula_tree::node::∼node ( ) `[inline, virtual]`

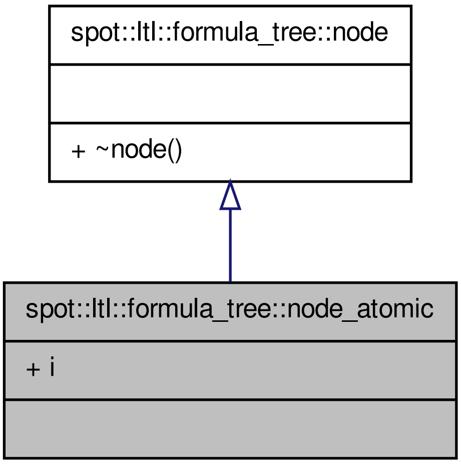
The documentation for this struct was generated from the following file:

- ltlast/formula_tree.hh

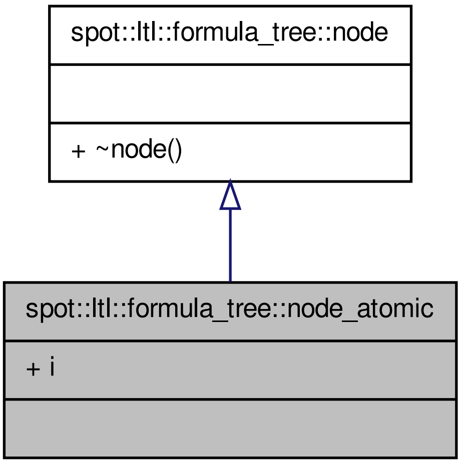
7.74 spot::ltl::formula_tree::node_atomic Struct Reference

`#include <ltlast/formula_tree.hh>`

Inheritance diagram for spot::ltl::formula_tree::node_atomic:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_atomic
+ i

Collaboration diagram for spot::ltl::formula_tree::node_atomic:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_atomic
+ i

Public Attributes

- int i

7.74.1 Member Data Documentation

7.74.1.1 int spot::ltl::formula_tree::node_atomic::i

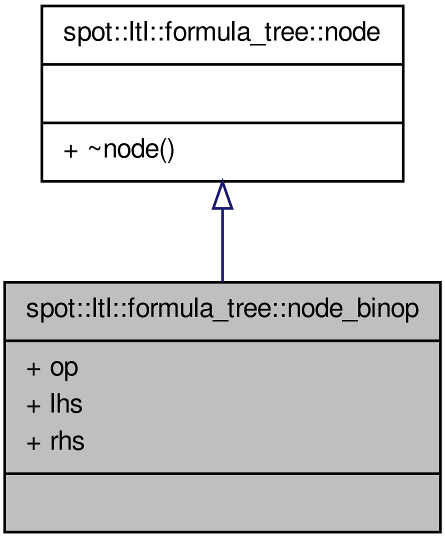
The documentation for this struct was generated from the following file:

- ltlast/formula_tree.hh

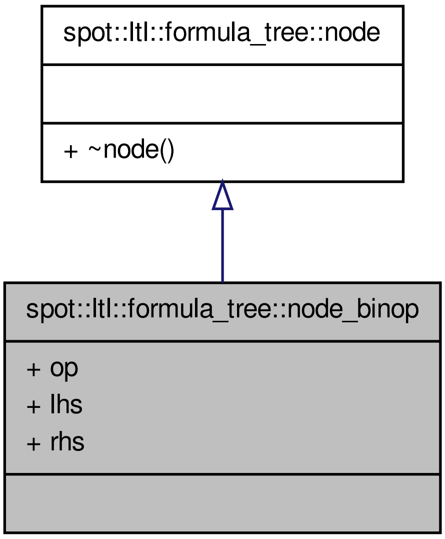
7.75 spot::ltl::formula_tree::node_binop Struct Reference

`#include <ltlast/formula_tree.hh>`

Inheritance diagram for spot::ltl::formula_tree::node_binop:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_binop
+ op
+ lhs
+ rhs

Collaboration diagram for spot::ltl::formula_tree::node_binop:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_binop
+ op
+ lhs
+ rhs

Public Attributes

- binop::type op
- node_ptr lhs
- node_ptr rhs

7.75.1 Member Data Documentation

7.75.1.1 node_ptr spot::ltl::formula_tree::node_binop::lhs

7.75.1.2 binop::type spot::ltl::formula_tree::node_binop::op

7.75.1.3 node_ptr spot::ltl::formula_tree::node_binop::rhs

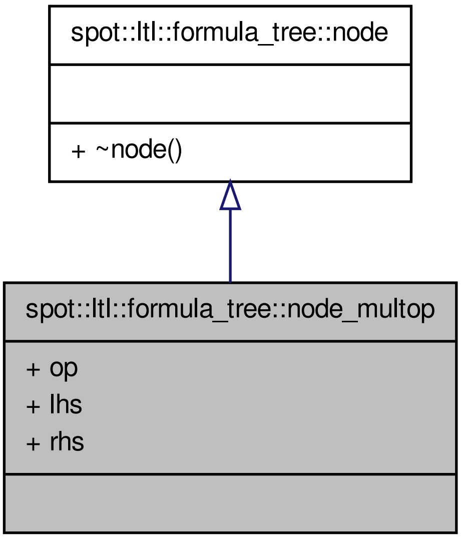
The documentation for this struct was generated from the following file:

- ltlast/formula_tree.hh

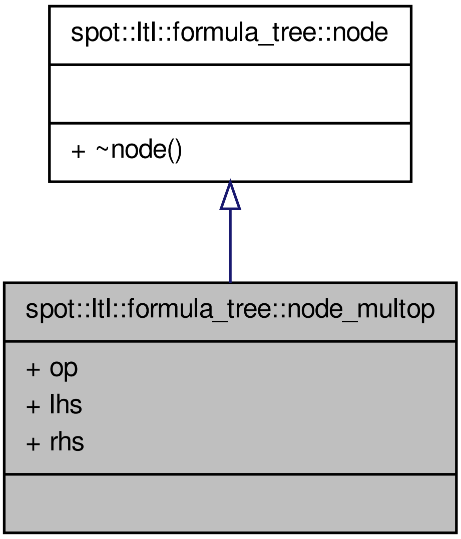
7.76 spot::ltl::formula_tree::node_multop Struct Reference

`#include <ltlast/formula_tree.hh>`

Inheritance diagram for spot::ltl::formula_tree::node_multop:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_multop
+ op
+ lhs
+ rhs

Collaboration diagram for spot::ltl::formula_tree::node_multop:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_multop
+ op
+ lhs
+ rhs

Public Attributes

- multop::type op
- node_ptr lhs
- node_ptr rhs

7.76.1 Member Data Documentation

7.76.1.1 node_ptr spot::ltl::formula_tree::node_multop::lhs

7.76.1.2 multop::type spot::ltl::formula_tree::node_multop::op

7.76.1.3 node_ptr spot::ltl::formula_tree::node_multop::rhs

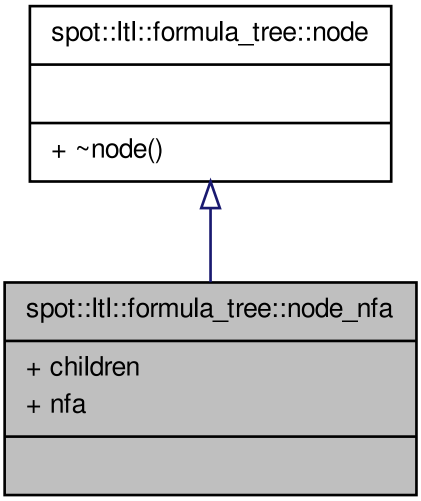
The documentation for this struct was generated from the following file:

- ltlast/formula_tree.hh

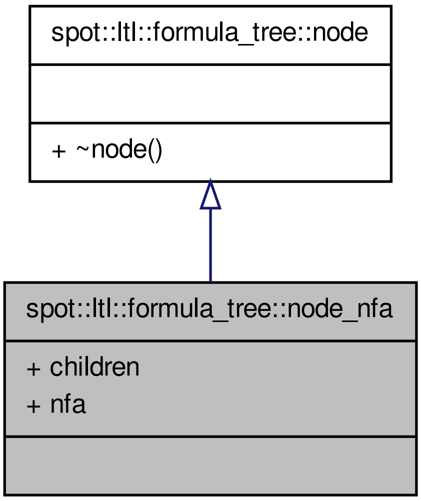
7.77 spot::ltl::formula_tree::node_nfa Struct Reference

`#include <ltlast/formula_tree.hh>`

Inheritance diagram for spot::ltl::formula_tree::node_nfa:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_nfa
+ children
+ nfa

Collaboration diagram for spot::ltl::formula_tree::node_nfa:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_nfa
+ children
+ nfa

Public Attributes

- std::vector< node_ptr > children
- spot::ltl::nfa::ptr nfa

7.77.1 Member Data Documentation

7.77.1.1 std::vector<node_ptr> spot::ltl::formula_tree::node_nfa::children

7.77.1.2 spot::ltl::nfa::ptr spot::ltl::formula_tree::node_nfa::nfa

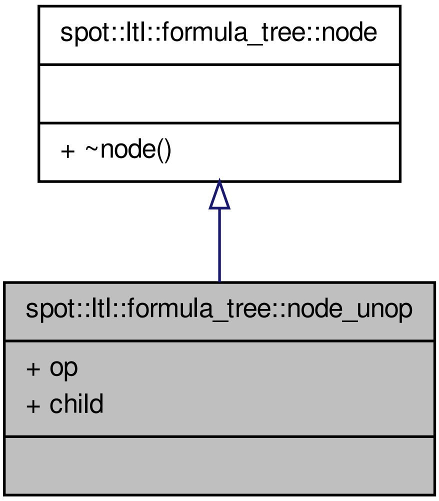
The documentation for this struct was generated from the following file:

- ltlast/formula_tree.hh

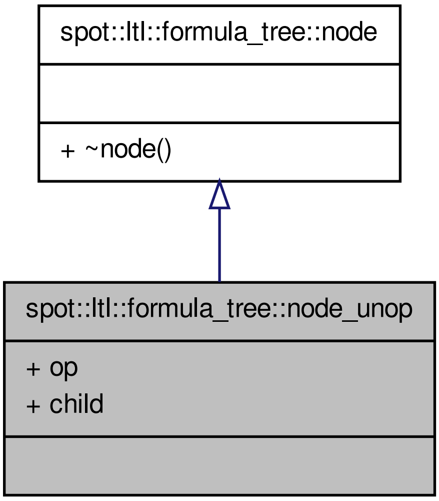
7.78 spot::ltl::formula_tree::node_unop Struct Reference

`#include <ltlast/formula_tree.hh>`

Inheritance diagram for spot::ltl::formula_tree::node_unop:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_unop
+ op
+ child

Collaboration diagram for spot::ltl::formula_tree::node_unop:


spot::ltl::formula_tree::node
+ ~node()
spot::ltl::formula_tree::node_unop
+ op
+ child

Public Attributes

- unop::type op
- node_ptr child

7.78.1 Member Data Documentation

7.78.1.1 node_ptr spot::ltl::formula_tree::node_unop::child

7.78.1.2 unop::type spot::ltl::formula_tree::node_unop::op

The documentation for this struct was generated from the following file:

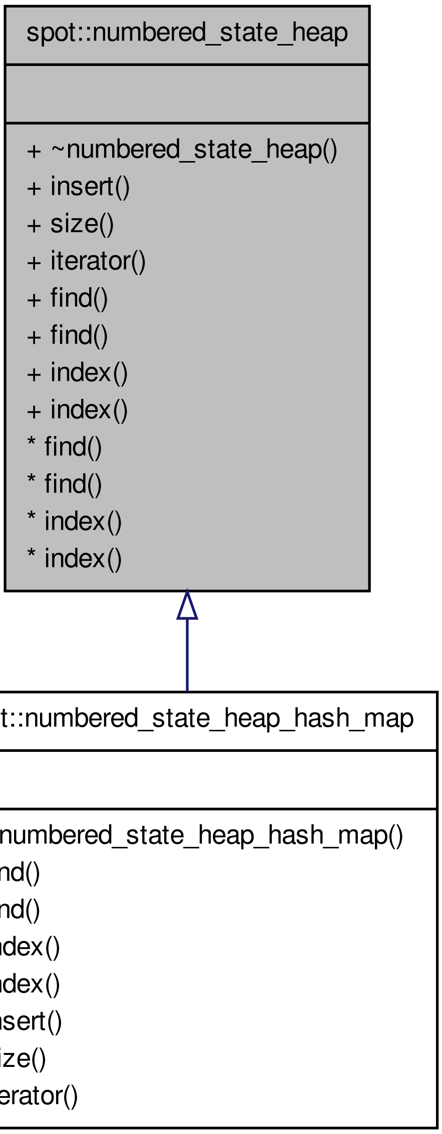
- ltlast/formula_tree.hh

7.79 spot::numbered_state_heap Class Reference

Keep track of a large quantity of indexed states.

`#include <tgbaalgos/gtec/nsheap.hh>`

Inheritance diagram for spot::numbered_state_heap:



Public Types

- typedef std::pair< const state $*$, int $*$ > state_index_p
- typedef std::pair< const state $*$, int > state_index

Public Member Functions

- virtual ∼numbered_state_heap ()
- virtual void insert (const state ∗s, int index)=0

  Add a new state s with index index.

- virtual int size () const =0

  The number of stored states.

- virtual numbered_state_heap_const_iterator ∗ iterator () const =0

  Return an iterator on the states/indexes pairs.

  - virtual state_index find (const state ∗s) const =0

    Is state in the heap?

  - virtual state_index_p find (const state ∗s)=0
  - virtual state_index index (const state ∗s) const =0

    Return the index of an existing state.

  - virtual state_index_p index (const state ∗s)=0

7.79.1 Detailed Description

Keep track of a large quantity of indexed states.

7.79.2 Member Typedef Documentation

7.79.2.1 typedef std::pair<const state∗, int> spot::numbered_state_heap::state_index

7.79.2.2 typedef std::pair<const state∗, int∗> spot::numbered_state_heap::state_index_p

7.79.3 Constructor & Destructor Documentation

7.79.3.1 virtual spot::numbered_state_heap::∼numbered_state_heap ( ) `[inline, virtual]`

7.79.4 Member Function Documentation

7.79.4.1 virtual state_index spot::numbered_state_heap::find (const state ∗ *s*) const `[pure virtual]`

Is state in the heap?

Returns a pair (0,0) if *s* is not in the heap. or a pair (p, i) if there is a clone *p* of *s* *i* in the heap with index. If *s* is in the heap and is different from *p* it will be freed.

These functions are called by the algorithm to check whether a successor is a new state to explore or an already visited state.

These functions can be redefined to search for more than an equal match. For example we could redefine it to check state inclusion.

Implemented in spot::numbered_state_heap_hash_map.

7.79.4.2 virtual state_index_p spot::numbered_state_heap::find (const state ∗ *s*) `[pure virtual]`

Implemented in spot::numbered_state_heap_hash_map.

7.79.4.3 virtual state_index_p spot::numbered_state_heap::index (const state ∗ *s*) `[pure virtual]`

Implemented in spot::numbered_state_heap_hash_map.

7.79.4.4 virtual state_index spot::numbered_state_heap::index (const state ∗ *s*) const `[pure virtual]`

Return the index of an existing state.

This is mostly similar to find(), except it will be called for state which we know are already in the heap, or for state which may not be in the heap but for which it is always OK to do equality checks.

Implemented in spot::numbered_state_heap_hash_map.

7.79.4.5 virtual void spot::numbered_state_heap::insert (const state ∗ *s*, int *index*) `[pure virtual]`

Add a new state *s* with index *index*.

Implemented in spot::numbered_state_heap_hash_map.

7.79.4.6 virtual numbered_state_heap_const_iterator∗ spot::numbered_state_heap::iterator ( ) const `[pure virtual]`

Return an iterator on the states/indexes pairs.

Implemented in spot::numbered_state_heap_hash_map.

7.79.4.7 virtual int spot::numbered_state_heap::size ( ) const `[pure virtual]`

The number of stored states.

Implemented in spot::numbered_state_heap_hash_map.

The documentation for this class was generated from the following file:

- tgbaalgos/gtec/nsheap.hh

7.80 spot::numbered_state_heap_const_iterator Class Reference

Iterator on numbered_state_heap objects.

`#include <tgbaalgos/gtec/nsheap.hh>`

Public Member Functions

- virtual ∼numbered_state_heap_const_iterator ()
  - virtual void first ()=0
    Iteration.
  - virtual void next ()=0
  - virtual bool done () const =0
  - virtual const state ∗ get_state () const =0
    Inspection.
  - virtual int get_index () const =0

7.80.1 Detailed Description

Iterator on numbered_state_heap objects.

7.80.2 Constructor & Destructor Documentation

7.80.2.1 virtual spot::numbered_state_heap_const_iterator::∼numbered_state_heap_const_iterator ( ) `[inline, virtual]`

7.80.3 Member Function Documentation

7.80.3.1 virtual bool spot::numbered_state_heap_const_iterator::done ( ) const `[pure virtual]`

7.80.3.2 virtual void spot::numbered_state_heap_const_iterator::first ( ) `[pure virtual]`

Iteration.

7.80.3.3 virtual int spot::numbered_state_heap_const_iterator::get_index ( ) const `[pure virtual]`

7.80.3.4 virtual const state∗ spot::numbered_state_heap_const_iterator::get_state ( ) const `[pure virtual]`

Inspection.

7.80.3.5 virtual void spot::numbered_state_heap_const_iterator::next ( ) `[pure virtual]`

The documentation for this class was generated from the following file:

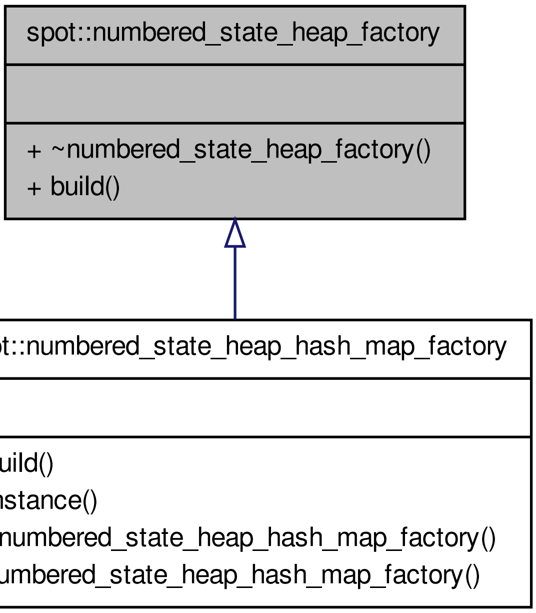
- tgbaalgos/gtec/nsheap.hh

7.81 spot::numbered_state_heap_factory Class Reference

Abstract factory for numbered_state_heap.

`#include <tgbaalgos/gtec/nsheap.hh>`

Inheritance diagram for spot::numbered_state_heap_factory:


spot::numbered_state_heap_factory
+ ~numbered_state_heap_factory()
+ build()
spot::numbered_state_heap_hash_map_factory
+ build()
+ instance()
# ~numbered_state_heap_hash_map_factory()
# numbered_state_heap_hash_map_factory()

Public Member Functions

- virtual ∼numbered_state_heap_factory ()
- virtual numbered_state_heap ∗ build () const =0

7.81.1 Detailed Description

Abstract factory for numbered_state_heap.

7.81.2 Constructor & Destructor Documentation

7.81.2.1 virtual spot::numbered_state_heap_factory::∼numbered_state_heap_factory ( ) `[inline, virtual]`

7.81.3 Member Function Documentation

7.81.3.1 virtual numbered_state_heap∗ spot::numbered_state_heap_factory::build ( ) const `[pure virtual]`

Implemented in spot::numbered_state_heap_hash_map_factory.

The documentation for this class was generated from the following file:

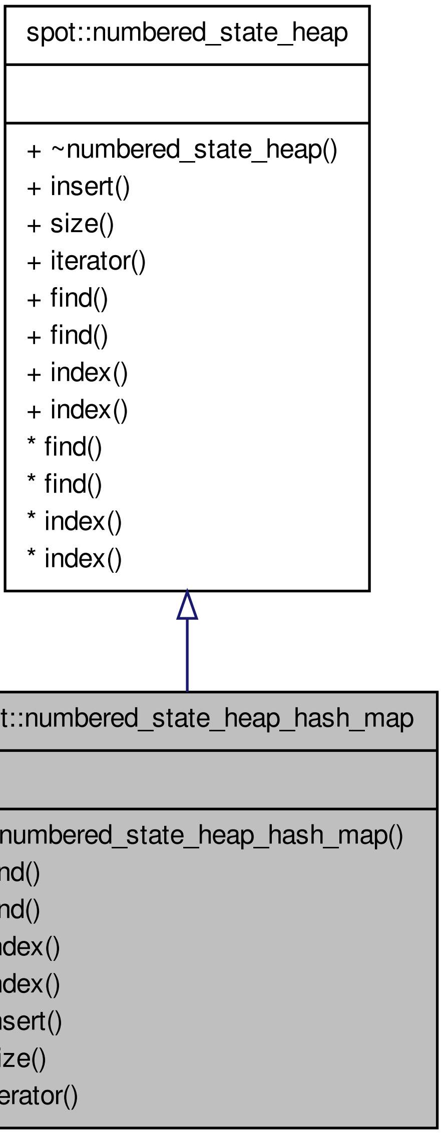
- tgbaalgos/gtec/nsheap.hh

7.82 spot::numbered_state_heap_hash_map Class Reference

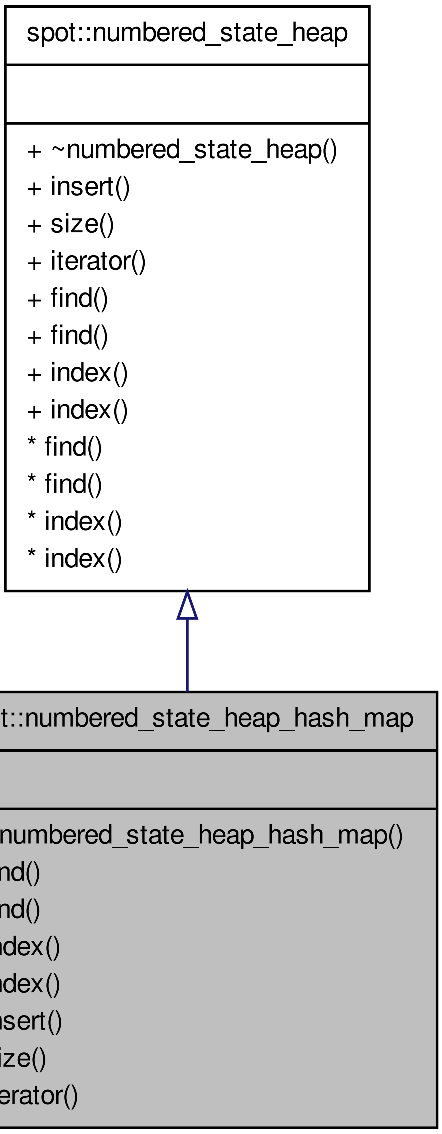
A straightforward implementation of numbered_state_heap with a hash map.

`#include <tgbaalgos/gtec/nsheap.hh>`

Inheritance diagram for spot::numbered_state_heap_hash_map:



Collaboration diagram for spot::numbered_state_heap_hash_map:



Public Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > hash_type
- typedef std::pair< const state ∗, int ∗ > state_index_p
- typedef std::pair< const state ∗, int > state_index

Public Member Functions

- virtual ~numbered_state_heap_hash_map ()
- virtual state_index find (const state ∗s) const

  Is state in the heap?

- virtual state_index_p find (const state ∗s)
- virtual state_index index (const state ∗s) const

  Return the index of an existing state.

- virtual state_index_p index (const state ∗s)
- virtual void insert (const state ∗s, int index)

  Add a new state s with index index.

- virtual int size () const

  The number of stored states.

- virtual numbered_state_heap_const_iterator ∗ iterator () const

  Return an iterator on the states/indexes pairs.

Protected Attributes

- hash_type h

  Map of visited states.

7.82.1 Detailed Description

A straightforward implementation of numbered_state_heap with a hash map.

7.82.2 Member Typedef Documentation

7.82.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::numbered_state_heap_hash_map::hash_type

7.82.2.2 typedef std::pair<const state∗, int> spot::numbered_state_heap::state_index `[inherited]`

7.82.2.3 typedef std::pair<const state∗, int∗> spot::numbered_state_heap::state_index_p `[inherited]`

7.82.3 Constructor & Destructor Documentation

7.82.3.1 virtual spot::numbered_state_heap_hash_map::∼numbered_state_heap_hash_map ( ) `[virtual]`

7.82.4 Member Function Documentation

7.82.4.1 virtual state_index spot::numbered_state_heap_hash_map::find (const state ∗ *s*) const `[virtual]`

Is state in the heap?

Returns a pair (0,0) if *s* is not in the heap. or a pair (p, i) if there is a clone *p* of *s* *i* in the heap with index. If *s* is in the heap and is different from *p* it will be freed.

These functions are called by the algorithm to check whether a successor is a new state to explore or an already visited state.

These functions can be redefined to search for more than an equal match. For example we could redefine it to check state inclusion.

Implements spot::numbered_state_heap.

7.82.4.2 virtual state_index_p spot::numbered_state_heap_hash_map::find (const state ∗ *s*) `[virtual]`

Implements spot::numbered_state_heap.

7.82.4.3 virtual state_index_p spot::numbered_state_heap_hash_map::index (const state ∗ *s*) `[virtual]`

Implements spot::numbered_state_heap.

7.82.4.4 virtual state_index spot::numbered_state_heap_hash_map::index (const state ∗ *s*) const `[virtual]`

Return the index of an existing state.

This is mostly similar to find(), except it will be called for state which we know are already in the heap, or for state which may not be in the heap but for which it is always OK to do equality checks.

Implements spot::numbered_state_heap.

7.82.4.5 virtual void spot::numbered_state_heap_hash_map::insert (const state ∗ *s*, int *index*) `[virtual]`

Add a new state *s* with index *index*.

Implements spot::numbered_state_heap.

7.82.4.6 virtual numbered_state_heap_const_iterator∗ spot::numbered_state_heap_hash_map::iterator ( ) const `[virtual]`

Return an iterator on the states/indexes pairs.

Implements spot::numbered_state_heap.

7.82.4.7 virtual int spot::numbered_state_heap_hash_map::size ( ) const `[virtual]`

The number of stored states.

Implements spot::numbered_state_heap.

7.82.5 Member Data Documentation

7.82.5.1 hash_type spot::numbered_state_heap_hash_map::h `[protected]`

Map of visited states.

The documentation for this class was generated from the following file:

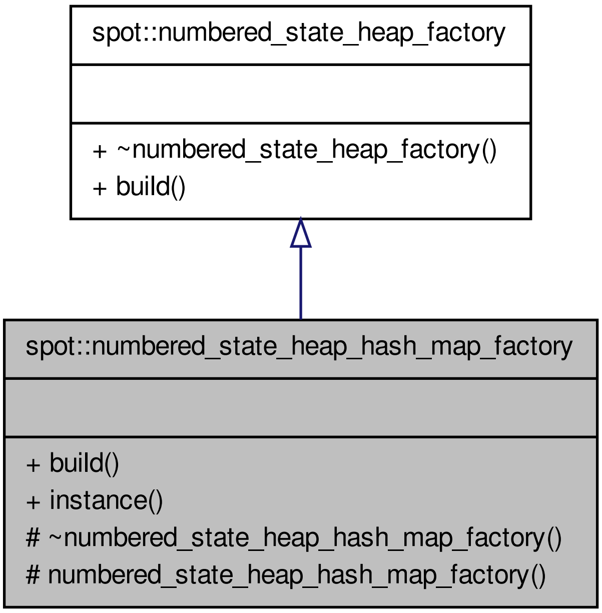
- tgbaalgos/gtec/nsheap.hh

7.83 spot::numbered_state_heap_hash_map_factory Class Reference

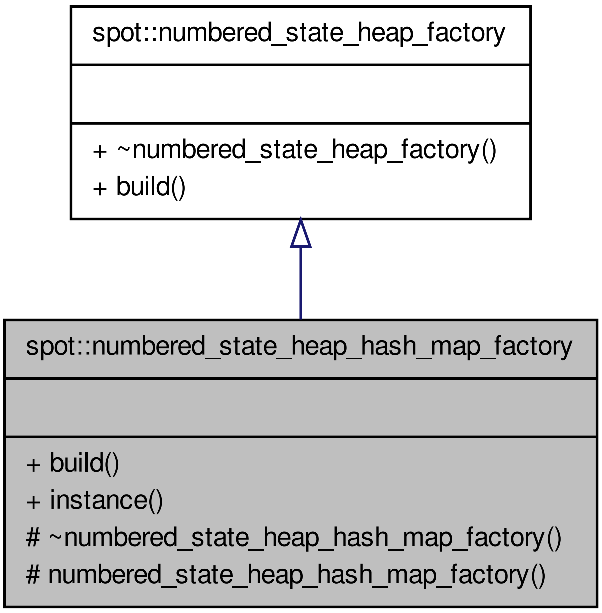
Factory for numbered_state_heap_hash_map.

`#include <tgbaalgos/gtec/nsheap.hh>`

Inheritance diagram for spot::numbered_state_heap_hash_map_factory:


spot::numbered_state_heap_factory
+ ~numbered_state_heap_factory()
+ build()
spot::numbered_state_heap_hash_map_factory
+ build()
+ instance()
# ~numbered_state_heap_hash_map_factory()
# numbered_state_heap_hash_map_factory()

Collaboration diagram for spot::numbered_state_heap_hash_map_factory:


spot::numbered_state_heap_factory
+ ~numbered_state_heap_factory()
+ build()
spot::numbered_state_heap_hash_map_factory
+ build()
+ instance()
# ~numbered_state_heap_hash_map_factory()
# numbered_state_heap_hash_map_factory()

Public Member Functions

- virtual numbered_state_heap_hash_map ∗ build () const

Static Public Member Functions

- static const numbered_state_heap_hash_map_factory ∗ instance ()

  Get the unique instance of this class.

Protected Member Functions

- virtual ∼numbered_state_heap_hash_map_factory ()
- numbered_state_heap_hash_map_factory ()

7.83.1 Detailed Description

Factory for numbered_state_heap_hash_map. This class is a singleton. Retrieve the instance using instance().

7.83.2 Constructor & Destructor Documentation

7.83.2.1 virtual spot::numbered_state_heap_hash_map_factory::∼numbered_state_heap_hash_map_factory ( ) `[inline, protected, virtual]`

7.83.2.2 spot::numbered_state_heap_hash_map_factory::numbered_state_heap_hash_map_factory ( ) `[protected]`

7.83.3 Member Function Documentation

7.83.3.1 virtual numbered_state_heap_hash_map∗ spot::numbered_state_heap_hash_map_factory::build ( ) const `[virtual]`

Implements spot::numbered_state_heap_factory.

7.83.3.2 static const numbered_state_heap_hash_map_factory∗ spot::numbered_state_heap_hash_map_factory::instance ( ) `[static]`

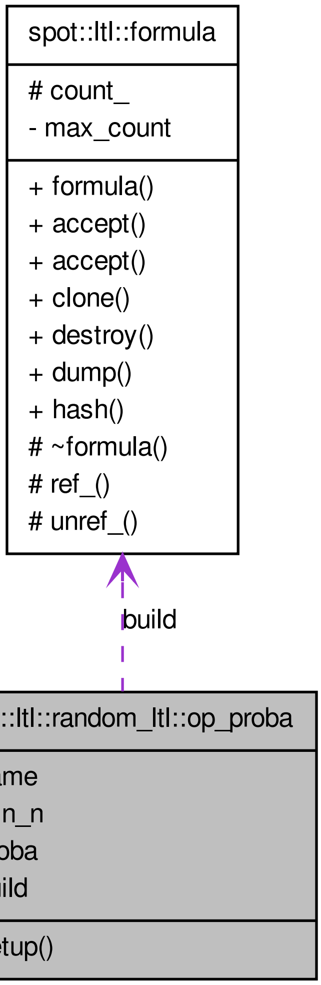
Get the unique instance of this class.

The documentation for this class was generated from the following file:

- tgbaalgos/gtec/nsheap.hh

7.84 spot::ltl::random_ltl::op_proba Struct Reference

Collaboration diagram for spot::ltl::random_ltl::op_proba:



Public Types

- typedef formula ∗(∗ builder)(const random_ltl ∗rl, int n)

Public Member Functions

- void setup (const char ∗name, int min_n, builder build)

Public Attributes

- const char ∗ name
- int min_n
- double proba
- builder build

7.84.1 Member Typedef Documentation

7.84.1.1 typedef formula∗(∗ spot::ltl::random_ltl::op_proba::builder)(const random_ltl ∗rl, int n)

7.84.2 Member Function Documentation

7.84.2.1 void spot::ltl::random_ltl::op_proba::setup (const char ∗ *name,* int *min_n,* builder *build*)

7.84.3 Member Data Documentation

7.84.3.1 builder spot::ltl::random_ltl::op_proba::build

7.84.3.2 int spot::ltl::random_ltl::op_proba::min_n

7.84.3.3 const char∗ spot::ltl::random_ltl::op_proba::name

7.84.3.4 double spot::ltl::random_ltl::op_proba::proba

The documentation for this struct was generated from the following file:

- ltlvisit/randomltl.hh

7.85 spot::option_map Class Reference

Manage a map of options.

Each option is defined by a string and is associated to an integer value.

`#include <misc/optionmap.hh>`

Public Member Functions

- const char ∗ parse_options (const char ∗options)
  Add the parsed options to the map.
- int get (const char ∗option, int def=0) const
  Get the value of option.
- int operator[ ] (const char ∗option) const
  Get the value of option.
- int set (const char ∗option, int val, int def=0)
  Set the value of option to val.
- void set (const option_map &o)
  Acquire all the settings of o.
- int & operator[ ] (const char ∗option)
  Get a reference to the current value of option.

Private Attributes

- std::map< std::string, int > options_

Friends

- std::ostream & operator<< (std::ostream &os, const option_map &m)
  Print the option_map m.

7.85.1 Detailed Description

Manage a map of options.

Each option is defined by a string and is associated to an integer value.

7.85.2 Member Function Documentation

7.85.2.1 int spot::option_map::get (const char ∗ *option*, int *def* = `0`) const

Get the value of *option*.

Returns

The value associated to *option* if it exists, *def* otherwise.

See also

operator[ ]()

7.85.2.2 int& spot::option_map::operator[ ] (const char ∗ *option*)

Get a reference to the current value of *option*.

7.85.2.3 int spot::option_map::operator[ ] (const char ∗ *option*) const

Get the value of *option*.

Returns

The value associated to *option* if it exists, 0 otherwise.

See also

get()

7.85.2.4 const char∗ spot::option_map::parse_options (const char ∗ *options*)

Add the parsed options to the map.

options are separated by a space, comma, semicolon or tabulation and can be optionnaly followed by an integer value (preceded by an equal sign). If not specified, the default value is 1.

The following three lines are equivalent.

```
/// optA !optB optC=4194304
/// optA=1, optB=0, optC=4096K
/// optC = 4M; optA !optB
///
```

Returns

A non-null pointer to the option for which an expected integer value cannot be parsed.

7.85.2.5 void spot::option_map::set (const option_map & *o*)

Acquire all the settings of *o*.

7.85.2.6 int spot::option_map::set (const char ∗ *option,* int *val,* int *def* = 0)

Set the value of *option* to *val*.

Returns

The previous value associated to *option* if declared, or *def* otherwise.

7.85.3 Friends And Related Function Documentation

7.85.3.1 std::ostream& operator<< (std::ostream & *os*, const option_map & *m*) `[friend]`

Print the option_map *m*.

7.85.4 Member Data Documentation

7.85.4.1 std::map<std::string, int> spot::option_map::options_ `[private]`

The documentation for this class was generated from the following file:

- misc/optionmap.hh

7.86 spot::ltl::multop::paircmp Struct Reference

Comparison functor used internally by ltl::multop.

`#include <ltlast/multop.hh>`

Public Member Functions

- bool operator() (const pair &p1, const pair &p2) const

7.86.1 Detailed Description

Comparison functor used internally by ltl::multop.

7.86.2 Member Function Documentation

7.86.2.1 bool spot::ltl::multop::paircmp::operator() (const pair & *p1*, const pair & *p2*) const `[inline]`

The documentation for this struct was generated from the following file:

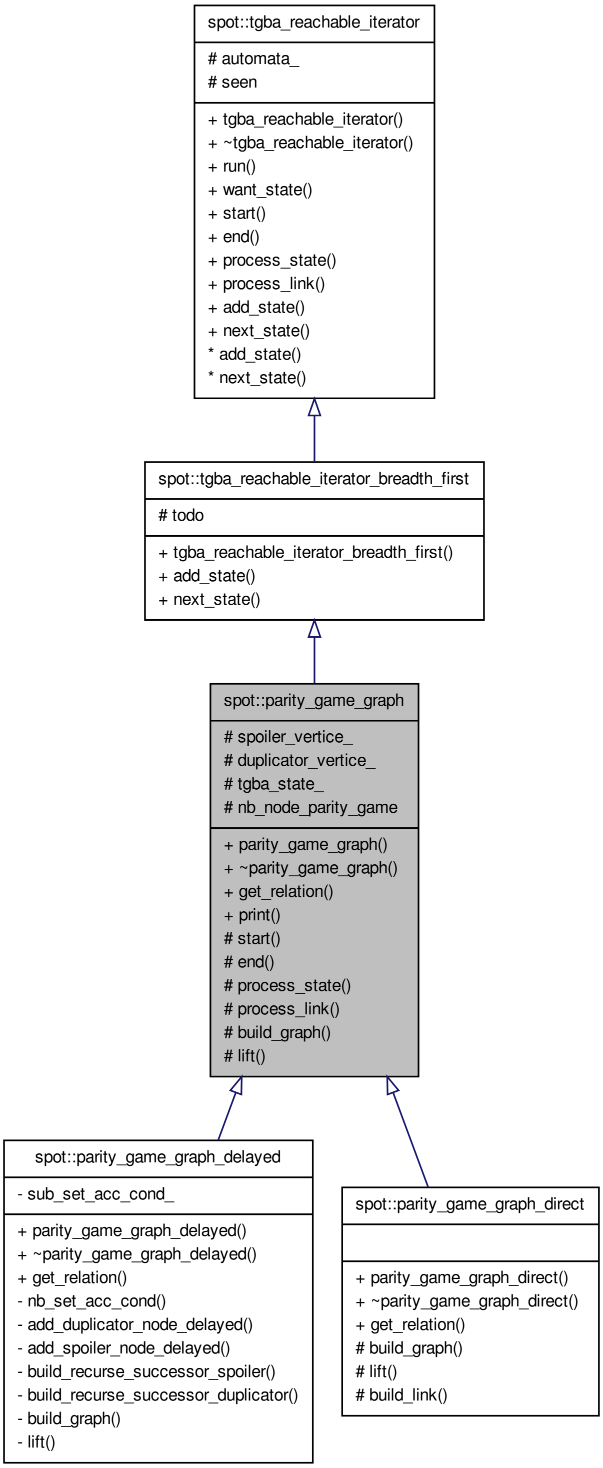
- ltlast/multop.hh

7.87 spot::parity_game_graph Class Reference

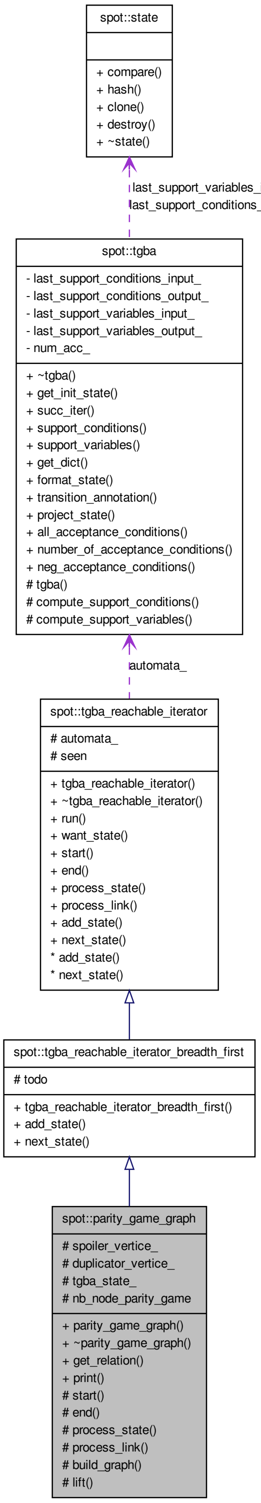
Parity game graph which compute a simulation relation.

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::parity_game_graph:



Collaboration diagram for spot::parity_game_graph:



Public Member Functions

- parity_game_graph (const tgba ∗a)
- virtual ∼parity_game_graph ()
- virtual simulation_relation ∗ get_relation ()=0
- void print (std::ostream &os)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Member Functions

- void start ()

  Called by run() before starting its iteration.

- void end ()

  Called by run() once all states have been explored.

- void process_state (const state ∗s, int n, tgba_succ_iterator ∗si)
- void process_link (int in, int out, const tgba_succ_iterator ∗si)
- virtual void build_graph ()=0

  Compute each node of the graph.

- virtual void lift ()=0

  Remove edge from spoiler to duplicator that make duplicator loose. Spoiler node whose still have some link, reveal a direct simulation relation.

Protected Attributes

- sn_v spoiler_vertice_
- dn_v duplicator_vertice_
- s_v tgba_state_
- int nb_node_parity_game
- std::deque< const state ∗ > todo

  A queue of states yet to explore.

- const tgba ∗ automata_

The spot::tgba to explore.

- seen_map seen

  States already seen.

7.87.1 Detailed Description

Parity game graph which compute a simulation relation.

7.87.2 Member Typedef Documentation

7.87.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected, inherited]`

7.87.3 Constructor & Destructor Documentation

7.87.3.1 spot::parity_game_graph::parity_game_graph (const tgba ∗ *a*)

7.87.3.2 virtual spot::parity_game_graph::∼parity_game_graph ( ) `[virtual]`

7.87.4 Member Function Documentation

7.87.4.1 virtual void spot::tgba_reachable_iterator_breadth_first::add_state (const state ∗ *s*) `[virtual, inherited]`

Implements spot::tgba_reachable_iterator.

7.87.4.2 virtual void spot::parity_game_graph::build_graph ( ) `[protected, pure virtual]`

Compute each node of the graph.

Implemented in spot::parity_game_graph_direct, and spot::parity_game_graph_delayed.

7.87.4.3 void spot::parity_game_graph::end ( ) `[protected, virtual]`

Called by run() once all states have been explored.

Reimplemented from spot::tgba_reachable_iterator.

7.87.4.4 virtual simulation_relation∗ spot::parity_game_graph::get_relation ( ) `[pure virtual]`

Implemented in spot::parity_game_graph_direct, and spot::parity_game_graph_delayed.

7.87.4.5 virtual void spot::parity_game_graph::lift ( ) `[protected, pure virtual]`

Remove edge from spoiler to duplicator that make duplicator loose. Spoiler node whose still have some link, reveal a direct simulation relation.

Implemented in spot::parity_game_graph_direct, and spot::parity_game_graph_delayed.

7.87.4.6 virtual const state∗ spot::tgba_reachable_iterator_breadth_first::next_state ( ) `[virtual, inherited]`

Called by run() to obtain the next state to process.

Implements spot::tgba_reachable_iterator.

7.87.4.7 void spot::parity_game_graph::print (std::ostream & *os*)

7.87.4.8 void spot::parity_game_graph::process_link (int *in*, int *out*, const tgba_succ_iterator ∗ *si*) `[protected]`

7.87.4.9 virtual void spot::tgba_reachable_iterator::process_link (const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

- ***in_s*** The source state
- ***in*** The source state number.
- ***out_s*** The destination state
- ***out*** The destination state number.
- ***si*** The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.87.4.10 void spot::parity_game_graph::process_state (const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[protected, virtual]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.
- ***si*** The spot::tgba_succ_iterator for *s*.

Reimplemented from spot::tgba_reachable_iterator.

7.87.4.11 void spot::tgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.87.4.12 void spot::parity_game_graph::start ( ) `[protected, virtual]`

Called by run() before starting its iteration.

Reimplemented from spot::tgba_reachable_iterator.

7.87.4.13 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.87.5 Member Data Documentation

7.87.5.1 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::tgba to explore.

7.87.5.2 dn_v spot::parity_game_graph::duplicator_vertice_ `[protected]`

7.87.5.3 int spot::parity_game_graph::nb_node_parity_game `[protected]`

7.87.5.4 seen_map spot::tgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.87.5.5 sn_v spot::parity_game_graph::spoiler_vertice_ `[protected]`

7.87.5.6 s_v spot::parity_game_graph::tgba_state_ `[protected]`

7.87.5.7 std::deque<const state*> spot::tgba_reachable_iterator_breadth_first::todo `[protected, inherited]`

A queue of states yet to explore.

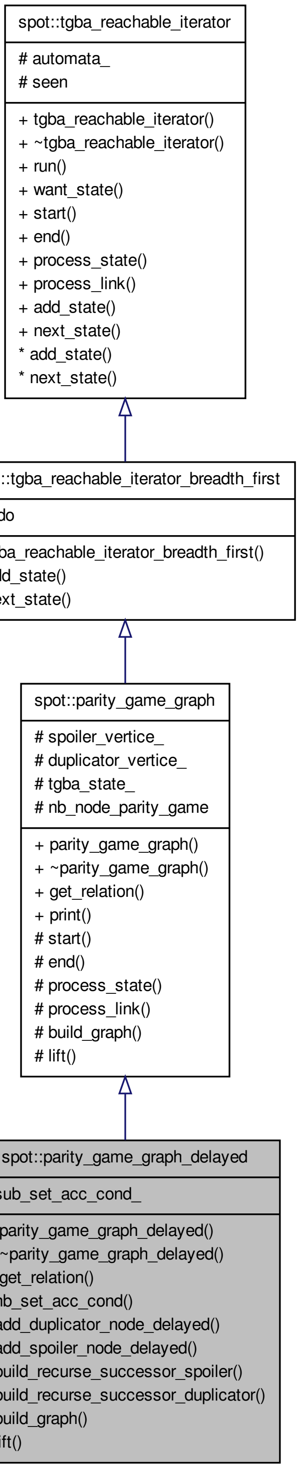
The documentation for this class was generated from the following file:

- tgbaalgos/reductgba_sim.hh

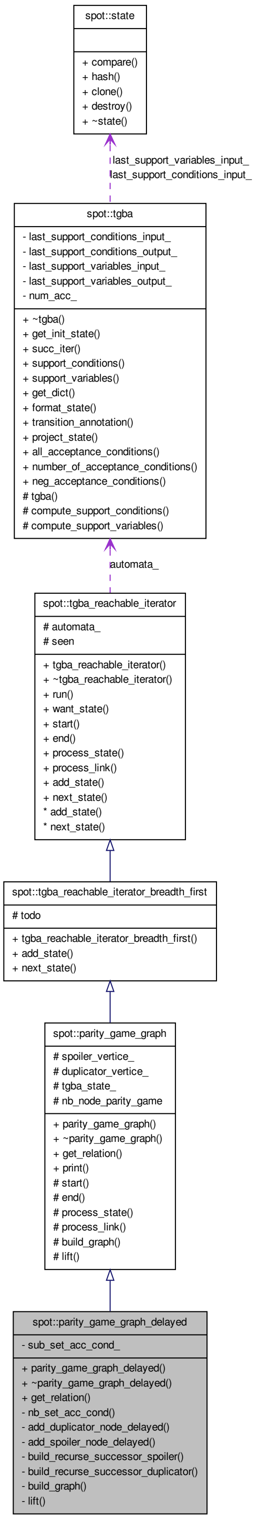
7.88 spot::parity_game_graph_delayed Class Reference

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::parity_game_graph_delayed:



Collaboration diagram for spot::parity_game_graph_delayed:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
automata_
spot::tgba_reachable_iterator
# automata_
# seen
+ tgba_reachable_iterator()
+ ~tgba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::tgba_reachable_iterator_breadth_first
# todo
+ tgba_reachable_iterator_breadth_first()
+ add_state()
+ next_state()
spot::parity_game_graph
# spoiler_vertice_
# duplicator_vertice_
# tgba_state_
# nb_node_parity_game
+ parity_game_graph()
+ ~parity_game_graph()
+ get_relation()
+ print()
# start()
# end()
# process_state()
# process_link()
# build_graph()
# lift()
spot::parity_game_graph_delayed
- sub_set_acc_cond_
+ parity_game_graph_delayed()
+ ~parity_game_graph_delayed()
+ get_relation()
- nb_set_acc_cond()
- add_duplicator_node_delayed()
- add_spoiler_node_delayed()
- build_recurse_successor_spoiler()
- build_recurse_successor_duplicator()
- build_graph()
- lift()

Public Member Functions

- parity_game_graph_delayed (const tgba ∗a)
- ∼parity_game_graph_delayed ()
- virtual delayed_simulation_relation ∗ get_relation ()
- void print (std::ostream &os)
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Member Functions

- void start ()

  Called by run() before starting its iteration.

- void end ()

  Called by run() once all states have been explored.

- void process_state (const state ∗s, int n, tgba_succ_iterator ∗si)
- void process_link (int in, int out, const tgba_succ_iterator ∗si)

Protected Attributes

- sn_v spoiler_vertice_
- dn_v duplicator_vertice_
- s_v tgba_state_
- int nb_node_parity_game
- std::deque< const state ∗ > todo

  A queue of states yet to explore.

- const tgba ∗ automata_

  The spot::tgba to explore.

- seen_map seen

  States already seen.

Private Types

- typedef std::vector< bdd > bdd_v

Private Member Functions

- int nb_set_acc_cond ()

  Return the number of acceptance condition.

- duplicator_node_delayed ∗ add_duplicator_node_delayed (const spot::state ∗sn, const spot::state ∗dn, bdd acc, bdd label, int nb)
- spoiler_node_delayed ∗ add_spoiler_node_delayed (const spot::state ∗sn, const spot::state ∗dn, bdd acc, int nb)
- void build_recurse_successor_spoiler (spoiler_node ∗sn, std::ostringstream &os)
- void build_recurse_successor_duplicator (duplicator_node ∗dn, spoiler_node ∗sn, std::ostringstream &os)
- virtual void build_graph ()

  Compute the couple as for direct simulation,.

- virtual void lift ()

  The Jurdzinski's lifting algorithm.

Private Attributes

- bdd_v sub_set_acc_cond_

7.88.1 Detailed Description

Parity game graph which computes the delayed simulation relation as explained in

```
/// @InProceedings{etessami.01.alp,
///   author = {Kousha Etessami and Thomas Wilke and Rebecca A. Schuller},
///   title = {Fair Simulation Relations, Parity Games, and State Space
///    Reduction for Buchi Automata},
///   booktitle = {Proceedings of the 28th international colloquium on
///    Automata, Languages and Programming},
///   pages = {694--707},
///   year = {2001},
///   editor = {Fernando Orejas and Paul G. Spirakis and Jan van Leeuwen},
///   volume = {2076},
///   series = {Lecture Notes in Computer Science},
///   address = {Crete, Greece},
///   month = {July},
///   publisher = {Springer-Verlag}
/// }
///
```

7.88.2 Member Typedef Documentation

7.88.2.1 typedef std::vector<bdd> spot::parity_game_graph_delayed::bdd_v `[private]`

Vector which contain all the sub-set of the set of acceptance condition.

7.88.2.2 typedef Sgi::hash_map<const state*, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected, inherited]`

7.88.3 Constructor & Destructor Documentation

7.88.3.1 spot::parity_game_graph_delayed::parity_game_graph_delayed (const tgba * *a*)

7.88.3.2 spot::parity_game_graph_delayed::~parity_game_graph_delayed ( )

7.88.4 Member Function Documentation

7.88.4.1 duplicator_node_delayed* spot::parity_game_graph_delayed::add_duplicator_node_delayed (const spot::state * *sn,* const spot::state * *dn,* bdd *acc,* bdd *label,* int *nb*) `[private]`

7.88.4.2 spoiler_node_delayed* spot::parity_game_graph_delayed::add_spoiler_node_delayed (const spot::state * *sn,* const spot::state * *dn,* bdd *acc,* int *nb*) `[private]`

7.88.4.3 virtual void spot::tgba_reachable_iterator_breadth_first::add_state (const state * *s*) `[virtual, inherited]`

Implements spot::tgba_reachable_iterator.

7.88.4.4 virtual void spot::parity_game_graph_delayed::build_graph ( ) `[private, virtual]`

Compute the couple as for direct simulation,.

Implements spot::parity_game_graph.

7.88.4.5 void spot::parity_game_graph_delayed::build_recurse_successor_duplicator (duplicator_node * *dn,* spoiler_node * *sn,* std::ostringstream & *os*) `[private]`

7.88.4.6 void spot::parity_game_graph_delayed::build_recurse_successor_spoiler (spoiler_node $*$ *sn*, std::ostringstream & *os*) `[private]`

7.88.4.7 void spot::parity_game_graph::end ( ) `[protected, virtual, inherited]`

Called by run() once all states have been explored.

Reimplemented from spot::tgba_reachable_iterator.

7.88.4.8 virtual delayed_simulation_relation$*$ spot::parity_game_graph_delayed::get_relation ( ) `[virtual]`

Implements spot::parity_game_graph.

7.88.4.9 virtual void spot::parity_game_graph_delayed::lift ( ) `[private, virtual]`

The Jurdzinski's lifting algorithm.

Implements spot::parity_game_graph.

7.88.4.10 int spot::parity_game_graph_delayed::nb_set_acc_cond ( ) `[private]`

Return the number of acceptance condition.

7.88.4.11 virtual const state$*$ spot::tgba_reachable_iterator_breadth_first::next_state ( ) `[virtual, inherited]`

Called by run() to obtain the next state to process.

Implements spot::tgba_reachable_iterator.

7.88.4.12 void spot::parity_game_graph::print (std::ostream & *os*) `[inherited]`

7.88.4.13 virtual void spot::tgba_reachable_iterator::process_link (const state $*$ *in_s*, int *in*, const state $*$ *out_s*, int *out*, const tgba_succ_iterator $*$ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

- ***in_s*** The source state
- ***in*** The source state number.
- ***out_s*** The destination state
- ***out*** The destination state number.
- ***si*** The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.88.4.14 void spot::parity_game_graph::process_link (int *in*, int *out*, const tgba_succ_iterator ∗ *si*) `[protected, inherited]`

7.88.4.15 void spot::parity_game_graph::process_state (const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[protected, virtual, inherited]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.
- ***si*** The spot::tgba_succ_iterator for *s*.

Reimplemented from spot::tgba_reachable_iterator.

7.88.4.16 void spot::tgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.88.4.17 void spot::parity_game_graph::start ( ) `[protected, virtual, inherited]`

Called by run() before starting its iteration.

Reimplemented from spot::tgba_reachable_iterator.

7.88.4.18 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.88.5 Member Data Documentation

7.88.5.1 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::tgba to explore.

7.88.5.2 dn_v spot::parity_game_graph::duplicator_vertice_ `[protected, inherited]`

7.88.5.3 int spot::parity_game_graph::nb_node_parity_game `[protected, inherited]`

7.88.5.4 seen_map spot::tgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.88.5.5 sn_v spot::parity_game_graph::spoiler_vertice_ `[protected, inherited]`

7.88.5.6 bdd_v spot::parity_game_graph_delayed::sub_set_acc_cond_ `[private]`

7.88.5.7 s_v spot::parity_game_graph::tgba_state_ `[protected, inherited]`

7.88.5.8 std::deque<const state∗> spot::tgba_reachable_iterator_breadth_first::todo `[protected, inherited]`

A queue of states yet to explore.

The documentation for this class was generated from the following file:

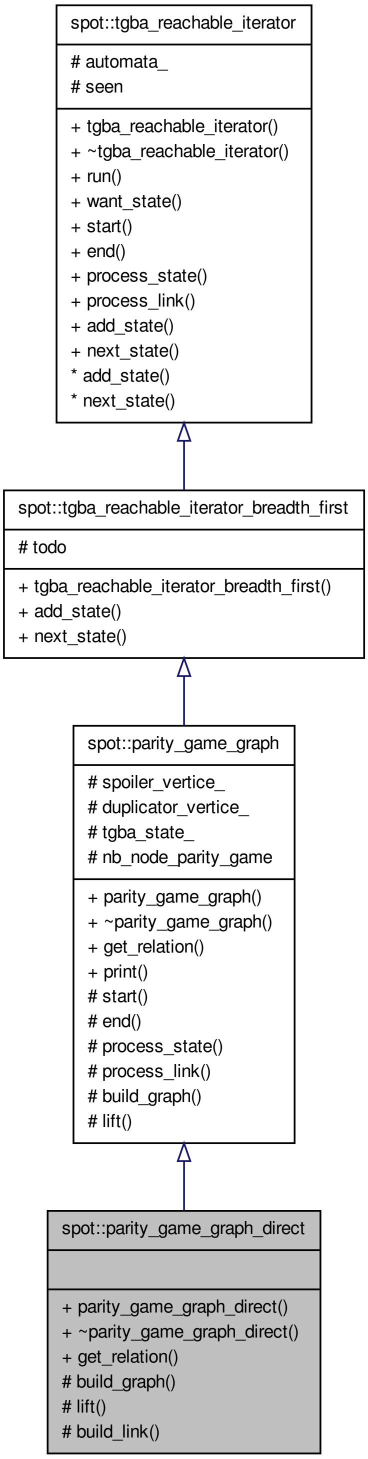
- tgbaalgos/reductgba_sim.hh

7.89 spot::parity_game_graph_direct Class Reference

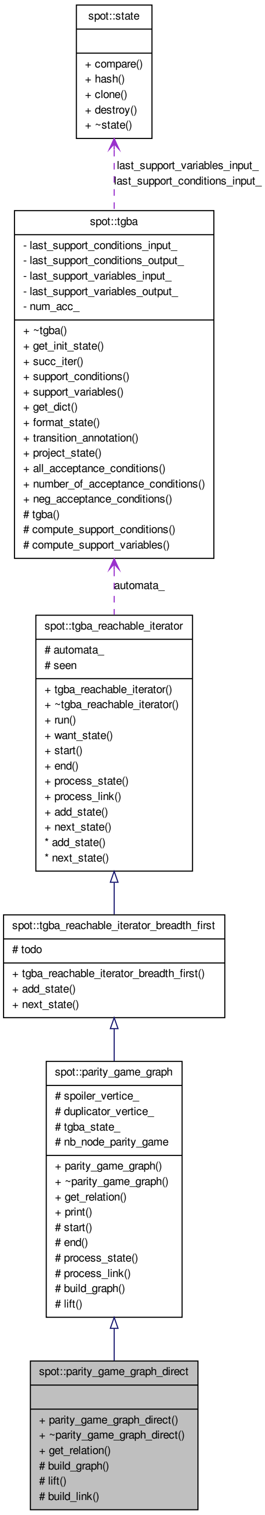
Parity game graph which compute the direct simulation relation.

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::parity_game_graph_direct:



Collaboration diagram for spot::parity_game_graph_direct:



Public Member Functions

- parity_game_graph_direct (const tgba ∗a)
- ∼parity_game_graph_direct ()
- virtual direct_simulation_relation ∗ get_relation ()
- void print (std::ostream &os)
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Member Functions

- virtual void build_graph ()

  Compute each node of the graph.

- virtual void lift ()

  Remove edge from spoiler to duplicator that make duplicator loose. Spoiler node whose still have some link, reveal a direct simulation relation.

- void build_link ()
- void start ()

  Called by run() before starting its iteration.

- void end ()

  Called by run() once all states have been explored.

- void process_state (const state ∗s, int n, tgba_succ_iterator ∗si)
- void process_link (int in, int out, const tgba_succ_iterator ∗si)

Protected Attributes

- sn_v spoiler_vertice_
- dn_v duplicator_vertice_
- s_v tgba_state_
- int nb_node_parity_game
- std::deque< const state ∗ > todo

  A queue of states yet to explore.

- const tgba ∗ automata_

The spot::tgba to explore.

- seen_map seen

  States already seen.

7.89.1 Detailed Description

Parity game graph which compute the direct simulation relation.

7.89.2 Member Typedef Documentation

7.89.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected, inherited]`

7.89.3 Constructor & Destructor Documentation

7.89.3.1 spot::parity_game_graph_direct::parity_game_graph_direct (const tgba ∗ *a*)

7.89.3.2 spot::parity_game_graph_direct::∼parity_game_graph_direct ( )

7.89.4 Member Function Documentation

7.89.4.1 virtual void spot::tgba_reachable_iterator_breadth_first::add_state (const state ∗ *s*) `[virtual, inherited]`

Implements spot::tgba_reachable_iterator.

7.89.4.2 virtual void spot::parity_game_graph_direct::build_graph ( ) `[protected, virtual]`

Compute each node of the graph.

Implements spot::parity_game_graph.

7.89.4.3 void spot::parity_game_graph_direct::build_link ( ) `[protected]`

7.89.4.4 void spot::parity_game_graph::end ( ) [protected, virtual, inherited]

Called by run() once all states have been explored.

Reimplemented from spot::tgba_reachable_iterator.

7.89.4.5 virtual direct_simulation_relation∗ spot::parity_game_graph_direct::get_relation ( ) [virtual]

Implements spot::parity_game_graph.

7.89.4.6 virtual void spot::parity_game_graph_direct::lift ( ) [protected, virtual]

Remove edge from spoiler to duplicator that make duplicator loose. Spoiler node whose still have some link, reveal a direct simulation relation.

Implements spot::parity_game_graph.

7.89.4.7 virtual const state∗ spot::tgba_reachable_iterator_breadth_first::next_state ( ) [virtual, inherited]

Called by run() to obtain the next state to process.

Implements spot::tgba_reachable_iterator.

7.89.4.8 void spot::parity_game_graph::print (std::ostream & *os*) [inherited]

7.89.4.9 void spot::parity_game_graph::process_link (int *in*, int *out*, const tgba_succ_iterator ∗ *si*) [protected, inherited]

7.89.4.10 virtual void spot::tgba_reachable_iterator::process_link (const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*) [virtual, inherited]

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

si The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.89.4.11 void spot::parity_game_graph::process_state (const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[protected, virtual, inherited]`

Called by run() to process a state.

Parameters

s The current state.

n A unique number assigned to *s*.

si The spot::tgba_succ_iterator for *s*.

Reimplemented from spot::tgba_reachable_iterator.

7.89.4.12 void spot::tgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.89.4.13 void spot::parity_game_graph::start ( ) `[protected, virtual, inherited]`

Called by run() before starting its iteration.

Reimplemented from spot::tgba_reachable_iterator.

7.89.4.14 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.89.5 Member Data Documentation

7.89.5.1 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::tgba to explore.

7.89.5.2 dn_v spot::parity_game_graph::duplicator_vertice_ `[protected, inherited]`

7.89.5.3 int spot::parity_game_graph::nb_node_parity_game `[protected, inherited]`

7.89.5.4 seen_map spot::tgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.89.5.5 sn_v spot::parity_game_graph::spoiler_vertice_ `[protected, inherited]`

7.89.5.6 s_v spot::parity_game_graph::tgba_state_ `[protected, inherited]`

7.89.5.7 std::deque<const state*> spot::tgba_reachable_iterator_breadth_first::todo `[protected, inherited]`

A queue of states yet to explore.

The documentation for this class was generated from the following file:

- tgbaalgos/reductgba_sim.hh

7.90 ltlyy::position Class Reference

Abstract a position.

`#include <ltlparse/position.hh>`

Public Member Functions

- position ()

  Construct a position.

- void initialize (std::string *fn)

  Initialization.

Line and Column related manipulators

- void lines (int count=1)

  (line related) Advance to the COUNT next lines.

- void columns (int count=1)

  (column related) Advance to the COUNT next columns.

Public Attributes

- std::string $*$ filename

  File name to which this position refers.

- unsigned int line

  Current line number.

- unsigned int column

  Current column number.

7.90.1 Detailed Description

Abstract a position.

7.90.2 Constructor & Destructor Documentation

7.90.2.1 ltlyy::position::position ( ) `[inline]`

Construct a position.

7.90.3 Member Function Documentation

7.90.3.1 void ltlyy::position::columns (int *count* = *1*) `[inline]`

(column related) Advance to the COUNT next columns.

References column.

Referenced by ltlyy::operator+=().

7.90.3.2 void ltlyy::position::initialize (std::string $*$ *fn*) `[inline]`

Initialization.

References column, filename, and line.

Referenced by ltlyy::location::step().

7.90.3.3 void ltlyy::position::lines (int *count* = `1`) `[inline]`

(line related) Advance to the COUNT next lines.

References column, and line.

7.90.4 Member Data Documentation

7.90.4.1 unsigned int ltlyy::position::column

Current column number.

Referenced by columns(), initialize(), lines(), ltlyy::operator<<(), and ltlyy::operator==().

7.90.4.2 std::string* ltlyy::position::filename

File name to which this position refers.

Referenced by initialize(), ltlyy::operator<<(), and ltlyy::operator==().

7.90.4.3 unsigned int ltlyy::position::line

Current line number.

Referenced by initialize(), lines(), ltlyy::operator<<(), and ltlyy::operator==().

The documentation for this class was generated from the following file:

- ltlparse/position.hh

7.91 neverclaimyy::position Class Reference

Abstract a position.

`#include <neverparse/position.hh>`

Public Member Functions

- position ()

  Construct a position.

- void initialize (std::string *fn)

  Initialization.

Line and Column related manipulators

- void lines (int count=1)
  (line related) Advance to the COUNT next lines.
- void columns (int count=1)
  (column related) Advance to the COUNT next columns.

Public Attributes

- std::string $*$ filename
  File name to which this position refers.
- unsigned int line
  Current line number.
- unsigned int column
  Current column number.

7.91.1 Detailed Description

Abstract a position.

7.91.2 Constructor & Destructor Documentation

7.91.2.1 neverclaimyy::position::position ( ) `[inline]`

Construct a position.

7.91.3 Member Function Documentation

7.91.3.1 void neverclaimyy::position::columns (int *count* = `1`) `[inline]`

(column related) Advance to the COUNT next columns.

References column.

Referenced by neverclaimyy::operator+=().

7.91.3.2 void neverclaimyy::position::initialize (std::string $*$ *fn*) `[inline]`

Initialization.

References column, filename, and line.

Referenced by neverclaimyy::location::step().

7.91.3.3 void neverclaimyy::position::lines (int *count* = `1`) `[inline]`

(line related) Advance to the COUNT next lines.

References column, and line.

7.91.4 Member Data Documentation

7.91.4.1 unsigned int neverclaimyy::position::column

Current column number.

Referenced by columns(), initialize(), lines(), neverclaimyy::operator<<(), and neverclaimyy::operator==().

7.91.4.2 std::string∗ neverclaimyy::position::filename

File name to which this position refers.

Referenced by initialize(), neverclaimyy::operator<<(), and neverclaimyy::operator==().

7.91.4.3 unsigned int neverclaimyy::position::line

Current line number.

Referenced by initialize(), lines(), neverclaimyy::operator<<(), and neverclaimyy::operator==().

The documentation for this class was generated from the following file:

- neverparse/position.hh

7.92 eltlyy::position Class Reference

Abstract a position.

`#include <eltlparse/position.hh>`

Public Member Functions

- position ()
  Construct a position.
- void initialize (std::string ∗fn)
  Initialization.

Line and Column related manipulators

- void lines (int count=1)
  (line related) Advance to the COUNT next lines.
- void columns (int count=1)
  (column related) Advance to the COUNT next columns.

Public Attributes

- std::string ∗ filename
  File name to which this position refers.
- unsigned int line
  Current line number.
- unsigned int column
  Current column number.

7.92.1 Detailed Description

Abstract a position.

7.92.2 Constructor & Destructor Documentation

7.92.2.1 eltlyy::position::position ( ) `[inline]`

Construct a position.

7.92.3 Member Function Documentation

7.92.3.1 void eltlyy::position::columns (int *count* = `1`) `[inline]`

(column related) Advance to the COUNT next columns.

References column.

Referenced by eltlyy::operator+=().

7.92.3.2 void eltlyy::position::initialize (std::string ∗ *fn*) `[inline]`

Initialization.

References column, filename, and line.

Referenced by eltlyy::location::step().

7.92.3.3 void eltlyy::position::lines (int *count* = `1`) `[inline]`

(line related) Advance to the COUNT next lines.

References column, and line.

7.92.4 Member Data Documentation

7.92.4.1 unsigned int eltlyy::position::column

Current column number.

Referenced by columns(), initialize(), lines(), eltlyy::operator<<(), and eltlyy::operator==().

7.92.4.2 std::string* eltlyy::position::filename

File name to which this position refers.

Referenced by initialize(), eltlyy::operator<<(), and eltlyy::operator==().

7.92.4.3 unsigned int eltlyy::position::line

Current line number.

Referenced by initialize(), lines(), eltlyy::operator<<(), and eltlyy::operator==().

The documentation for this class was generated from the following file:

- eltlparse/position.hh

7.93 sautyy::position Class Reference

Abstract a position.

`#include <sautparse/position.hh>`

Public Member Functions

- position ()

  Construct a position.

- void initialize (std::string *fn)

  Initialization.

Line and Column related manipulators

- void lines (int count=1)
  (line related) Advance to the COUNT next lines.
- void columns (int count=1)
  (column related) Advance to the COUNT next columns.

Public Attributes

- std::string ∗ filename
  File name to which this position refers.
- unsigned int line
  Current line number.
- unsigned int column
  Current column number.

7.93.1 Detailed Description

Abstract a position.

7.93.2 Constructor & Destructor Documentation

7.93.2.1 sautyy::position::position ( ) `[inline]`

Construct a position.

7.93.3 Member Function Documentation

7.93.3.1 void sautyy::position::columns (int *count* = `1`) `[inline]`

(column related) Advance to the COUNT next columns.

References column.

Referenced by sautyy::operator+=().

7.93.3.2 void sautyy::position::initialize (std::string ∗ *fn*) `[inline]`

Initialization.

References column, filename, and line.

7.93.3.3 void sautyy::position::lines (int *count* = `1`) `[inline]`

(line related) Advance to the COUNT next lines.

References column, and line.

7.93.4 Member Data Documentation

7.93.4.1 unsigned int sautyy::position::column

Current column number.

Referenced by columns(), initialize(), lines(), and sautyy::operator<<().

7.93.4.2 std::string∗ sautyy::position::filename

File name to which this position refers.

Referenced by initialize(), and sautyy::operator<<().

7.93.4.3 unsigned int sautyy::position::line

Current line number.

Referenced by initialize(), lines(), and sautyy::operator<<().

The documentation for this class was generated from the following file:

- sautparse/position.hh

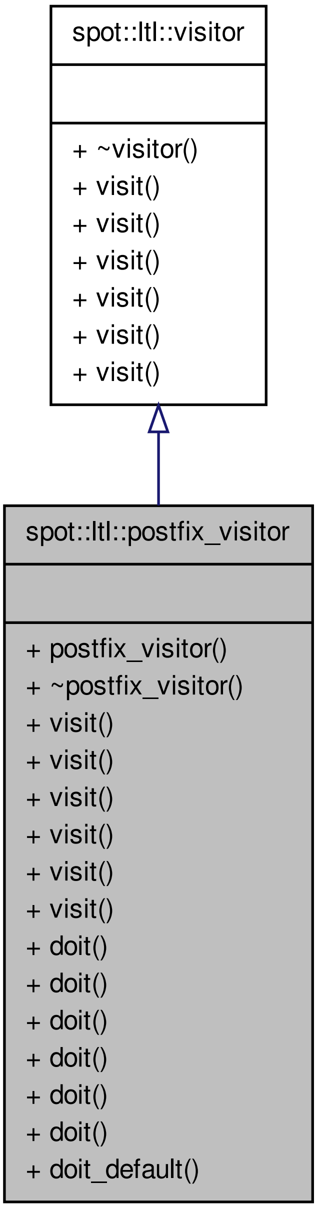
7.94 spot::ltl::postfix_visitor Class Reference

Apply an algorithm on each node of an AST, during a postfix traversal.

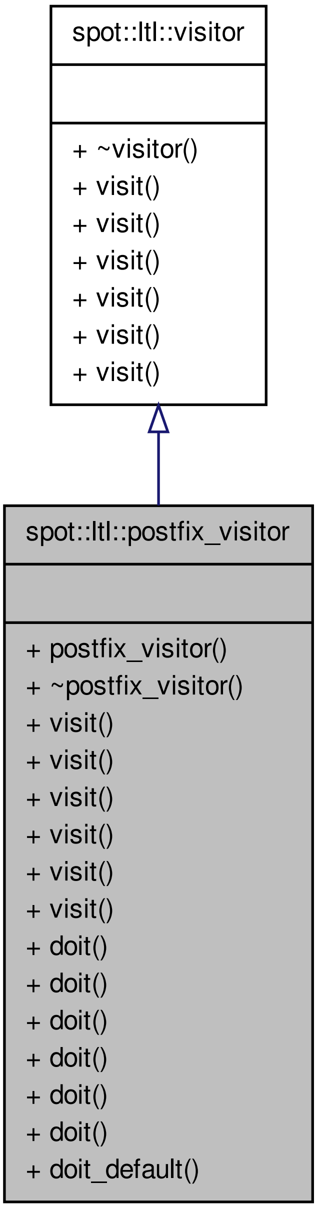
Override one or more of the postifix_visitor::doit methods with the algorithm to apply.

`#include <ltlvisit/postfix.hh>`

Inheritance diagram for spot::ltl::postfix_visitor:



Collaboration diagram for spot::ltl::postfix_visitor:



Public Member Functions

- postfix_visitor ()
- virtual ∼postfix_visitor ()
- void visit (atomic_prop ∗ap)

- void visit (unop ∗uo)
- void visit (binop ∗bo)
- void visit (multop ∗mo)
- void visit (automatop ∗c)
- void visit (constant ∗c)
- virtual void doit (atomic_prop ∗ap)
- virtual void doit (unop ∗uo)
- virtual void doit (binop ∗bo)
- virtual void doit (multop ∗mo)
- virtual void doit (automatop ∗mo)
- virtual void doit (constant ∗c)
- virtual void doit_default (formula ∗f)

7.94.1 Detailed Description

Apply an algorithm on each node of an AST, during a postfix traversal.

Override one or more of the postfix_visitor::doit methods with the algorithm to apply.

7.94.2 Constructor & Destructor Documentation

7.94.2.1 spot::ltl::postfix_visitor::postfix_visitor ( )

7.94.2.2 virtual spot::ltl::postfix_visitor::∼postfix_visitor ( ) `[virtual]`

7.94.3 Member Function Documentation

7.94.3.1 virtual void spot::ltl::postfix_visitor::doit (atomic_prop ∗ *ap*) `[virtual]`

7.94.3.2 virtual void spot::ltl::postfix_visitor::doit (unop ∗ *uo*) `[virtual]`

7.94.3.3 virtual void spot::ltl::postfix_visitor::doit (binop ∗ *bo*) `[virtual]`

7.94.3.4 virtual void spot::ltl::postfix_visitor::doit (multop ∗ *mo*) `[virtual]`

7.94.3.5 virtual void spot::ltl::postfix_visitor::doit (automatop ∗ *mo*) `[virtual]`

7.94.3.6 virtual void spot::ltl::postfix_visitor::doit (constant ∗ *c*) `[virtual]`

7.94.3.7 virtual void spot::ltl::postfix_visitor::doit_default (formula ∗ *f*) `[virtual]`

7.94.3.8 void spot::ltl::postfix_visitor::visit (binop ∗ *bo*) `[virtual]`

Implements spot::ltl::visitor.

7.94.3.9 void spot::ltl::postfix_visitor::visit (unop ∗ *uo*) `[virtual]`

Implements spot::ltl::visitor.

7.94.3.10 void spot::ltl::postfix_visitor::visit (constant ∗ *c*) `[virtual]`

Implements spot::ltl::visitor.

7.94.3.11 void spot::ltl::postfix_visitor::visit (atomic_prop ∗ *ap*) `[virtual]`

Implements spot::ltl::visitor.

7.94.3.12 void spot::ltl::postfix_visitor::visit (multop ∗ *mo*) `[virtual]`

Implements spot::ltl::visitor.

7.94.3.13 void spot::ltl::postfix_visitor::visit (automatop ∗ *c*) `[virtual]`

Implements spot::ltl::visitor.

The documentation for this class was generated from the following file:

- ltlvisit/postfix.hh

7.95 spot::power_map Struct Reference

`#include <tgbaalgos/powerset.hh>`

Public Types

- typedef std::set< const state ∗, state_ptr_less_than > power_state
- typedef std::map< int, power_state > power_map_data
- typedef Sgi::hash_set< const state ∗, state_ptr_hash, state_ptr_equal > state_set

Public Member Functions

- ∼power_map ()
- const power_state & states_of (int s) const
- const state ∗ canonicalize (const state ∗s)

Public Attributes

- power_map_data map_
- state_set states

7.95.1 Member Typedef Documentation

7.95.1.1 typedef std::map<int, power_state> spot::power_map::power_map_data

7.95.1.2 typedef std::set<const state∗, state_ptr_less_than> spot::power_map::power_state

7.95.1.3 typedef Sgi::hash_set<const state∗, state_ptr_hash, state_ptr_equal> spot::power_map::state_set

7.95.2 Constructor & Destructor Documentation

7.95.2.1 spot::power_map::∼power_map ( ) `[inline]`

References spot::state::destroy(), and states.

7.95.3 Member Function Documentation

7.95.3.1 const state∗ spot::power_map::canonicalize (const state ∗ *s*) `[inline]`

References spot::state::destroy(), and states.

7.95.3.2 const power_state& spot::power_map::states_of (int *s*) const `[inline]`

References map_.

7.95.4 Member Data Documentation

7.95.4.1 power_map_data spot::power_map::map_

Referenced by states_of().

7.95.4.2 state_set spot::power_map::states

Referenced by canonicalize(), and ∼power_map().

The documentation for this struct was generated from the following file:

- tgbaalgos/powerset.hh

7.96 spot::ptr_hash< T > Struct Template Reference

A hash function for pointers.

`#include <misc/hash.hh>`

Public Member Functions

- size_t operator() (const T ∗p) const

7.96.1 Detailed Description

template<class T> struct spot::ptr_hash< T >

A hash function for pointers.

7.96.2 Member Function Documentation

7.96.2.1 template<class T > size_t spot::ptr_hash< T >::operator() (const T ∗ *p*) const `[inline]`

References spot::knuth32_hash().

The documentation for this struct was generated from the following file:

- misc/hash.hh

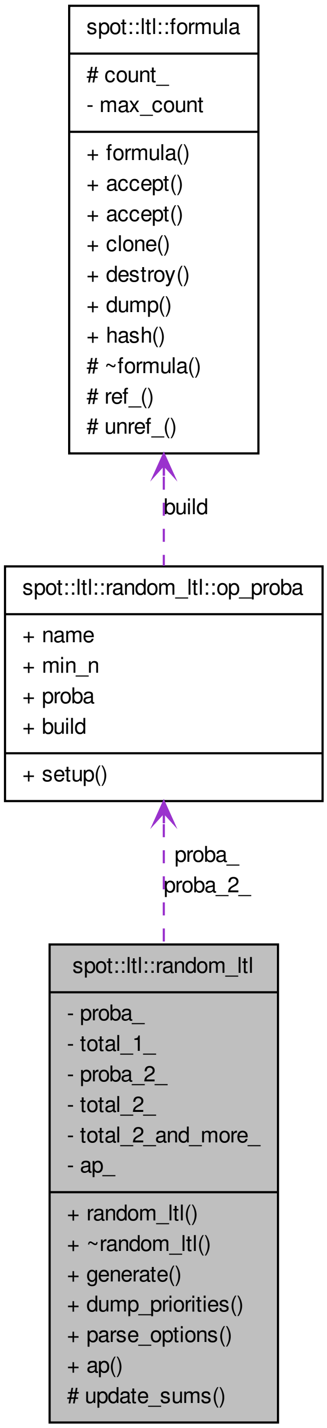
7.97 spot::ltl::random_ltl Class Reference

Generate random LTL formulae.

This class recursively construct LTL formulae of a given size. The formulae will use the use atomic propositions from the set of proposition passed to the constructor, in addition to the constant and all LTL operators supported by Spot.

`#include <ltlvisit/randomltl.hh>`

Collaboration diagram for spot::ltl::random_ltl:



Classes

- struct op_proba

Public Member Functions

- random_ltl (const atomic_prop_set ∗ap)

  Create a random LTL generator using atomic propositions from ap.

- ∼random_ltl ()
- formula ∗ generate (int n) const

  Generate a formula of size n.

- std::ostream & dump_priorities (std::ostream &os) const

  Print the priorities of each operator, constants, and atomic propositions.

- const char ∗ parse_options (char ∗options)

  Update the priorities used to generate LTL formulae.

- const atomic_prop_set ∗ ap () const

  Return the set of atomic proposition used to build formulae.

Protected Member Functions

- void update_sums ()

Private Attributes

- op_proba ∗ proba_
- double total_1_
- op_proba ∗ proba_2_
- double total_2_
- double total_2_and_more_
- const atomic_prop_set ∗ ap_

7.97.1 Detailed Description

Generate random LTL formulae.

This class recursively construct LTL formulae of a given size. The formulae will use the use atomic propositions from the set of proposition passed to the constructor, in addition to the constant and all LTL operators supported by Spot. By default each operator has equal chance to be selected. Also, each atomic proposition has as much chance as each constant (i.e., true and false) to be picked. This can be tuned using parse_options().

7.97.2 Constructor & Destructor Documentation

7.97.2.1 spot::ltl::random_ltl::random_ltl (const atomic_prop_set ∗ *ap*)

Create a random LTL generator using atomic propositions from *ap*.

7.97.2.2 spot::ltl::random_ltl::∼random_ltl ( )

7.97.3 Member Function Documentation

7.97.3.1 const atomic_prop_set∗ spot::ltl::random_ltl::ap ( ) const `[inline]`

Return the set of atomic proposition used to build formulae.

References ap_.

7.97.3.2 std::ostream& spot::ltl::random_ltl::dump_priorities (std::ostream & *os*) const

Print the priorities of each operator, constants, and atomic propositions.

7.97.3.3 formula∗ spot::ltl::random_ltl::generate (int *n*) const

Generate a formula of size *n*.

It is possible to obtain formulae that are smaller than *n*, because some simple simplifications are performed by the AST. (For instance the formula `a | a` is automatically reduced to `a` by spot::ltl::multop.)

Furthermore, for the purpose of this generator, `a | b | c` has length 5, while it has length `4` for spot::ltl::length().

7.97.3.4 const char∗ spot::ltl::random_ltl::parse_options (char ∗ *options*)

Update the priorities used to generate LTL formulae.

The initial priorities are as follows.

```
/// ap      n
/// false   1
/// true    1
/// not     1
/// F       1
/// G       1
/// X       1
/// equiv   1
/// implies 1
/// xor     1
/// R       1
/// U       1
/// W       1
/// M       1
/// and     1
/// or      1
///
```

Where `n` is the number of atomic propositions in the set passed to the constructor.

This means that each operator has equal chance to be selected. Also, each atomic proposition has as much chance as each constant (i.e., true and false) to be picked. This can be

These priorities can be altered using this function. *options* should be comma-separated list of KEY=VALUE assignments, using keys from the above list. For instance `"xor=0, F=3"` will prevent `xor` from being used, and will raise the relative probability of occurrences of the `F` operator.

7.97.3.5 void spot::ltl::random_ltl::update_sums ( ) `[protected]`

7.97.4 Member Data Documentation

7.97.4.1 const atomic_prop_set∗ spot::ltl::random_ltl::ap_ `[private]`

Referenced by ap().

7.97.4.2 op_proba∗ spot::ltl::random_ltl::proba_ `[private]`

7.97.4.3 op_proba∗ spot::ltl::random_ltl::proba_2_ `[private]`

7.97.4.4 double spot::ltl::random_ltl::total_1_ `[private]`

7.97.4.5 double spot::ltl::random_ltl::total_2_ `[private]`

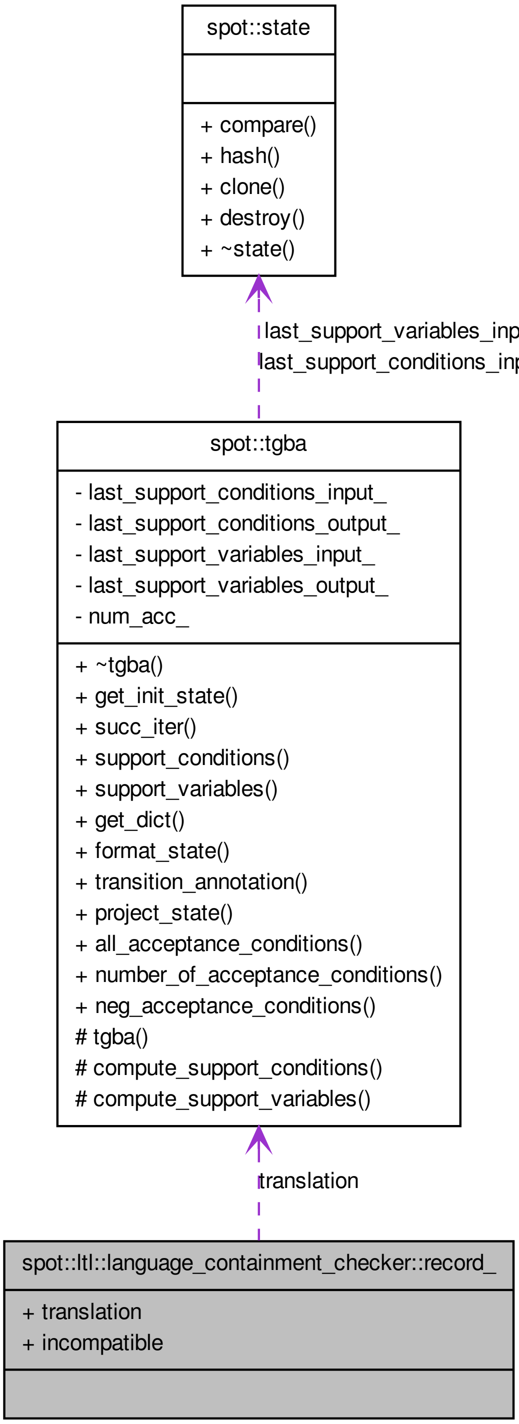
7.97.4.6 double spot::ltl::random_ltl::total_2_and_more_ `[private]`

The documentation for this class was generated from the following file:

- ltlvisit/randomltl.hh

7.98 spot::ltl::language_containment_checker::record_ Struct Reference

Collaboration diagram for spot::ltl::language_containment_checker::record_:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
translation
spot::ltl::language_containment_checker::record_
+ translation
+ incompatible

Public Types

- typedef std::map< const record_ ∗, bool > incomp_map

Public Attributes

- const tgba ∗ translation
- incomp_map incompatible

7.98.1 Member Typedef Documentation

7.98.1.1 typedef std::map<const record_∗, bool> spot::ltl::language_containment_checker::record_::incomp_map

7.98.2 Member Data Documentation

7.98.2.1 incomp_map spot::ltl::language_containment_checker::record_::incompatible

7.98.2.2 const tgba∗ spot::ltl::language_containment_checker::record_::translation

The documentation for this struct was generated from the following file:

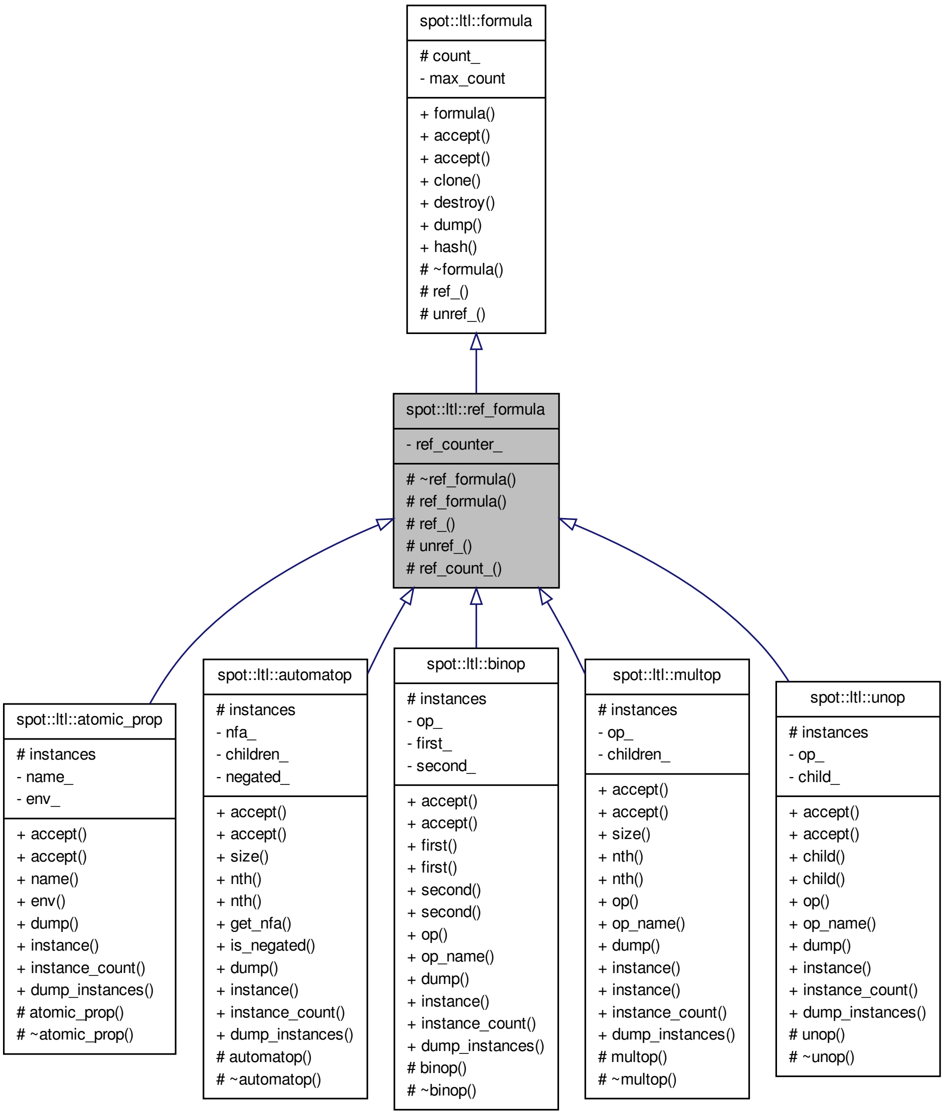
- ltlvisit/contain.hh

7.99 spot::ltl::ref_formula Class Reference

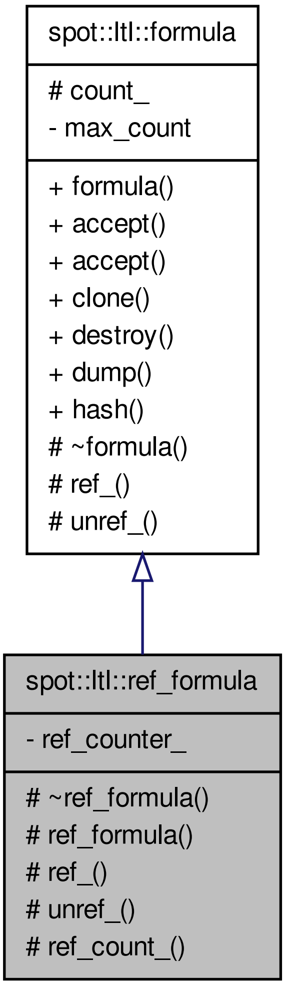
A reference-counted LTL formula.

`#include <ltlast/refformula.hh>`

Inheritance diagram for spot::ltl::ref_formula:



Collaboration diagram for spot::ltl::ref_formula:



Public Member Functions

- virtual void accept (visitor &v)=0

  Entry point for vspot::ltl::visitor instances.

- virtual void accept (const_visitor &v) const =0

  Entry point for vspot::ltl::const_visitor instances.

- formula ∗ clone () const

  clone this node

- void destroy () const

  release this node

- virtual std::string dump () const =0

  Return a canonic representation of the formula.

- size_t hash () const

  Return a hash key for the formula.

Protected Member Functions

- virtual ∼ref_formula ()
- ref_formula ()
- void ref_ ()

  increment reference counter if any

- bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

- unsigned ref_count_ ()

  Number of references to this formula.

Protected Attributes

- size_t count_

  The hash key of this formula.

Private Attributes

- unsigned ref_counter_

7.99.1 Detailed Description

A reference-counted LTL formula.

7.99.2 Constructor & Destructor Documentation

7.99.2.1 virtual spot::ltl::ref_formula::∼ref_formula ( ) `[protected, virtual]`

7.99.2.2 spot::ltl::ref_formula::ref_formula ( ) `[protected]`

7.99.3 Member Function Documentation

7.99.3.1 virtual void spot::ltl::formula::accept (visitor & *v*) `[pure virtual, inherited]`

Entry point for vspot::ltl::visitor instances.

Implemented in spot::ltl::atomic_prop, spot::ltl::automatop, spot::ltl::binop, spot::ltl::constant, spot::ltl::multop, and spot::ltl::unop.

7.99.3.2 virtual void spot::ltl::formula::accept (const_visitor & *v*) const `[pure virtual, inherited]`

Entry point for vspot::ltl::const_visitor instances.

Implemented in spot::ltl::atomic_prop, spot::ltl::automatop, spot::ltl::binop, spot::ltl::constant, spot::ltl::multop, and spot::ltl::unop.

7.99.3.3 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.99.3.4 void spot::ltl::formula::destroy ( ) const `[inherited]`

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.99.3.5 virtual std::string spot::ltl::formula::dump ( ) const `[pure virtual, inherited]`

Return a canonic representation of the formula.

Implemented in spot::ltl::atomic_prop, spot::ltl::automatop, spot::ltl::binop, spot::ltl::constant, spot::ltl::multop, and spot::ltl::unop.

Referenced by spot::ltl::formula_ptr_less_than::operator()().

7.99.3.6 size_t spot::ltl::formula::hash ( ) const `[inline, inherited]`

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.99.3.7 void spot::ltl::ref_formula::ref_ ( ) `[protected, virtual]`

increment reference counter if any

Reimplemented from spot::ltl::formula.

7.99.3.8 unsigned spot::ltl::ref_formula::ref_count_ ( ) `[protected]`

Number of references to this formula.

7.99.3.9 bool spot::ltl::ref_formula::unref_ ( ) `[protected, virtual]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented from spot::ltl::formula.

7.99.4 Member Data Documentation

7.99.4.1 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.99.4.2 unsigned spot::ltl::ref_formula::ref_counter_ `[private]`

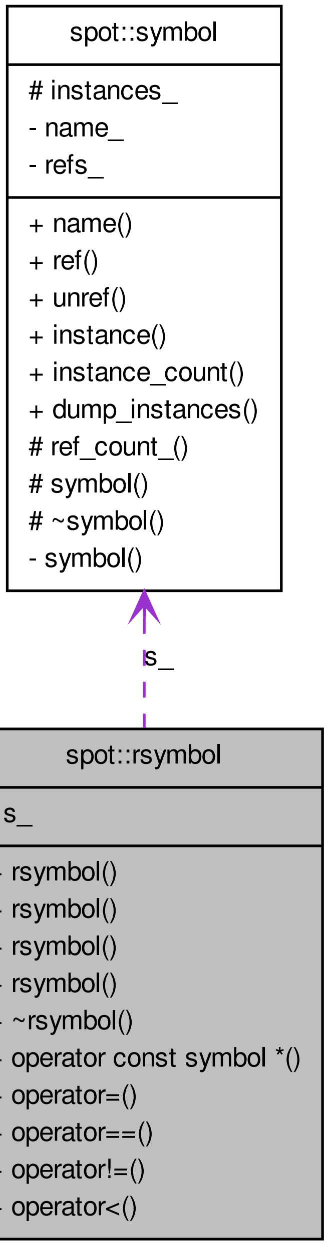
The documentation for this class was generated from the following file:

- ltlast/refformula.hh

7.100 spot::rsymbol Class Reference

`#include <evtgba/symbol.hh>`

Collaboration diagram for spot::rsymbol:



Public Member Functions

- rsymbol (const symbol ∗s)
- rsymbol (const std::string &s)

- rsymbol (const char ∗s)
- rsymbol (const rsymbol &rs)
- ∼rsymbol ()
- operator const symbol ∗ () const
- const rsymbol & operator= (const rsymbol &rs)
- bool operator== (const rsymbol &rs) const
- bool operator!= (const rsymbol &rs) const
- bool operator< (const rsymbol &rs) const

Private Attributes

- const symbol ∗ s_

7.100.1 Constructor & Destructor Documentation

7.100.1.1 spot::rsymbol::rsymbol (const symbol ∗ *s*) `[inline]`

Referenced by operator=().

7.100.1.2 spot::rsymbol::rsymbol (const std::string & *s*) `[inline]`

7.100.1.3 spot::rsymbol::rsymbol (const char ∗ *s*) `[inline]`

7.100.1.4 spot::rsymbol::rsymbol (const rsymbol & *rs*) `[inline]`

References spot::symbol::ref(), and s_.

7.100.1.5 spot::rsymbol::∼rsymbol ( ) `[inline]`

References s_, and spot::symbol::unref().

Referenced by operator=().

7.100.2 Member Function Documentation

7.100.2.1 spot::rsymbol::operator const symbol ∗ ( ) const `[inline]`

References s_.

7.100.2.2 bool spot::rsymbol::operator!= (const rsymbol & *rs*) const `[inline]`

References s_.

7.100.2.3 bool spot::rsymbol::operator< (const rsymbol & *rs*) const `[inline]`

References s_.

7.100.2.4 const rsymbol& spot::rsymbol::operator= (const rsymbol & *rs*) `[inline]`

References rsymbol(), and ~rsymbol().

7.100.2.5 bool spot::rsymbol::operator== (const rsymbol & *rs*) const `[inline]`

References s_.

7.100.3 Member Data Documentation

7.100.3.1 const symbol* spot::rsymbol::s_ `[private]`

Referenced by operator const symbol *(), operator!=(), operator<(), operator==(), rsymbol(), and ~rsymbol().

The documentation for this class was generated from the following file:

- evtgba/symbol.hh

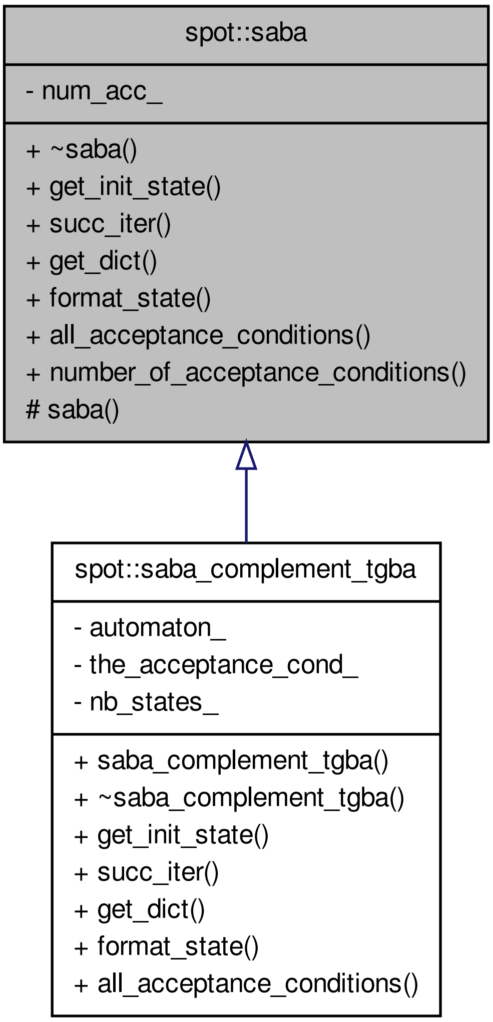
7.101 spot::saba Class Reference

A State-based Alternating (Generalized) Büchi Automaton.

Browsing such automaton can be achieved using two functions: `get_init_state`, and `succ_iter`. The former returns the initial state while the latter lists the successor states of any state.

`#include <saba/saba.hh>`

Inheritance diagram for spot::saba:



Public Member Functions

- virtual ∼saba ()
- virtual saba_state ∗ get_init_state () const =0

  Get the initial state of the automaton.

- virtual saba_succ_iterator ∗ succ_iter (const saba_state ∗local_state) const =0

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const =0

Get the dictionary associated to the automaton.

- virtual std::string format_state (const saba_state ∗state) const =0

  Format the state as a string for printing.

- virtual bdd all_acceptance_conditions () const =0

  Return the set of all acceptance conditions used by this automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- saba ()

Private Attributes

- int num_acc_

7.101.1 Detailed Description

A State-based Alternating (Generalized) Büchi Automaton.

Browsing such automaton can be achieved using two functions: `get_init_state`, and `succ_iter`. The former returns the initial state while the latter lists the successor states of any state. Note that although this is a transition-based automata, we never represent transitions! Transition informations are obtained by querying the iterator over the successors of a state.

7.101.2 Constructor & Destructor Documentation

7.101.2.1 spot::saba::saba ( ) `[protected]`

7.101.2.2 virtual spot::saba::∼saba ( ) `[virtual]`

7.101.3 Member Function Documentation

7.101.3.1 virtual bdd spot::saba::all_acceptance_conditions ( ) const `[pure virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implemented in spot::saba_complement_tgba.

7.101.3.2 virtual std::string spot::saba::format_state (const saba_state * *state*) const `[pure virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implemented in spot::saba_complement_tgba.

7.101.3.3 virtual bdd_dict* spot::saba::get_dict ( ) const `[pure virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implemented in spot::saba_complement_tgba.

7.101.3.4 virtual saba_state* spot::saba::get_init_state ( ) const `[pure virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

Implemented in spot::saba_complement_tgba.

7.101.3.5 virtual unsigned int spot::saba::number_of_acceptance_conditions ( ) const `[virtual]`

The number of acceptance conditions.

7.101.3.6 virtual saba_succ_iterator* spot::saba::succ_iter (const saba_state * *local_state*) const `[pure virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to delete it when appropriate (this can be done during the lifetime of the iterator).

Implemented in spot::saba_complement_tgba.

7.101.4 Member Data Documentation

7.101.4.1 int spot::saba::num_acc_ `[mutable, private]`

The documentation for this class was generated from the following file:

- saba/saba.hh

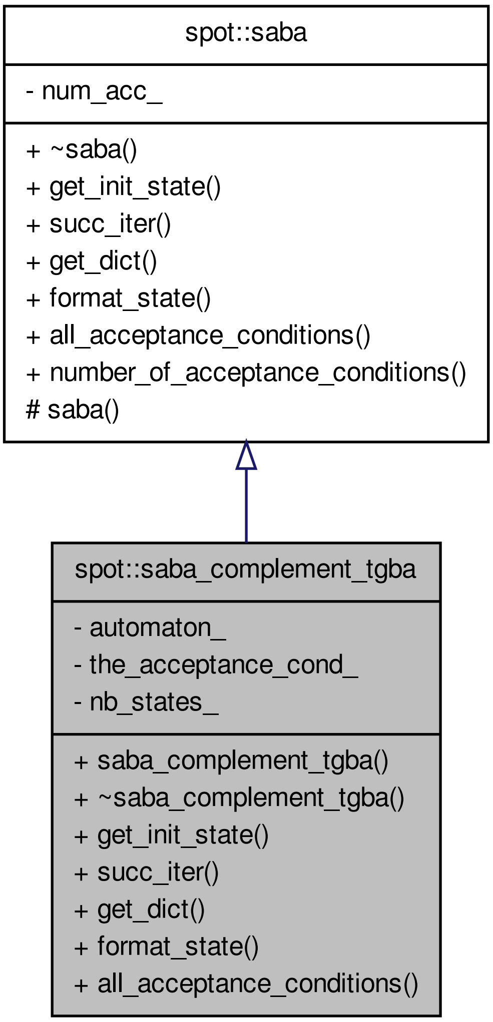
7.102 spot::saba_complement_tgba Class Reference

Complement a TGBA and produce a SABA.

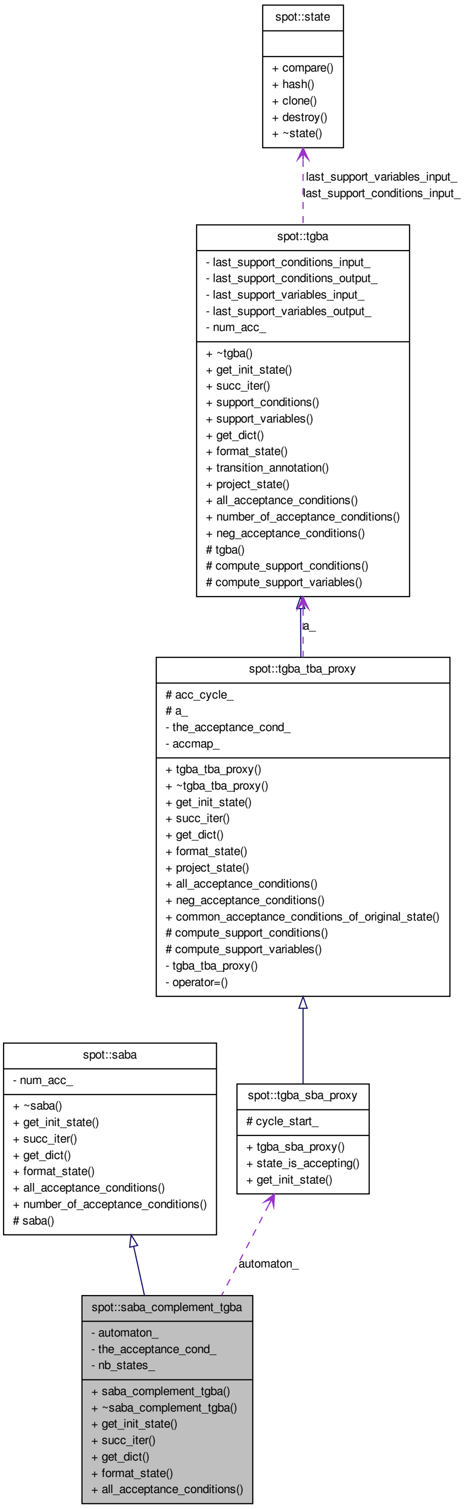
The original TGBA is transformed into a States-based Büchi Automaton.

`#include <saba/sabacomplementtgba.hh>`

Inheritance diagram for spot::saba_complement_tgba:



Collaboration diagram for spot::saba_complement_tgba:



Public Member Functions

- saba_complement_tgba (const tgba ∗a)
- virtual ∼saba_complement_tgba ()
- virtual saba_state ∗ get_init_state () const

  Get the initial state of the automaton.
- virtual saba_succ_iterator ∗ succ_iter (const saba_state ∗local_state) const

  Get an iterator over the successors of local_state.
- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.
- virtual std::string format_state (const saba_state ∗state) const

  Format the state as a string for printing.
- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.
- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Private Attributes

- const tgba_sba_proxy ∗ automaton_
- bdd the_acceptance_cond_
- unsigned nb_states_

7.102.1 Detailed Description

Complement a TGBA and produce a SABA.

The original TGBA is transformed into a States-based Büchi Automaton. Several techniques are supposed to by applied on the resulting automaton before its transformation into a TGBA. Those techniques are expected to reduce the size of the automaton.

This algorithm comes from:

```
/// @Article{          gurumurthy.03.lncs,
///   title          = {On complementing nondeterministic {B\"uchi} automata},
///   author         = {Gurumurthy, S. and Kupferman, O. and Somenzi, F. and
///                     Vardi, M.Y.},
///   journal        = {Lecture Notes in Computer Science},
///   pages          = {96--110},
///   year           = {2003},
///   publisher      = {Springer-Verlag}
/// }
///
```

The construction is done on-the-fly, by the `saba_complement_succ_iterator` class.

See also

saba_complement_succ_iterator

7.102.2 Constructor & Destructor Documentation

7.102.2.1 spot::saba_complement_tgba::saba_complement_tgba (const tgba ∗ *a*)

7.102.2.2 virtual spot::saba_complement_tgba::∼saba_complement_tgba ( ) `[virtual]`

7.102.3 Member Function Documentation

7.102.3.1 virtual bdd spot::saba_complement_tgba::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::saba.

7.102.3.2 virtual std::string spot::saba_complement_tgba::format_state (const saba_state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::saba.

7.102.3.3 virtual bdd_dict∗ spot::saba_complement_tgba::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::saba.

7.102.3.4 virtual saba_state∗ spot::saba_complement_tgba::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

Implements spot::saba.

7.102.3.5 virtual unsigned int spot::saba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.102.3.6 virtual saba_succ_iterator∗ spot::saba_complement_tgba::succ_iter (const saba_state ∗ *local_state*) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

Parameters

> ***local_state*** The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to delete it when appropriate (this can be done during the lifetime of the iterator).

Implements spot::saba.

7.102.4 Member Data Documentation

7.102.4.1 const tgba_sba_proxy∗ spot::saba_complement_tgba::automaton_ `[private]`

7.102.4.2 unsigned spot::saba_complement_tgba::nb_states_ `[private]`

7.102.4.3 bdd spot::saba_complement_tgba::the_acceptance_cond_ `[private]`

The documentation for this class was generated from the following file:

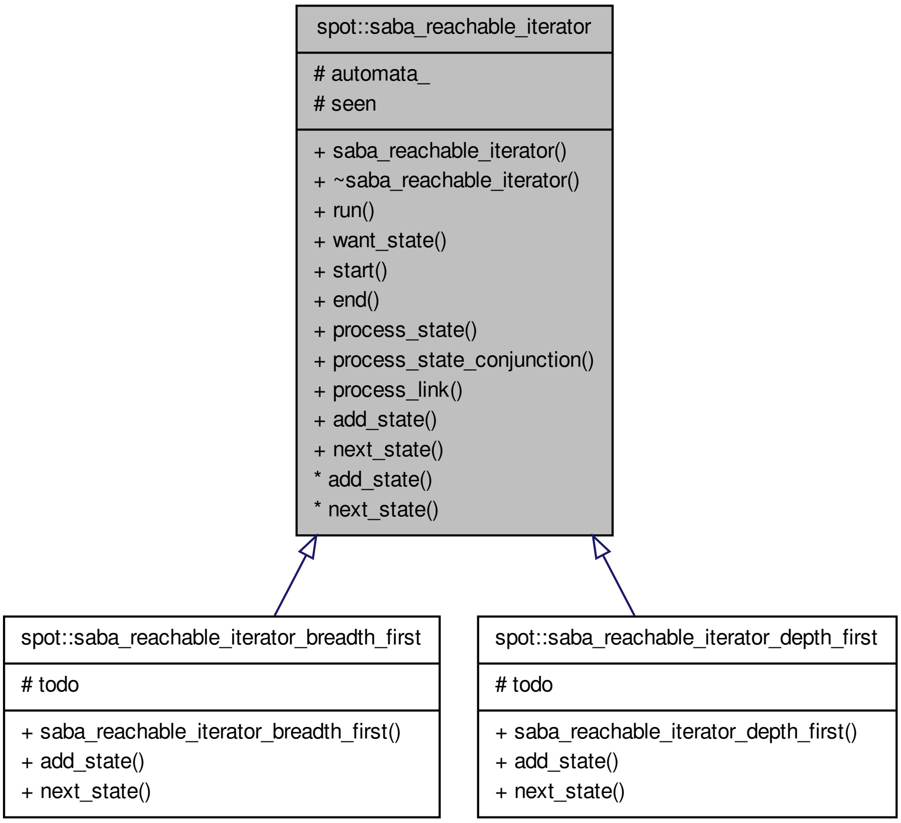
- saba/sabacomplementtgba.hh

7.103 spot::saba_reachable_iterator Class Reference

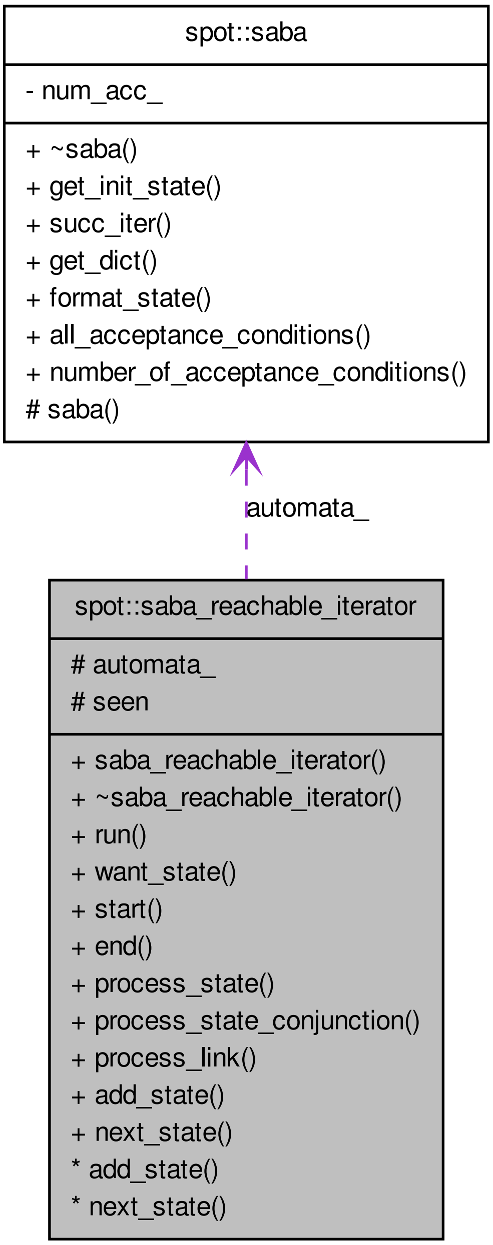
Iterate over all reachable states of a spot::saba.

`#include <sabaalgos/sabareachiter.hh>`

Inheritance diagram for spot::saba_reachable_iterator:


spot::saba_reachable_iterator
# automata_
# seen
+ saba_reachable_iterator()
+ ~saba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_state_conjunction()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::saba_reachable_iterator_breadth_first
# todo
+ saba_reachable_iterator_breadth_first()
+ add_state()
+ next_state()
spot::saba_reachable_iterator_depth_first
# todo
+ saba_reachable_iterator_depth_first()
+ add_state()
+ next_state()

Collaboration diagram for spot::saba_reachable_iterator:



Public Member Functions

- saba_reachable_iterator (const saba ∗a)
- virtual ∼saba_reachable_iterator ()

- void run ()

  Iterate over all reachable states of a spot::saba.

- virtual bool want_state (const saba_state ∗s) const
- virtual void start ()

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const saba_state ∗s, int n)
- virtual void process_state_conjunction (const saba_state ∗in_s, int in, const saba_state_conjunction ∗sc, int sc_id, const saba_succ_iterator ∗si)
- virtual void process_link (const saba_state ∗in_s, int in, const saba_state ∗out_s, int out, const saba_state_conjunction ∗sc, int sc_id, const saba_succ_iterator ∗si)

Todo list management.

Called by run() to register newly discovered states.

spot::saba_reachable_iterator_depth_first and spot::saba_reachable_iterator_breadth_first offer two precanned implementations for these functions.

- virtual void add_state (const saba_state ∗s)=0
- virtual const saba_state ∗ next_state ()=0

  Called by run() to obtain the next state to process.

Protected Types

- typedef Sgi::hash_map< const saba_state ∗, int, saba_state_ptr_hash, saba_state_ptr_equal > seen_map

Protected Attributes

- const saba ∗ automata_

  The spot::saba to explore.

- seen_map seen

  States already seen.

7.103.1 Detailed Description

Iterate over all reachable states of a spot::saba.

7.103.2 Member Typedef Documentation

7.103.2.1 typedef Sgi::hash_map<const saba_state∗, int, saba_state_ptr_hash, saba_state_ptr_equal> spot::saba_reachable_iterator::seen_map `[protected]`

7.103.3 Constructor & Destructor Documentation

7.103.3.1 spot::saba_reachable_iterator::saba_reachable_iterator (const saba ∗ *a*)

7.103.3.2 virtual spot::saba_reachable_iterator::∼saba_reachable_iterator ( ) `[virtual]`

7.103.4 Member Function Documentation

7.103.4.1 virtual void spot::saba_reachable_iterator::add_state (const saba_state ∗ *s*) `[pure virtual]`

Implemented in spot::saba_reachable_iterator_depth_first, and spot::saba_reachable_iterator_breadth_first.

7.103.4.2 virtual void spot::saba_reachable_iterator::end ( ) `[virtual]`

Called by run() once all states have been explored.

7.103.4.3 virtual const saba_state∗ spot::saba_reachable_iterator::next_state ( ) `[pure virtual]`

Called by run() to obtain the next state to process.

Implemented in spot::saba_reachable_iterator_depth_first, and spot::saba_reachable_iterator_breadth_first.

7.103.4.4 virtual void spot::saba_reachable_iterator::process_link (const saba_state ∗ *in_s,* int *in,* const saba_state ∗ *out_s,* int *out,* const saba_state_conjunction ∗ *sc,* int *sc_id,* const saba_succ_iterator ∗ *si*) `[virtual]`

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

sc The spot::saba_state_conjunction positionned on the current conjunction.

sc_id An unique number for the this transition assigned to *sc*.

si The spot::saba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::saba_reachable_iterator instance and destroyed when the instance is destroyed.

7.103.4.5 virtual void spot::saba_reachable_iterator::process_state (const saba_state ∗ *s*, int *n*) `[virtual]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.

7.103.4.6 virtual void spot::saba_reachable_iterator::process_state_conjunction (const saba_state ∗ *in_s*, int *in*, const saba_state_conjunction ∗ *sc*, int *sc_id*, const saba_succ_iterator ∗ *si*) `[virtual]`

Called by run() to process a conjunction of states.

Parameters

- ***in_s*** The current state.
- ***in*** An unique number assigned to *in_s*.
- ***sc*** The spot::saba_state_conjunction positionned on the current conjunction.
- ***sc_id*** An unique number for the this transition assigned to *sc*.
- ***si*** The spot::saba_succ_iterator positionned on the current transition.

7.103.4.7 void spot::saba_reachable_iterator::run ( )

Iterate over all reachable states of a spot::saba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), process_state_conjunction() and process_link(), while it iterates over states.

7.103.4.8 virtual void spot::saba_reachable_iterator::start ( ) `[virtual]`

Called by run() before starting its iteration.

7.103.4.9 virtual bool spot::saba_reachable_iterator::want_state (const saba_state ∗ *s*) const `[virtual]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.103.5 Member Data Documentation

7.103.5.1 const saba∗ spot::saba_reachable_iterator::automata_ `[protected]`

The spot::saba to explore.

7.103.5.2 seen_map spot::saba_reachable_iterator::seen `[protected]`

States already seen.

The documentation for this class was generated from the following file:

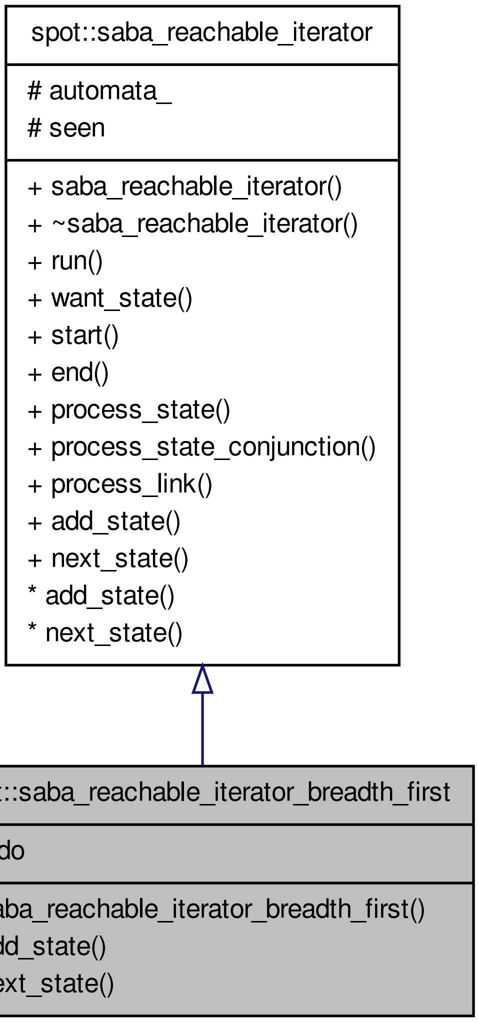
- sabaalgos/sabareachiter.hh

7.104 spot::saba_reachable_iterator_breadth_first Class Reference

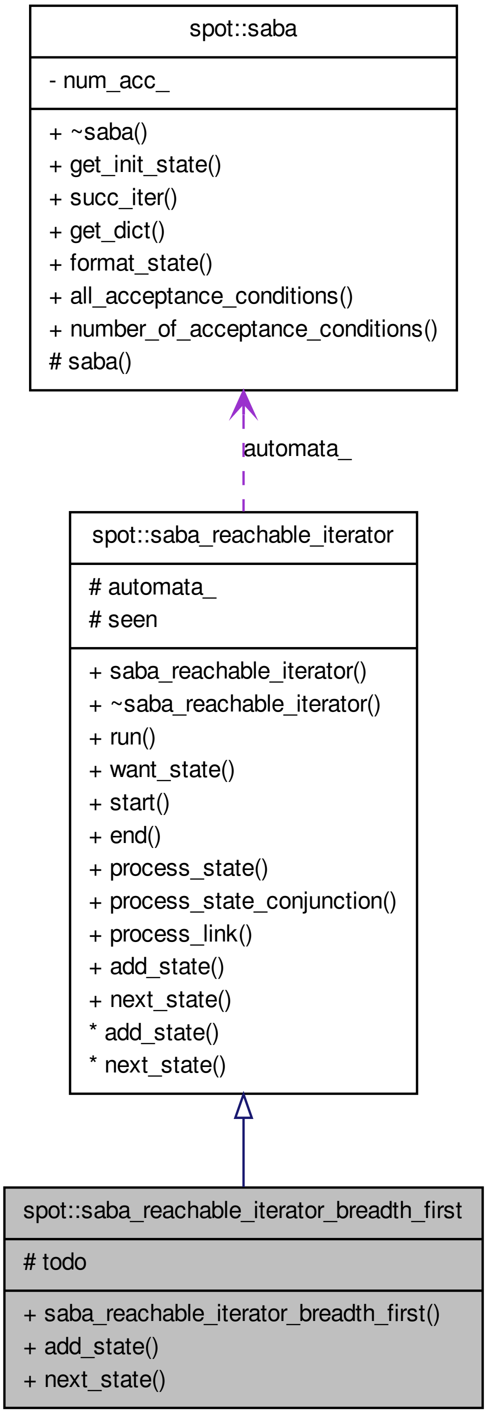
An implementation of spot::saba_reachable_iterator that browses states breadth first.

`#include <sabaalgos/sabareachiter.hh>`

Inheritance diagram for spot::saba_reachable_iterator_breadth_first:


spot::saba_reachable_iterator
# automata_
# seen
+ saba_reachable_iterator()
+ ~saba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_state_conjunction()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::saba_reachable_iterator_breadth_first
# todo
+ saba_reachable_iterator_breadth_first()
+ add_state()
+ next_state()

Collaboration diagram for spot::saba_reachable_iterator_breadth_first:



Public Member Functions

- saba_reachable_iterator_breadth_first (const saba ∗a)
- virtual void add_state (const saba_state ∗s)
- virtual const saba_state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::saba.

- virtual bool want_state (const saba_state ∗s) const
- virtual void start ()

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const saba_state ∗s, int n)
- virtual void process_state_conjunction (const saba_state ∗in_s, int in, const saba_state_conjunction ∗sc, int sc_id, const saba_succ_iterator ∗si)
- virtual void process_link (const saba_state ∗in_s, int in, const saba_state ∗out_s, int out, const saba_state_conjunction ∗sc, int sc_id, const saba_succ_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const saba_state ∗, int, saba_state_ptr_hash, saba_state_ptr_equal > seen_map

Protected Attributes

- std::deque< const saba_state ∗ > todo

  A queue of states yet to explore.

- const saba ∗ automata_

  The spot::saba to explore.

- seen_map seen

  States already seen.

7.104.1 Detailed Description

An implementation of spot::saba_reachable_iterator that browses states breadth first.

7.104.2 Member Typedef Documentation

7.104.2.1 typedef Sgi::hash_map<const saba_state∗, int, saba_state_ptr_hash, saba_state_ptr_equal> spot::saba_reachable_iterator::seen_map `[protected, inherited]`

7.104.3 Constructor & Destructor Documentation

7.104.3.1 spot::saba_reachable_iterator_breadth_first::saba_reachable_iterator_breadth_first (const saba ∗ *a*)

7.104.4 Member Function Documentation

7.104.4.1 virtual void spot::saba_reachable_iterator_breadth_first::add_state (const saba_state ∗ *s*) `[virtual]`

Implements spot::saba_reachable_iterator.

7.104.4.2 virtual void spot::saba_reachable_iterator::end ( ) `[virtual, inherited]`

Called by run() once all states have been explored.

7.104.4.3 virtual const saba_state∗ spot::saba_reachable_iterator_breadth_first::next_state ( ) `[virtual]`

Called by run() to obtain the next state to process.

Implements spot::saba_reachable_iterator.

7.104.4.4 virtual void spot::saba_reachable_iterator::process_link (const saba_state ∗ *in_s*, int *in*, const saba_state ∗ *out_s*, int *out*, const saba_state_conjunction ∗ *sc*, int *sc_id*, const saba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

sc The spot::saba_state_conjunction positionned on the current conjunction.

sc_id An unique number for the this transition assigned to *sc*.

si The spot::saba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::saba_reachable_iterator instance and destroyed when the instance is destroyed.

7.104.4.5 virtual void spot::saba_reachable_iterator::process_state (const saba_state * *s*, int *n*) `[virtual, inherited]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.

7.104.4.6 virtual void spot::saba_reachable_iterator::process_state_conjunction (const saba_state * *in_s*, int *in*, const saba_state_conjunction * *sc*, int *sc_id*, const saba_succ_iterator * *si*) `[virtual, inherited]`

Called by run() to process a conjunction of states.

Parameters

- ***in_s*** The current state.
- ***in*** An unique number assigned to *in_s*.
- ***sc*** The spot::saba_state_conjunction positionned on the current conjunction.
- ***sc_id*** An unique number for the this transition assigned to *sc*.
- ***si*** The spot::saba_succ_iterator positionned on the current transition.

7.104.4.7 void spot::saba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::saba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), process_state_conjunction() and process_link(), while it iterates over states.

7.104.4.8 virtual void spot::saba_reachable_iterator::start ( ) `[virtual, inherited]`

Called by run() before starting its iteration.

7.104.4.9 virtual bool spot::saba_reachable_iterator::want_state (const saba_state * *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.104.5 Member Data Documentation

7.104.5.1 const saba* spot::saba_reachable_iterator::automata_ `[protected, inherited]`

The spot::saba to explore.

7.104.5.2 seen_map spot::saba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.104.5.3 std::deque<const saba_state*> spot::saba_reachable_iterator_breadth_first::todo `[protected]`

A queue of states yet to explore.

The documentation for this class was generated from the following file:

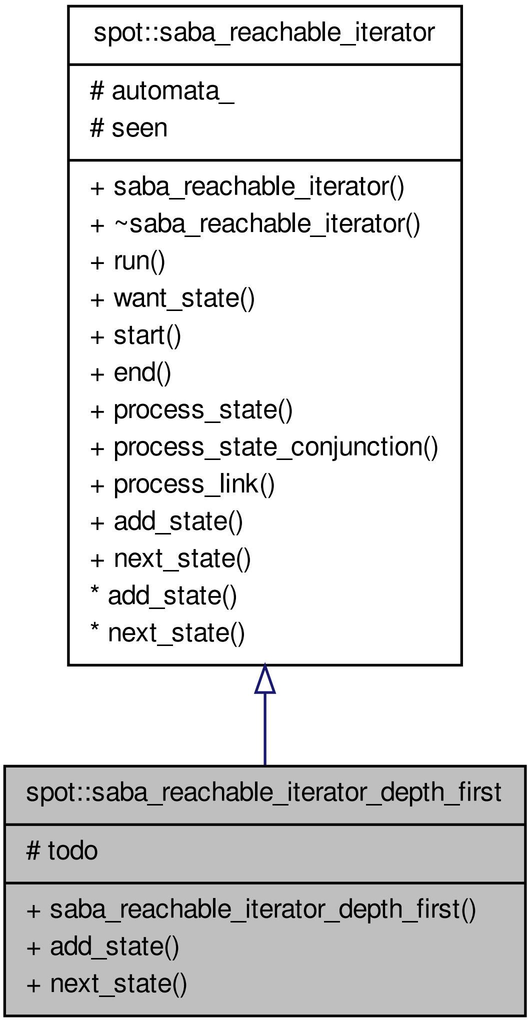
- sabaalgos/sabareachiter.hh

7.105 spot::saba_reachable_iterator_depth_first Class Reference

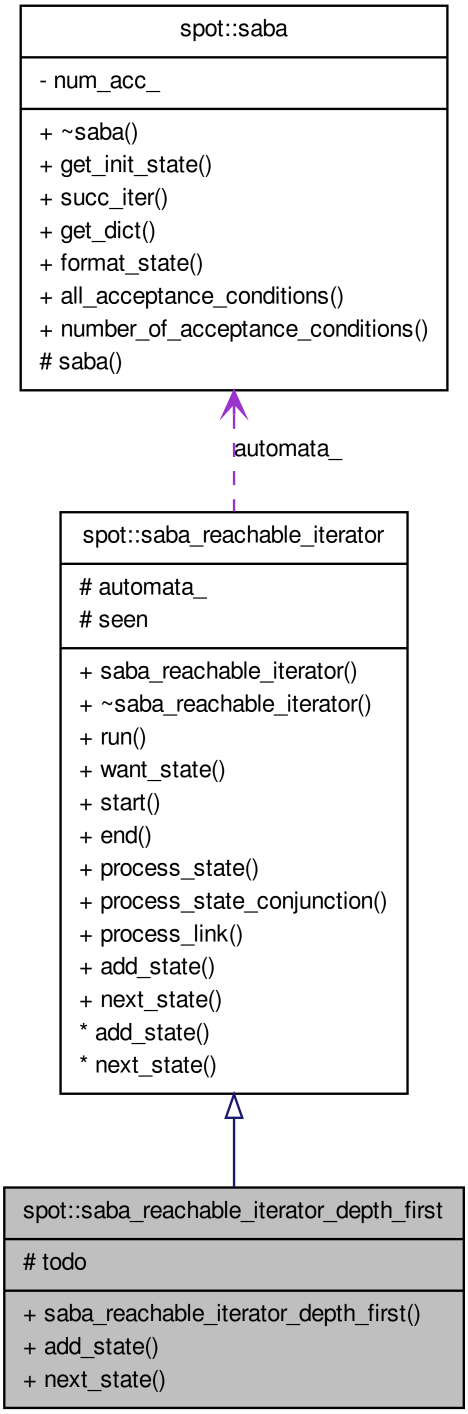
An implementation of spot::saba_reachable_iterator that browses states depth first.

`#include <sabaalgos/sabareachiter.hh>`

Inheritance diagram for spot::saba_reachable_iterator_depth_first:


spot::saba_reachable_iterator
# automata_
# seen
+ saba_reachable_iterator()
+ ~saba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_state_conjunction()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::saba_reachable_iterator_depth_first
# todo
+ saba_reachable_iterator_depth_first()
+ add_state()
+ next_state()

Collaboration diagram for spot::saba_reachable_iterator_depth_first:



Public Member Functions

- saba_reachable_iterator_depth_first (const saba ∗a)
- virtual void add_state (const saba_state ∗s)
- virtual const saba_state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::saba.

- virtual bool want_state (const saba_state ∗s) const
- virtual void start ()

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const saba_state ∗s, int n)
- virtual void process_state_conjunction (const saba_state ∗in_s, int in, const saba_state_conjunction ∗sc, int sc_id, const saba_succ_iterator ∗si)
- virtual void process_link (const saba_state ∗in_s, int in, const saba_state ∗out_s, int out, const saba_state_conjunction ∗sc, int sc_id, const saba_succ_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const saba_state ∗, int, saba_state_ptr_hash, saba_state_ptr_equal > seen_map

Protected Attributes

- std::stack< const saba_state ∗ > todo

  A stack of states yet to explore.

- const saba ∗ automata_

  The spot::saba to explore.

- seen_map seen

  States already seen.

7.105.1 Detailed Description

An implementation of spot::saba_reachable_iterator that browses states depth first.

7.105.2 Member Typedef Documentation

7.105.2.1 typedef Sgi::hash_map<const saba_state∗, int, saba_state_ptr_hash, saba_state_ptr_equal> spot::saba_reachable_iterator::seen_map `[protected, inherited]`

7.105.3 Constructor & Destructor Documentation

7.105.3.1 spot::saba_reachable_iterator_depth_first::saba_reachable_iterator_depth_first (const saba ∗ *a*)

7.105.4 Member Function Documentation

7.105.4.1 virtual void spot::saba_reachable_iterator_depth_first::add_state (const saba_state ∗ *s*) `[virtual]`

Implements spot::saba_reachable_iterator.

7.105.4.2 virtual void spot::saba_reachable_iterator::end ( ) `[virtual, inherited]`

Called by run() once all states have been explored.

7.105.4.3 virtual const saba_state∗ spot::saba_reachable_iterator_depth_first::next_state ( ) `[virtual]`

Called by run() to obtain the next state to process.

Implements spot::saba_reachable_iterator.

7.105.4.4 virtual void spot::saba_reachable_iterator::process_link (const saba_state ∗ *in_s,* int *in,* const saba_state ∗ *out_s,* int *out,* const saba_state_conjunction ∗ *sc,* int *sc_id,* const saba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

sc The spot::saba_state_conjunction positionned on the current conjunction.

sc_id An unique number for the this transition assigned to *sc*.

si The spot::saba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::saba_reachable_iterator instance and destroyed when the instance is destroyed.

7.105.4.5 virtual void spot::saba_reachable_iterator::process_state (const saba_state ∗ *s*, int *n*) `[virtual, inherited]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.

7.105.4.6 virtual void spot::saba_reachable_iterator::process_state_conjunction (const saba_state ∗ *in_s*, int *in*, const saba_state_conjunction ∗ *sc*, int *sc_id*, const saba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a conjunction of states.

Parameters

- ***in_s*** The current state.
- ***in*** An unique number assigned to *in_s*.
- ***sc*** The spot::saba_state_conjunction positionned on the current conjunction.
- ***sc_id*** An unique number for the this transition assigned to *sc*.
- ***si*** The spot::saba_succ_iterator positionned on the current transition.

7.105.4.7 void spot::saba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::saba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), process_state_conjunction() and process_link(), while it iterates over states.

7.105.4.8 virtual void spot::saba_reachable_iterator::start ( ) `[virtual, inherited]`

Called by run() before starting its iteration.

7.105.4.9 virtual bool spot::saba_reachable_iterator::want_state (const saba_state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.105.5 Member Data Documentation

7.105.5.1 const saba∗ spot::saba_reachable_iterator::automata_ `[protected, inherited]`

The spot::saba to explore.

7.105.5.2 seen_map spot::saba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.105.5.3 std::stack<const saba_state∗> spot::saba_reachable_iterator_depth_first::todo `[protected]`

A stack of states yet to explore.

The documentation for this class was generated from the following file:

- sabaalgos/sabareachiter.hh

7.106 spot::saba_state Class Reference

Abstract class for saba states.

`#include <saba/sabastate.hh>`

Public Member Functions

- virtual int compare (const saba_state ∗other) const =0

  Compares two states (that come from the same automaton).

- virtual size_t hash () const =0

  Hash a state.

- virtual saba_state ∗ clone () const =0

  Duplicate a state.

- virtual bdd acceptance_conditions () const =0

  Get the acceptance condition.

- virtual ∼saba_state ()

7.106.1 Detailed Description

Abstract class for saba states.

7.106.2 Constructor & Destructor Documentation

7.106.2.1 virtual spot::saba_state::∼saba_state ( ) `[inline, virtual]`

7.106.3 Member Function Documentation

7.106.3.1 virtual bdd spot::saba_state::acceptance_conditions ( ) const `[pure virtual]`

Get the acceptance condition.

saba are state-labeled automata, then their acceptance conditions are labeled on states.

7.106.3.2 virtual saba_state* spot::saba_state::clone ( ) const `[pure virtual]`

Duplicate a state.

7.106.3.3 virtual int spot::saba_state::compare (const saba_state * *other*) const `[pure virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::saba_state_ptr_less_than

Referenced by spot::saba_state_ptr_equal::operator()(), and spot::saba_state_ptr_less_than::operator()().

7.106.3.4 virtual size_t spot::saba_state::hash ( ) const `[pure virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::saba_state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Referenced by spot::saba_state_ptr_hash::operator()().

The documentation for this class was generated from the following file:

- saba/sabastate.hh

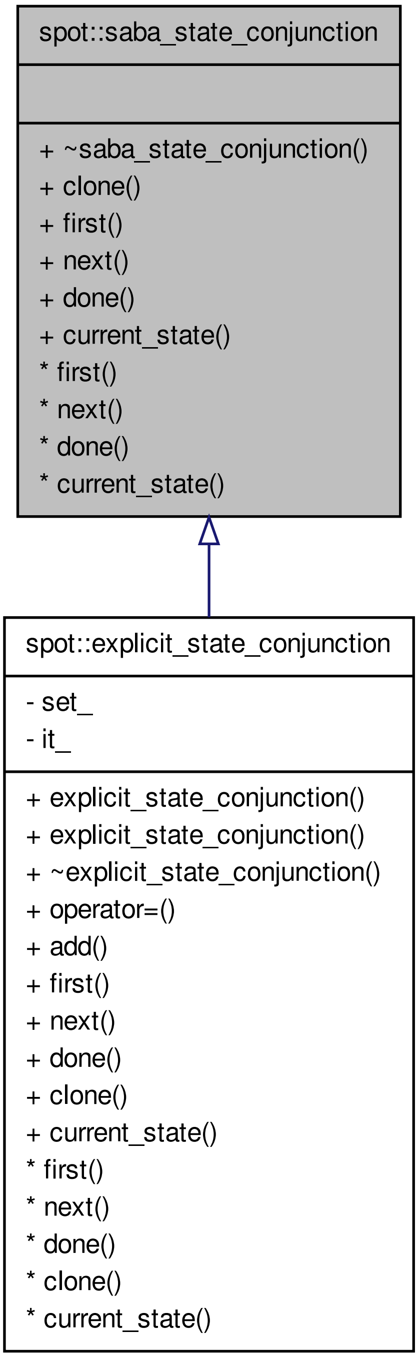
7.107 spot::saba_state_conjunction Class Reference

Iterate over a conjunction of saba_state.

This class provides the basic functionalities required to iterate over a conjunction of states of a saba.

`#include <saba/sabasucciter.hh>`

Inheritance diagram for spot::saba_state_conjunction:



Public Member Functions

- virtual ~saba_state_conjunction ()
- virtual saba_state_conjunction ∗ clone () const =0

  Duplicate a saba_state conjunction.

Iteration

- virtual void first ()=0

  Position the iterator on the first successor of the conjunction (if any).
- virtual void next ()=0

  Jump to the next successor (if any).
- virtual bool done () const =0

  Check whether the iteration over a conjunction of states is finished.

Inspection

- virtual saba_state ∗ current_state () const =0

  Get the state of the current successor.

7.107.1 Detailed Description

Iterate over a conjunction of saba_state.

This class provides the basic functionalities required to iterate over a conjunction of states of a saba.

7.107.2 Constructor & Destructor Documentation

7.107.2.1 virtual spot::saba_state_conjunction::~saba_state_conjunction ( ) `[inline, virtual]`

7.107.3 Member Function Documentation

7.107.3.1 virtual saba_state_conjunction∗ spot::saba_state_conjunction::clone ( ) const `[pure virtual]`

Duplicate a saba_state conjunction.

Implemented in spot::explicit_state_conjunction.

7.107.3.2 virtual saba_state* spot::saba_state_conjunction::current_state ( ) const `[pure virtual]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

Warning

the state is allocated with new, its deletion is the responsibility of the caller.

Implemented in spot::explicit_state_conjunction.

7.107.3.3 virtual bool spot::saba_state_conjunction::done ( ) const `[pure virtual]`

Check whether the iteration over a conjunction of states is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

Implemented in spot::explicit_state_conjunction.

7.107.3.4 virtual void spot::saba_state_conjunction::first ( ) `[pure virtual]`

Position the iterator on the first successor of the conjunction (if any).

This method can be called several times to make multiple passes over successors.

Warning

One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implemented in spot::explicit_state_conjunction.

7.107.3.5 virtual void spot::saba_state_conjunction::next ( ) `[pure virtual]`

Jump to the next successor (if any).

Warning

Again, one should always call `done()` to ensure there is a successor.

Implemented in spot::explicit_state_conjunction.

The documentation for this class was generated from the following file:

- saba/sabasucciter.hh

7.108 spot::saba_state_ptr_equal Struct Reference

An Equivalence Relation for `saba_state*`.

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `saba_state*`.

`#include <saba/sabastate.hh>`

Public Member Functions

- bool operator() (const saba_state ∗left, const saba_state ∗right) const

7.108.1 Detailed Description

An Equivalence Relation for `saba_state*`.

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `saba_state*`. For instance here is how one could declare a map of `saba_state*`.

```
// Remember how many times each state has been visited.
Sgi::hash_map<spot::saba_state*, int, spot::saba_state_ptr_hash,
                                  spot::saba_state_ptr_equal> seen;
```

7.108.2 Member Function Documentation

7.108.2.1 bool spot::saba_state_ptr_equal::operator() (const saba_state ∗ *left*, const saba_state ∗ *right*) const `[inline]`

References spot::saba_state::compare().

The documentation for this struct was generated from the following file:

- saba/sabastate.hh

7.109 spot::saba_state_ptr_hash Struct Reference

Hash Function for `saba_state*`.

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `saba_state*`.

`#include <saba/sabastate.hh>`

Public Member Functions

- size_t operator() (const saba_state ∗that) const

7.109.1 Detailed Description

Hash Function for `saba_state*`.

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `saba_state*`. For instance here is how one could declare a map of `saba_state*`.

```
// Remember how many times each state has been visited.
Sgi::hash_map<spot::saba_state*, int, spot::saba_state_ptr_hash,
                                 spot::saba_state_ptr_equal> seen;
```

7.109.2 Member Function Documentation

7.109.2.1 size_t spot::saba_state_ptr_hash::operator() (const saba_state * *that*) const `[inline]`

References spot::saba_state::hash().

The documentation for this struct was generated from the following file:

- saba/sabastate.hh

7.110 spot::saba_state_ptr_less_than Struct Reference

Strict Weak Ordering for `saba_state*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `saba_state*`.

`#include <saba/sabastate.hh>`

Public Member Functions

- bool operator() (const saba_state *left, const saba_state *right) const

7.110.1 Detailed Description

Strict Weak Ordering for `saba_state*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `saba_state*`. For instance here is how one could declare a map of `saba_state*`.

```
// Remember how many times each state has been visited.
std::map<spot::saba_state*, int, spot::saba_state_ptr_less_than> seen;
```

7.110.2 Member Function Documentation

7.110.2.1 bool spot::saba_state_ptr_less_than::operator() (const saba_state * *left*, const saba_state * *right*) const `[inline]`

References spot::saba_state::compare().

The documentation for this struct was generated from the following file:

- saba/sabastate.hh

7.111 spot::saba_state_shared_ptr_equal Struct Reference

An Equivalence Relation for `shared_saba_state` (shared_ptr<const saba_state*>).

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `shared_saba_state`.

`#include <saba/sabastate.hh>`

Public Member Functions

- bool operator() (shared_saba_state left, shared_saba_state right) const

7.111.1 Detailed Description

An Equivalence Relation for `shared_saba_state` (shared_ptr<const saba_state*>).

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `shared_saba_state`. For instance here is how one could declare a map of `shared_saba_state`

```
// Remember how many times each state has been visited.
Sgi::hash_map<shared_saba_state, int,
              spot::saba_state_shared_ptr_hash,
              spot::saba_state_shared_ptr_equal> seen;
```

7.111.2 Member Function Documentation

7.111.2.1 bool spot::saba_state_shared_ptr_equal::operator() (shared_saba_state *left*, shared_saba_state *right*) const `[inline]`

The documentation for this struct was generated from the following file:

- saba/sabastate.hh

7.112 spot::saba_state_shared_ptr_hash Struct Reference

Hash Function for `shared_saba_state` (shared_ptr<const saba_state*>).

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `shared_saba_state`.

`#include <saba/sabastate.hh>`

Public Member Functions

- size_t operator() (shared_saba_state that) const

7.112.1 Detailed Description

Hash Function for `shared_saba_state` (shared_ptr<const saba_state*>).

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `shared_saba_state`. For instance here is how one could declare a map of `shared_saba_state`.

```
// Remember how many times each state has been visited.
Sgi::hash_map<shared_saba_state, int,
              spot::saba_state_shared_ptr_hash,
              spot::saba_state_shared_ptr_equal> seen;
```

7.112.2 Member Function Documentation

7.112.2.1 size_t spot::saba_state_shared_ptr_hash::operator() (shared_saba_state *that*) const `[inline]`

The documentation for this struct was generated from the following file:

- saba/sabastate.hh

7.113 spot::saba_state_shared_ptr_less_than Struct Reference

Strict Weak Ordering for `shared_saba_state` (shared_ptr<const saba_state∗>).

This is meant to be used as a comparison functor for STL `map` whose key are of type `shared_saba_state`.

`#include <saba/sabastate.hh>`

Public Member Functions

- bool operator() (shared_saba_state left, shared_saba_state right) const

7.113.1 Detailed Description

Strict Weak Ordering for `shared_saba_state` (shared_ptr<const saba_state∗>).

This is meant to be used as a comparison functor for STL `map` whose key are of type `shared_saba_state`. For instance here is how one could declare a map of `shared_saba_state`.

```
// Remember how many times each state has been visited.
std::map<shared_saba_state, int, spot::saba_state_shared_ptr_less_than>
   seen;
```

7.113.2 Member Function Documentation

7.113.2.1 bool spot::saba_state_shared_ptr_less_than::operator() (shared_saba_state *left,* shared_saba_state *right*) const `[inline]`

The documentation for this struct was generated from the following file:

- saba/sabastate.hh

7.114 spot::saba_succ_iterator Class Reference

Iterate over the successors of a saba_state.

This class provides the basic functionalities required to iterate over the successors of a state of a saba. Since transitions of an alternating automaton are defined as a boolean function with conjunctions (universal) and disjunctions (non-deterministic),.

`#include <saba/sabasucciter.hh>`

Public Member Functions

- virtual ∼saba_succ_iterator ()

Iteration

- virtual void first ()=0
  Position the iterator on the first conjunction of successors (if any).
- virtual void next ()=0
  Jump to the next conjunction of successors (if any).
- virtual bool done () const =0
  Check whether the iteration is finished.

Inspection

- virtual saba_state_conjunction ∗ current_conjunction () const =0
  Get current conjunction of successor states.
- virtual bdd current_condition () const =0
  Get the condition on the transition leading to this successor.

7.114.1 Detailed Description

Iterate over the successors of a saba_state.

This class provides the basic functionalities required to iterate over the successors of a state of a saba. Since transitions of an alternating automaton are defined as a boolean function with conjunctions (universal) and disjunctions (non-deterministic),.

7.114.2 Constructor & Destructor Documentation

7.114.2.1 virtual spot::saba_succ_iterator::∼saba_succ_iterator ( ) `[inline, virtual]`

7.114.3 Member Function Documentation

7.114.3.1 virtual bdd spot::saba_succ_iterator::current_condition ( ) const `[pure virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

7.114.3.2 virtual saba_state_conjunction∗ spot::saba_succ_iterator::current_conjunction ( ) const [pure virtual]

Get current conjunction of successor states.

7.114.3.3 virtual bool spot::saba_succ_iterator::done ( ) const [pure virtual]

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

7.114.3.4 virtual void spot::saba_succ_iterator::first ( ) [pure virtual]

Position the iterator on the first conjunction of successors (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

7.114.3.5 virtual void spot::saba_succ_iterator::next ( ) [pure virtual]

Jump to the next conjunction of successors (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

The documentation for this class was generated from the following file:

- saba/sabasucciter.hh

7.115 spot::scc_map::scc Struct Reference

`#include <tgbaalgos/scc.hh>`

Public Member Functions

- scc (int index)

Public Attributes

- int index

  Index of the SCC.

- bdd acc
- std::list< const state $*$ > states

  States of the component.

- cond_set conds

  Set of conditions used in the SCC.

- bdd supp

  Conjunction of atomic propositions used in the SCC.

- bdd supp_rec

  Conjunction of atomic propositions used in the SCC.

- succ_type succ

  Successor SCC.

- bool trivial

  Trivial SCC have one state and no self-loops.

- bdd useful_acc

  Useful acceptance conditions.

7.115.1 Constructor & Destructor Documentation

7.115.1.1 spot::scc_map::scc::scc (int *index*) `[inline]`

7.115.2 Member Data Documentation

7.115.2.1 bdd spot::scc_map::scc::acc

The union of all acceptance conditions of transitions which connect the states of the connected component.

7.115.2.2 cond_set spot::scc_map::scc::conds

Set of conditions used in the SCC.

7.115.2.3 int spot::scc_map::scc::index

Index of the SCC.

7.115.2.4 std::list<const state∗> spot::scc_map::scc::states

States of the component.

7.115.2.5 succ_type spot::scc_map::scc::succ

Successor SCC.

7.115.2.6 bdd spot::scc_map::scc::supp

Conjunction of atomic propositions used in the SCC.

7.115.2.7 bdd spot::scc_map::scc::supp_rec

Conjunction of atomic propositions used in the SCC.

7.115.2.8 bool spot::scc_map::scc::trivial

Trivial SCC have one state and no self-loops.

7.115.2.9 bdd spot::scc_map::scc::useful_acc

Useful acceptance conditions.

The documentation for this struct was generated from the following file:

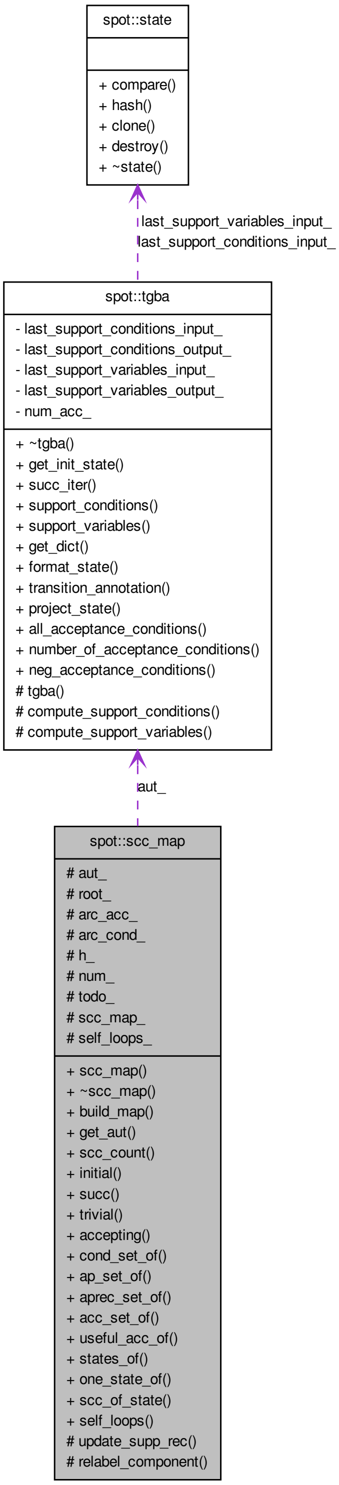
- tgbaalgos/scc.hh

7.116 spot::scc_map Class Reference

Build a map of Strongly Connected components in in a TGBA.

`#include <tgbaalgos/scc.hh>`

Collaboration diagram for spot::scc_map:



Classes

- struct scc

Public Types

- typedef std::map< unsigned, bdd > succ_type
- typedef std::set< bdd, bdd_less_than > cond_set

Public Member Functions

- scc_map (const tgba ∗aut)

  Constructor.

- ∼scc_map ()
- void build_map ()

  Actually compute the graph of strongly connected components.

- const tgba ∗ get_aut () const

  Get the automaton for which the map has been constructed.

- unsigned scc_count () const

  Get the number of SCC in the automaton.

- unsigned initial () const

  Get number of the SCC containing the initial state.

- const succ_type & succ (unsigned n) const

  Successor SCCs of a SCC.

- bool trivial (unsigned n) const

  Return whether an SCC is trivial.

- bool accepting (unsigned n) const

  Return whether an SCC is accepting.

- const cond_set & cond_set_of (unsigned n) const

  Return the set of conditions occurring in an SCC.

- bdd ap_set_of (unsigned n) const

  Return the set of atomic properties occurring in an SCC.

- bdd aprec_set_of (unsigned n) const

  Return the set of atomic properties reachable from this SCC.

- bdd acc_set_of (unsigned n) const

  Return the set of acceptance conditions occurring in an SCC.

- bdd useful_acc_of (unsigned n) const

Return the set of useful acceptance conditions of SCC n.

- const std::list< const state ∗ > & states_of (unsigned n) const

  Return the set of states of an SCC.

- const state ∗ one_state_of (unsigned n) const

  Return one state of an SCC.

- unsigned scc_of_state (const state ∗s) const

  Return the number of the SCC a state belongs too.

- unsigned self_loops () const

  Return the number of self loops in the automaton.

Protected Types

- typedef std::list< scc > stack_type
- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > hash_type
- typedef std::pair< const spot::state ∗, tgba_succ_iterator ∗ > pair_state_iter
- typedef std::vector< scc > scc_map_type

Protected Member Functions

- bdd update_supp_rec (unsigned state)
- int relabel_component ()

Protected Attributes

- const tgba ∗ aut_
- stack_type root_
- std::stack< bdd > arc_acc_
- std::stack< bdd > arc_cond_
- hash_type h_
- int num_
- std::stack< pair_state_iter > todo_
- scc_map_type scc_map_
- unsigned self_loops_

7.116.1 Detailed Description

Build a map of Strongly Connected components in in a TGBA.

7.116.2 Member Typedef Documentation

7.116.2.1 typedef std::set<bdd, bdd_less_than> spot::scc_map::cond_set

7.116.2.2 typedef Sgi::hash_map<const state*, int, state_ptr_hash, state_ptr_equal> spot::scc_map::hash_type `[protected]`

7.116.2.3 typedef std::pair<const spot::state*, tgba_succ_iterator*> spot::scc_map::pair_state_iter `[protected]`

7.116.2.4 typedef std::vector<scc> spot::scc_map::scc_map_type `[protected]`

7.116.2.5 typedef std::list<scc> spot::scc_map::stack_type `[protected]`

7.116.2.6 typedef std::map<unsigned, bdd> spot::scc_map::succ_type

7.116.3 Constructor & Destructor Documentation

7.116.3.1 spot::scc_map::scc_map (const tgba * *aut*)

Constructor.

This will note compute the map initially. You should call build_map() to do so.

7.116.3.2 spot::scc_map::~scc_map ( )

7.116.4 Member Function Documentation

7.116.4.1 bdd spot::scc_map::acc_set_of (unsigned *n*) const

Return the set of acceptance conditions occurring in an SCC.

Precondition

This should only be called once build_map() has run.

7.116.4.2 bool spot::scc_map::accepting (unsigned *n*) const

Return whether an SCC is accepting.

Precondition

This should only be called once build_map() has run.

7.116.4.3 bdd spot::scc_map::ap_set_of (unsigned *n*) const

Return the set of atomic properties occurring in an SCC.

Returns

a BDD that is a conjuction of all atomic properties occurring on the transitions in the SCC n.

Precondition

This should only be called once build_map() has run.

7.116.4.4 bdd spot::scc_map::aprec_set_of (unsigned *n*) const

Return the set of atomic properties reachable from this SCC.

Returns

a BDD that is a conjuction of all atomic properties occurring on the transitions reachable from this SCC n.

Precondition

This should only be called once build_map() has run.

7.116.4.5 void spot::scc_map::build_map ( )

Actually compute the graph of strongly connected components.

7.116.4.6 const cond_set& spot::scc_map::cond_set_of (unsigned *n*) const

Return the set of conditions occurring in an SCC.

Precondition

This should only be called once build_map() has run.

7.116.4.7 const tgba∗ spot::scc_map::get_aut ( ) const

Get the automaton for which the map has been constructed.

7.116.4.8 unsigned spot::scc_map::initial ( ) const

Get number of the SCC containing the initial state.

Precondition

This should only be called once build_map() has run.

7.116.4.9 const state∗ spot::scc_map::one_state_of (unsigned *n*) const

Return one state of an SCC.

The state in the returned list is still owned by the scc_map instance. It should NOT be destroyed by the client code.

Precondition

This should only be called once build_map() has run.

7.116.4.10 int spot::scc_map::relabel_component ( ) `[protected]`

7.116.4.11 unsigned spot::scc_map::scc_count ( ) const

Get the number of SCC in the automaton.

SCCs are labelled from 0 to scc_count()-1.

Precondition

This should only be called once build_map() has run.

7.116.4.12 unsigned spot::scc_map::scc_of_state (const state ∗ *s*) const

Return the number of the SCC a state belongs too.

Precondition

This should only be called once build_map() has run.

7.116.4.13 unsigned spot::scc_map::self_loops ( ) const

Return the number of self loops in the automaton.

7.116.4.14 const std::list<const state∗>& spot::scc_map::states_of (unsigned *n*) const

Return the set of states of an SCC.

The states in the returned list are still owned by the scc_map instance. They should NOT be destroyed by the client code.

Precondition

This should only be called once build_map() has run.

7.116.4.15 const succ_type& spot::scc_map::succ (unsigned *n*) const

Successor SCCs of a SCC.

Precondition

This should only be called once build_map() has run.

7.116.4.16 bool spot::scc_map::trivial (unsigned *n*) const

Return whether an SCC is trivial.

Trivial SCCs have one state and no self-loop.

Precondition

This should only be called once build_map() has run.

7.116.4.17 bdd spot::scc_map::update_supp_rec (unsigned *state*) `[protected]`

7.116.4.18 bdd spot::scc_map::useful_acc_of (unsigned *n*) const

Return the set of useful acceptance conditions of SCC n.

Useless acceptances conditions are always implied by other acceptances conditions. This returns all the other acceptance conditions.

7.116.5 Member Data Documentation

7.116.5.1 std::stack<bdd> spot::scc_map::arc_acc_ `[protected]`

7.116.5.2 std::stack<bdd> spot::scc_map::arc_cond_ `[protected]`

7.116.5.3 const tgba∗ spot::scc_map::aut_ `[protected]`

7.116.5.4 hash_type spot::scc_map::h_ `[protected]`

7.116.5.5 int spot::scc_map::num_ `[protected]`

7.116.5.6 stack_type spot::scc_map::root_ `[protected]`

7.116.5.7 scc_map_type spot::scc_map::scc_map_ `[protected]`

7.116.5.8 unsigned spot::scc_map::self_loops_ `[protected]`

7.116.5.9 std::stack<pair_state_iter> spot::scc_map::todo_ `[protected]`

The documentation for this class was generated from the following file:

- tgbaalgos/scc.hh

7.117 spot::scc_stack Class Reference

`#include <tgbaalgos/gtec/sccstack.hh>`

Classes

- struct connected_component

Public Types

- typedef std::list< connected_component > stack_type

Public Member Functions

- void push (int index)

  Stack a new SCC with index index.

- connected_component & top ()

  Access the top SCC.

- const connected_component & top () const

  Access the top SCC.

- void pop ()

  Pop the top SCC.

- size_t size () const

  How many SCC are in stack.

- std::list< const state ∗ > & rem ()

  The `rem` member of the top SCC.

- unsigned clear_rem ()
- bool empty () const

  Is the stack empty?

Public Attributes

- stack_type s

7.117.1 Member Typedef Documentation

7.117.1.1 typedef std::list<connected_component> spot::scc_stack::stack_type

7.117.2 Member Function Documentation

7.117.2.1 unsigned spot::scc_stack::clear_rem ( )

Purge all `rem` members.

Returns

the number of elements cleared.

7.117.2.2 bool spot::scc_stack::empty ( ) const

Is the stack empty?

7.117.2.3 void spot::scc_stack::pop ( )

Pop the top SCC.

7.117.2.4 void spot::scc_stack::push (int *index*)

Stack a new SCC with index *index*.

7.117.2.5 std::list<const state*>& spot::scc_stack::rem ( )

The `rem` member of the top SCC.

7.117.2.6 size_t spot::scc_stack::size ( ) const

How many SCC are in stack.

7.117.2.7 const connected_component& spot::scc_stack::top ( ) const

Access the top SCC.

7.117.2.8 connected_component& spot::scc_stack::top ( )

Access the top SCC.

7.117.3 Member Data Documentation

7.117.3.1 stack_type spot::scc_stack::s

The documentation for this class was generated from the following file:

- tgbaalgos/gtec/sccstack.hh

7.118 spot::scc_stats Struct Reference

`#include <tgbaalgos/scc.hh>`

Public Member Functions

- std::ostream & dump (std::ostream &out) const

Public Attributes

- unsigned scc_total

  Total number of SCCs.

- unsigned acc_scc

  Total number of accepting SCC.

- unsigned dead_scc
- unsigned acc_paths
- unsigned dead_paths
- unsigned self_loops
- std::vector< bool > useless_scc_map

  A map of the useless SCCs.

- bdd useful_acc

7.118.1 Member Function Documentation

7.118.1.1 std::ostream& spot::scc_stats::dump (std::ostream & *out*) const

7.118.2 Member Data Documentation

7.118.2.1 unsigned spot::scc_stats::acc_paths

Number of maximal accepting paths.

A path is maximal and accepting if it ends in an accepting SCC that has only dead (i.e. non accepting) successors, or no successors at all.

7.118.2.2 unsigned spot::scc_stats::acc_scc

Total number of accepting SCC.

7.118.2.3 unsigned spot::scc_stats::dead_paths

Number of paths to a terminal dead SCC.

A terminal dead SCC is a dead SCC without successors.

7.118.2.4 unsigned spot::scc_stats::dead_scc

Total number of dead SCC.

An SCC is dead if no accepting SCC is reachable from it. Note that an SCC can be neither dead nor accepting.

7.118.2.5 unsigned spot::scc_stats::scc_total

Total number of SCCs.

7.118.2.6 unsigned spot::scc_stats::self_loops

7.118.2.7 bdd spot::scc_stats::useful_acc

The set of useful acceptance conditions (i.e. acceptance conditions that are not always implied by other acceptance conditions).

7.118.2.8 std::vector<bool> spot::scc_stats::useless_scc_map

A map of the useless SCCs.

The documentation for this struct was generated from the following file:

- tgbaalgos/scc.hh

7.119 spot::sccs_set Struct Reference

`#include <tgbaalgos/cutscc.hh>`

Public Attributes

- std::set< unsigned > sccs
- unsigned size

7.119.1 Member Data Documentation

7.119.1.1 std::set<unsigned> spot::sccs_set::sccs

7.119.1.2 unsigned spot::sccs_set::size

The documentation for this struct was generated from the following file:

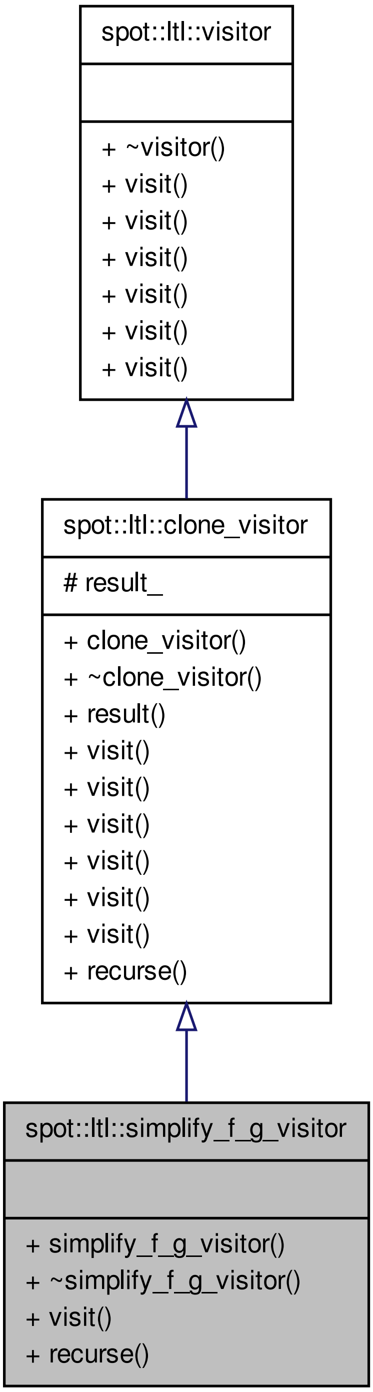
- tgbaalgos/cutscc.hh

7.120 spot::ltl::simplify_f_g_visitor Class Reference

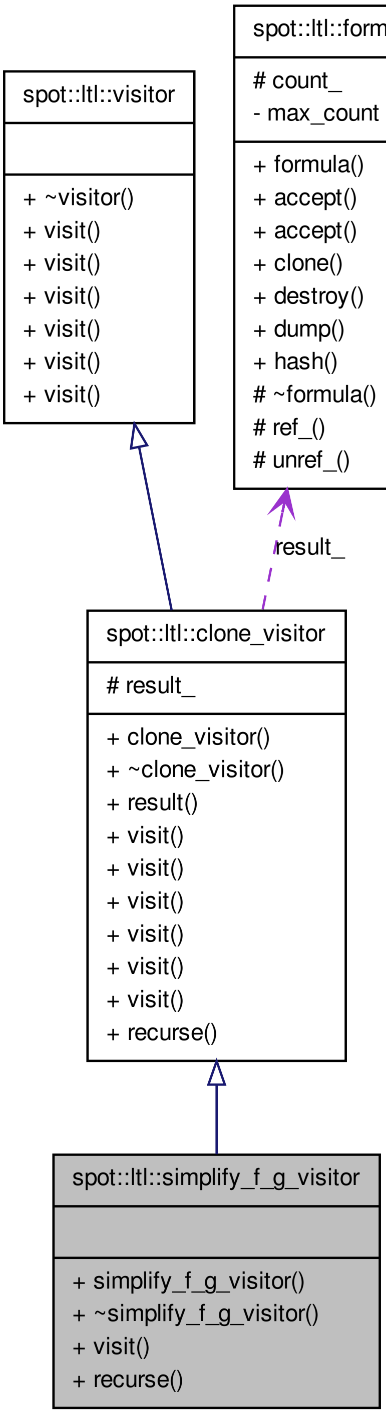
Replace `true U f` and `false R g` by `F f` and `G g`.

`#include <ltlvisit/simpfg.hh>`

Inheritance diagram for spot::ltl::simplify_f_g_visitor:



Collaboration diagram for spot::ltl::simplify_f_g_visitor:



Public Member Functions

- simplify_f_g_visitor ()
- virtual ∼simplify_f_g_visitor ()
- void visit (binop ∗bo)
- virtual formula ∗ recurse (formula ∗f)
- formula ∗ result () const
- void visit (atomic_prop ∗ap)
- void visit (unop ∗uo)
- void visit (automatop ∗mo)
- void visit (multop ∗mo)
- void visit (constant ∗c)

Protected Attributes

- formula ∗ result_

Private Types

- typedef clone_visitor super

7.120.1 Detailed Description

Replace `true U f` and `false R g` by `F f` and `G g`. Perform the following rewriting (from left to right):

- true U a = F a
- a M true = F a
- false R a = G a
- a W false = G a

7.120.2 Member Typedef Documentation

7.120.2.1 typedef clone_visitor spot::ltl::simplify_f_g_visitor::super `[private]`

7.120.3 Constructor & Destructor Documentation

7.120.3.1 spot::ltl::simplify_f_g_visitor::simplify_f_g_visitor ( )

7.120.3.2 virtual spot::ltl::simplify_f_g_visitor::∼simplify_f_g_visitor ( ) `[virtual]`

7.120.4 Member Function Documentation

7.120.4.1 virtual formula∗ spot::ltl::simplify_f_g_visitor::recurse (formula ∗ *f*) `[virtual]`

Reimplemented from spot::ltl::clone_visitor.

7.120.4.2 formula∗ spot::ltl::clone_visitor::result ( ) const `[inherited]`

7.120.4.3 void spot::ltl::clone_visitor::visit (multop ∗ *mo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.120.4.4 void spot::ltl::clone_visitor::visit (automatop ∗ *mo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.120.4.5 void spot::ltl::clone_visitor::visit (unop ∗ *uo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

Reimplemented in spot::ltl::unabbreviate_ltl_visitor.

7.120.4.6 void spot::ltl::clone_visitor::visit (atomic_prop ∗ *ap*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.120.4.7 void spot::ltl::clone_visitor::visit (constant ∗ *c*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.120.4.8 void spot::ltl::simplify_f_g_visitor::visit (binop ∗ *bo*) `[virtual]`

Reimplemented from spot::ltl::clone_visitor.

7.120.5 Member Data Documentation

7.120.5.1 formula∗ spot::ltl::clone_visitor::result_ `[protected, inherited]`

The documentation for this class was generated from the following file:

- ltlvisit/simpfg.hh

7.121 eltlyy::slice< T, S > Class Template Reference

Present a slice of the top of a stack.

`#include <eltlparse/stack.hh>`

Public Member Functions

- slice (const S &stack, unsigned int range)
- const T & operator[ ] (unsigned int i) const

Private Attributes

- const S & stack_
- unsigned int range_

7.121.1 Detailed Description

template<class T, class S = stack<T>> class eltlyy::slice< T, S >

Present a slice of the top of a stack.

7.121.2 Constructor & Destructor Documentation

7.121.2.1 template<class T , class S = stack<T>> eltlyy::slice< T, S >::slice (const S & *stack*, unsigned int *range*) `[inline]`

7.121.3 Member Function Documentation

7.121.3.1 template<class T , class S = stack<T>> const T& eltlyy::slice< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References eltlyy::slice< T, S >::range_, and eltlyy::slice< T, S >::stack_.

7.121.4 Member Data Documentation

7.121.4.1 template<class T , class S = stack<T>> unsigned int eltlyy::slice< T, S >::range_ `[private]`

Referenced by eltlyy::slice< T, S >::operator[ ]().

7.121.4.2 template<class T , class S = stack<T>> const S& eltlyy::slice< T, S >::stack_ `[private]`

Referenced by eltlyy::slice< T, S >::operator[ ]().

The documentation for this class was generated from the following file:

- eltlparse/stack.hh

7.122 neverclaimyy::slice< T, S > Class Template Reference

Present a slice of the top of a stack.

`#include <neverparse/stack.hh>`

Public Member Functions

- slice (const S &stack, unsigned int range)
- const T & operator[ ] (unsigned int i) const

Private Attributes

- const S & stack_
- unsigned int range_

7.122.1 Detailed Description

template<class T, class S = stack<T>> class neverclaimyy::slice< T, S >

Present a slice of the top of a stack.

7.122.2 Constructor & Destructor Documentation

7.122.2.1 template<class T , class S = stack<T>> neverclaimyy::slice< T, S >::slice (const S & *stack*, unsigned int *range*) `[inline]`

7.122.3 Member Function Documentation

7.122.3.1 template<class T , class S = stack<T>> const T& neverclaimyy::slice< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References neverclaimyy::slice< T, S >::range_, and neverclaimyy::slice< T, S >::stack_.

7.122.4 Member Data Documentation

7.122.4.1 template<class T , class S = stack<T>> unsigned int neverclaimyy::slice< T, S >::range_ `[private]`

Referenced by neverclaimyy::slice< T, S >::operator[ ]().

7.122.4.2 template<class T , class S = stack<T>> const S& neverclaimyy::slice< T, S >::stack_ `[private]`

Referenced by neverclaimyy::slice< T, S >::operator[ ]().

The documentation for this class was generated from the following file:

- neverparse/stack.hh

7.123 sautyy::slice< T, S > Class Template Reference

Present a slice of the top of a stack.

`#include <sautparse/stack.hh>`

Public Member Functions

- slice (const S &stack, unsigned int range)
- const T & operator[ ] (unsigned int i) const

Private Attributes

- const S & stack_
- unsigned int range_

7.123.1 Detailed Description

template<class T, class S = stack<T>> class sautyy::slice< T, S >

Present a slice of the top of a stack.

7.123.2 Constructor & Destructor Documentation

7.123.2.1 template<class T , class S = stack<T>> sautyy::slice< T, S >::slice (const S & *stack*, unsigned int *range*) `[inline]`

7.123.3 Member Function Documentation

7.123.3.1 template<class T , class S = stack<T>> const T& sautyy::slice< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References sautyy::slice< T, S >::range_, and sautyy::slice< T, S >::stack_.

7.123.4 Member Data Documentation

7.123.4.1 template<class T , class S = stack<T>> unsigned int sautyy::slice< T, S >::range_ `[private]`

Referenced by sautyy::slice< T, S >::operator[ ]().

7.123.4.2 template<class T , class S = stack<T>> const S& sautyy::slice< T, S >::stack_ `[private]`

Referenced by sautyy::slice< T, S >::operator[ ]().

The documentation for this class was generated from the following file:

- sautparse/stack.hh

7.124 ltlyy::slice< T, S > Class Template Reference

Present a slice of the top of a stack.

`#include <ltlparse/stack.hh>`

Public Member Functions

- slice (const S &stack, unsigned int range)
- const T & operator[ ] (unsigned int i) const

Private Attributes

- const S & stack_
- unsigned int range_

7.124.1 Detailed Description

template<class T, class S = stack<T>> class ltlyy::slice< T, S >

Present a slice of the top of a stack.

7.124.2 Constructor & Destructor Documentation

7.124.2.1 template<class T , class S = stack<T>> ltlyy::slice< T, S >::slice (const S & *stack*, unsigned int *range*) `[inline]`

7.124.3 Member Function Documentation

7.124.3.1 template<class T , class S = stack<T>> const T& ltlyy::slice< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References ltlyy::slice< T, S >::range_, and ltlyy::slice< T, S >::stack_.

7.124.4 Member Data Documentation

7.124.4.1 template<class T , class S = stack<T>> unsigned int ltlyy::slice< T, S >::range_ `[private]`

Referenced by ltlyy::slice< T, S >::operator[ ]().

7.124.4.2 template<class T , class S = stack<T>> const S& ltlyy::slice< T, S >::stack_ `[private]`

Referenced by ltlyy::slice< T, S >::operator[ ]().

The documentation for this class was generated from the following file:

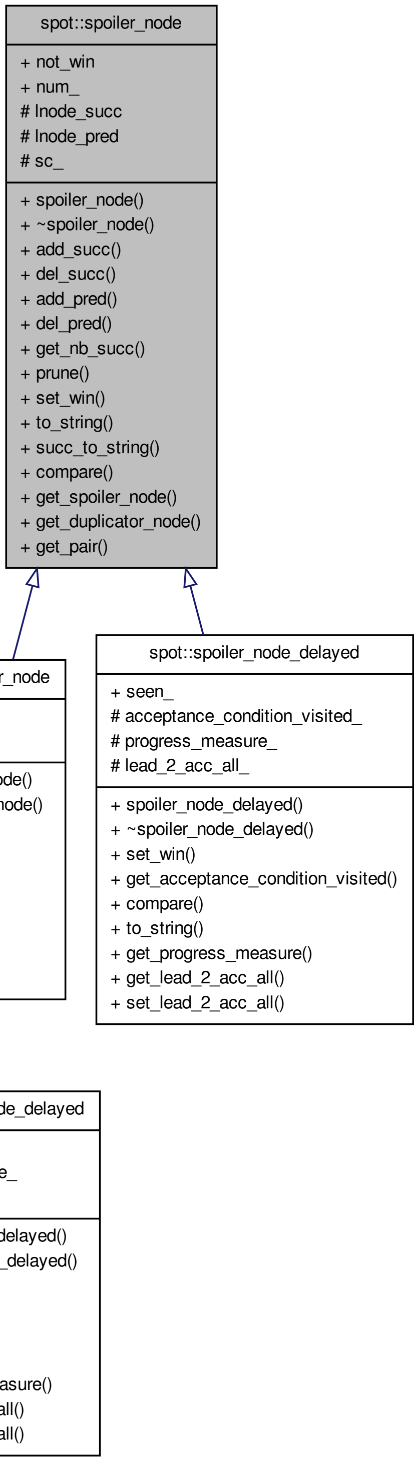
- ltlparse/stack.hh

7.125 spot::spoiler_node Class Reference

Spoiler node of parity game graph.

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::spoiler_node:



Public Member Functions

- spoiler_node (const state ∗d_node, const state ∗s_node, int num)
- virtual ∼spoiler_node ()
- bool add_succ (spoiler_node ∗n)

  Add a successor. Return true if n wasn't yet in the list of successor, false eitherwise.

- void del_succ (spoiler_node ∗n)
- virtual void add_pred (spoiler_node ∗n)
- virtual void del_pred ()
- int get_nb_succ ()
- bool prune ()
- virtual bool set_win ()
- virtual std::string to_string (const tgba ∗a)
- virtual std::string succ_to_string ()
- virtual bool compare (spoiler_node ∗n)
- const state ∗ get_spoiler_node ()
- const state ∗ get_duplicator_node ()
- state_couple ∗ get_pair ()

Public Attributes

- bool not_win
- int num_

Protected Attributes

- sn_v ∗ lnode_succ
- sn_v ∗ lnode_pred
- state_couple ∗ sc_

7.125.1 Detailed Description

Spoiler node of parity game graph.

7.125.2 Constructor & Destructor Documentation

7.125.2.1 spot::spoiler_node::spoiler_node (const state ∗ *d_node*, const state ∗ *s_node*, int *num*)

7.125.2.2 virtual spot::spoiler_node::∼spoiler_node ( ) `[virtual]`

7.125.3 Member Function Documentation

7.125.3.1 virtual void spot::spoiler_node::add_pred (spoiler_node ∗ *n*) `[virtual]`

7.125.3.2 bool spot::spoiler_node::add_succ (spoiler_node ∗ *n*)

Add a successor. Return true if *n* wasn't yet in the list of successor, false eitherwise.

7.125.3.3 virtual bool spot::spoiler_node::compare (spoiler_node ∗ *n*) `[virtual]`

Reimplemented in spot::duplicator_node, and spot::spoiler_node_delayed.

7.125.3.4 virtual void spot::spoiler_node::del_pred ( ) `[virtual]`

7.125.3.5 void spot::spoiler_node::del_succ (spoiler_node ∗ *n*)

7.125.3.6 const state∗ spot::spoiler_node::get_duplicator_node ( )

7.125.3.7 int spot::spoiler_node::get_nb_succ ( )

7.125.3.8 state_couple∗ spot::spoiler_node::get_pair ( )

7.125.3.9 const state∗ spot::spoiler_node::get_spoiler_node ( )

7.125.3.10 bool spot::spoiler_node::prune ( )

7.125.3.11 virtual bool spot::spoiler_node::set_win ( ) `[virtual]`

Reimplemented in spot::duplicator_node, spot::spoiler_node_delayed, and spot::duplicator_node_delayed.

7.125.3.12 virtual std::string spot::spoiler_node::succ_to_string ( ) `[virtual]`

7.125.3.13 virtual std::string spot::spoiler_node::to_string (const tgba ∗ *a*) `[virtual]`

Reimplemented in spot::duplicator_node, spot::spoiler_node_delayed, and spot::duplicator_node_delayed.

7.125.4 Member Data Documentation

7.125.4.1 sn_v∗ spot::spoiler_node::lnode_pred `[protected]`

7.125.4.2 sn_v∗ spot::spoiler_node::lnode_succ `[protected]`

7.125.4.3 bool spot::spoiler_node::not_win

7.125.4.4 int spot::spoiler_node::num_

7.125.4.5 state_couple∗ spot::spoiler_node::sc_ `[protected]`

The documentation for this class was generated from the following file:

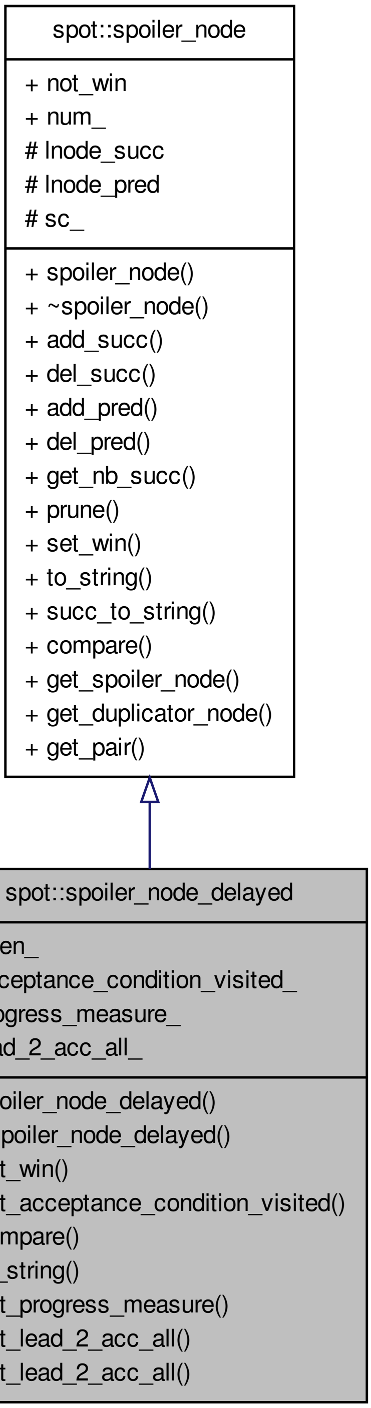
- tgbaalgos/reductgba_sim.hh

7.126 spot::spoiler_node_delayed Class Reference

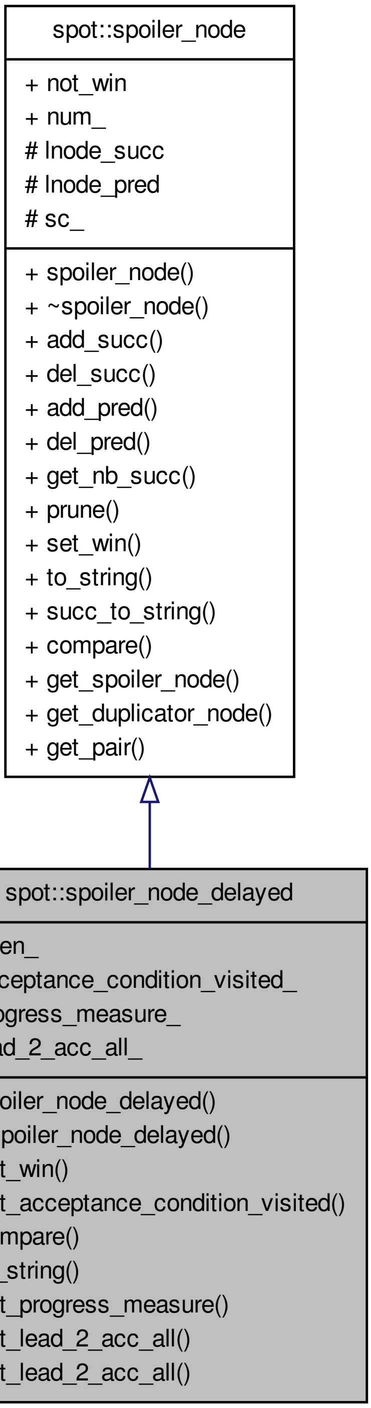
Spoiler node of parity game graph for delayed simulation.

`#include <tgbaalgos/reductgba_sim.hh>`

Inheritance diagram for spot::spoiler_node_delayed:



Collaboration diagram for spot::spoiler_node_delayed:



Public Member Functions

- spoiler_node_delayed (const state ∗d_node, const state ∗s_node, bdd a, int num)
- ∼spoiler_node_delayed ()
- bool set_win ()

  Return true if the progress_measure has changed.

- bdd get_acceptance_condition_visited () const
- virtual bool compare (spoiler_node ∗n)
- virtual std::string to_string (const tgba ∗a)
- int get_progress_measure () const
- bool get_lead_2_acc_all ()
- bool set_lead_2_acc_all (bdd acc=bddfalse)
- bool add_succ (spoiler_node ∗n)

  Add a successor. Return true if n wasn't yet in the list of successor, false eitherwise.

- void del_succ (spoiler_node ∗n)
- virtual void add_pred (spoiler_node ∗n)
- virtual void del_pred ()
- int get_nb_succ ()
- bool prune ()
- virtual std::string succ_to_string ()
- const state ∗ get_spoiler_node ()
- const state ∗ get_duplicator_node ()
- state_couple ∗ get_pair ()

Public Attributes

- bool seen_
- bool not_win
- int num_

Protected Attributes

- bdd acceptance_condition_visited_
- int progress_measure_
- bool lead_2_acc_all_
- sn_v ∗ lnode_succ
- sn_v ∗ lnode_pred
- state_couple ∗ sc_

7.126.1 Detailed Description

Spoiler node of parity game graph for delayed simulation.

7.126.2 Constructor & Destructor Documentation

7.126.2.1 spot::spoiler_node_delayed::spoiler_node_delayed (const state ∗ *d_node*, const state ∗ *s_node*, bdd *a*, int *num*)

7.126.2.2 spot::spoiler_node_delayed::∼spoiler_node_delayed ( )

7.126.3 Member Function Documentation

7.126.3.1 virtual void spot::spoiler_node::add_pred (spoiler_node ∗ *n*) `[virtual, inherited]`

7.126.3.2 bool spot::spoiler_node::add_succ (spoiler_node ∗ *n*) `[inherited]`

Add a successor. Return true if *n* wasn't yet in the list of successor, false eitherwise.

7.126.3.3 virtual bool spot::spoiler_node_delayed::compare (spoiler_node ∗ *n*) `[virtual]`

Reimplemented from spot::spoiler_node.

7.126.3.4 virtual void spot::spoiler_node::del_pred ( ) `[virtual, inherited]`

7.126.3.5 void spot::spoiler_node::del_succ (spoiler_node ∗ *n*) `[inherited]`

7.126.3.6 bdd spot::spoiler_node_delayed::get_acceptance_condition_visited ( ) const

7.126.3.7 const state∗ spot::spoiler_node::get_duplicator_node ( ) `[inherited]`

7.126.3.8 bool spot::spoiler_node_delayed::get_lead_2_acc_all ( )

7.126.3.9 int spot::spoiler_node::get_nb_succ ( ) `[inherited]`

7.126.3.10 state_couple∗ spot::spoiler_node::get_pair ( ) `[inherited]`

7.126.3.11 int spot::spoiler_node_delayed::get_progress_measure ( ) const

7.126.3.12 const state∗ spot::spoiler_node::get_spoiler_node ( ) `[inherited]`

7.126.3.13 bool spot::spoiler_node::prune ( ) `[inherited]`

7.126.3.14 bool spot::spoiler_node_delayed::set_lead_2_acc_all (bdd *acc* = `bddfalse`)

7.126.3.15 bool spot::spoiler_node_delayed::set_win ( ) `[virtual]`

Return true if the progress_measure has changed.

Reimplemented from spot::spoiler_node.

7.126.3.16 virtual std::string spot::spoiler_node::succ_to_string ( ) `[virtual, inherited]`

7.126.3.17 virtual std::string spot::spoiler_node_delayed::to_string (const tgba ∗ *a*) `[virtual]`

Reimplemented from spot::spoiler_node.

7.126.4 Member Data Documentation

7.126.4.1 bdd spot::spoiler_node_delayed::acceptance_condition_visited_ `[protected]`

a Bdd for retain all the acceptance condition that a node has visited.

7.126.4.2 bool spot::spoiler_node_delayed::lead_2_acc_all_ `[protected]`

7.126.4.3 sn_v∗ spot::spoiler_node::lnode_pred `[protected, inherited]`

7.126.4.4 sn_v∗ spot::spoiler_node::lnode_succ `[protected, inherited]`

7.126.4.5 bool spot::spoiler_node::not_win `[inherited]`

7.126.4.6 int spot::spoiler_node::num_ `[inherited]`

7.126.4.7 int spot::spoiler_node_delayed::progress_measure_ `[protected]`

7.126.4.8 state_couple∗ spot::spoiler_node::sc_ `[protected, inherited]`

7.126.4.9 bool spot::spoiler_node_delayed::seen_

The documentation for this class was generated from the following file:

- tgbaalgos/reductgba_sim.hh

7.127 neverclaimyy::stack< T, S > Class Template Reference

`#include <neverparse/stack.hh>`

Public Types

- typedef S::reverse_iterator iterator
- typedef S::const_reverse_iterator const_iterator

Public Member Functions

- stack ()
- stack (unsigned int n)
- T & operator[ ] (unsigned int i)
- const T & operator[ ] (unsigned int i) const

- void push (const T &t)
- void pop (unsigned int n=1)
- unsigned int height () const
- const_iterator begin () const
- const_iterator end () const

Private Attributes

- S seq_

template<class T, class S = std::deque<T>> class neverclaimyy::stack< T, S >

7.127.1 Member Typedef Documentation

7.127.1.1 template<class T , class S = std::deque<T>> typedef S::const_reverse_iterator neverclaimyy::stack< T, S >::const_iterator

7.127.1.2 template<class T , class S = std::deque<T>> typedef S::reverse_iterator neverclaimyy::stack< T, S >::iterator

7.127.2 Constructor & Destructor Documentation

7.127.2.1 template<class T , class S = std::deque<T>> neverclaimyy::stack< T, S >::stack ( ) `[inline]`

7.127.2.2 template<class T , class S = std::deque<T>> neverclaimyy::stack< T, S >::stack (unsigned int *n*) `[inline]`

7.127.3 Member Function Documentation

7.127.3.1 template<class T , class S = std::deque<T>> const_iterator neverclaimyy::stack< T, S >::begin ( ) const `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.3.2 template<class T , class S = std::deque<T>> const_iterator neverclaimyy::stack< T, S >::end ( ) const `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.3.3 template<class T , class S = std::deque<T>> unsigned int neverclaimyy::stack< T, S >::height ( ) const `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.3.4 template<class T , class S = std::deque<T>> const T& neverclaimyy::stack< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.3.5 template<class T , class S = std::deque<T>> T& neverclaimyy::stack< T, S >::operator[ ] (unsigned int *i*) `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.3.6 template<class T , class S = std::deque<T>> void neverclaimyy::stack< T, S >::pop (unsigned int *n* = *1*) `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.3.7 template<class T , class S = std::deque<T>> void neverclaimyy::stack< T, S >::push (const T & *t*) `[inline]`

References neverclaimyy::stack< T, S >::seq_.

7.127.4 Member Data Documentation

7.127.4.1 template<class T , class S = std::deque<T>> S neverclaimyy::stack< T, S >::seq_ `[private]`

Referenced by neverclaimyy::stack< T, S >::begin(), neverclaimyy::stack< T, S >::end(), neverclaimyy::stack< T, S >::height(), neverclaimyy::stack< T, S >::operator[ ](), neverclaimyy::stack< T, S >::pop(), and neverclaimyy::stack< T, S >::push().

The documentation for this class was generated from the following file:

- neverparse/stack.hh

7.128 sautyy::stack< T, S > Class Template Reference

`#include <sautparse/stack.hh>`

Public Types

- typedef S::reverse_iterator iterator
- typedef S::const_reverse_iterator const_iterator

Public Member Functions

- stack ()
- stack (unsigned int n)
- T & operator[ ] (unsigned int i)
- const T & operator[ ] (unsigned int i) const
- void push (const T &t)
- void pop (unsigned int n=1)
- unsigned int height () const
- const_iterator begin () const
- const_iterator end () const

Private Attributes

- S seq_

template<class T, class S = std::deque<T>> class sautyy::stack< T, S >

7.128.1 Member Typedef Documentation

7.128.1.1 template<class T , class S = std::deque<T>> typedef S::const_reverse_iterator sautyy::stack< T, S >::const_iterator

7.128.1.2 template<class T , class S = std::deque<T>> typedef S::reverse_iterator sautyy::stack< T, S >::iterator

7.128.2 Constructor & Destructor Documentation

7.128.2.1 template<class T , class S = std::deque<T>> sautyy::stack< T, S >::stack ( ) `[inline]`

7.128.2.2 template<class T , class S = std::deque<T>> sautyy::stack< T, S >::stack (unsigned int *n*) `[inline]`

7.128.3 Member Function Documentation

7.128.3.1 template<class T , class S = std::deque<T>> const_iterator sautyy::stack< T, S >::begin ( ) const `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.3.2 template<class T , class S = std::deque<T>> const_iterator sautyy::stack< T, S >::end ( ) const `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.3.3 template<class T , class S = std::deque<T>> unsigned int sautyy::stack< T, S >::height ( ) const `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.3.4 template<class T , class S = std::deque<T>> const T& sautyy::stack< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.3.5 template<class T , class S = std::deque<T>> T& sautyy::stack< T, S >::operator[ ] (unsigned int *i*) `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.3.6 template<class T , class S = std::deque<T>> void sautyy::stack< T, S >::pop (unsigned int *n* = `1`) `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.3.7 template<class T , class S = std::deque<T>> void sautyy::stack< T, S >::push (const T & *t*) `[inline]`

References sautyy::stack< T, S >::seq_.

7.128.4 Member Data Documentation

7.128.4.1 template<class T , class S = std::deque<T>> S sautyy::stack< T, S >::seq_ `[private]`

Referenced by sautyy::stack< T, S >::begin(), sautyy::stack< T, S >::end(), sautyy::stack< T, S >::height(), sautyy::stack< T, S >::operator[ ](), sautyy::stack< T, S >::pop(), and sautyy::stack< T, S >::push().

The documentation for this class was generated from the following file:

- sautparse/stack.hh

7.129 eltlyy::stack< T, S > Class Template Reference

`#include <eltlparse/stack.hh>`

Public Types

- typedef S::reverse_iterator iterator
- typedef S::const_reverse_iterator const_iterator

Public Member Functions

- stack ()
- stack (unsigned int n)
- T & operator[ ] (unsigned int i)
- const T & operator[ ] (unsigned int i) const
- void push (const T &t)
- void pop (unsigned int n=1)
- unsigned int height () const
- const_iterator begin () const
- const_iterator end () const

Private Attributes

- S seq_

template<class T, class S = std::deque<T>> class eltlyy::stack< T, S >

7.129.1 Member Typedef Documentation

7.129.1.1 template<class T , class S = std::deque<T>> typedef S::const_reverse_iterator eltlyy::stack< T, S >::const_iterator

7.129.1.2 template<class T , class S = std::deque<T>> typedef S::reverse_iterator eltlyy::stack< T, S >::iterator

7.129.2 Constructor & Destructor Documentation

7.129.2.1 template<class T , class S = std::deque<T>> eltlyy::stack< T, S >::stack ( ) `[inline]`

7.129.2.2 template<class T , class S = std::deque<T>> eltlyy::stack< T, S >::stack (unsigned int *n*) `[inline]`

7.129.3 Member Function Documentation

7.129.3.1 template<class T , class S = std::deque<T>> const_iterator eltlyy::stack< T, S >::begin ( ) const `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.3.2 template<class T , class S = std::deque<T>> const_iterator eltlyy::stack< T, S >::end ( ) const `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.3.3 template<class T , class S = std::deque<T>> unsigned int eltlyy::stack< T, S >::height ( ) const `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.3.4 template<class T , class S = std::deque<T>> const T& eltlyy::stack< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.3.5 template<class T , class S = std::deque<T>> T& eltlyy::stack< T, S >::operator[ ] (unsigned int *i*) `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.3.6 template<class T , class S = std::deque<T>> void eltlyy::stack< T, S >::pop (unsigned int *n* = `1`) `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.3.7 template<class T , class S = std::deque<T>> void eltlyy::stack< T, S >::push (const T & *t*) `[inline]`

References eltlyy::stack< T, S >::seq_.

7.129.4 Member Data Documentation

7.129.4.1 template<class T , class S = std::deque<T>> S eltlyy::stack< T, S >::seq_ `[private]`

Referenced by eltlyy::stack< T, S >::begin(), eltlyy::stack< T, S >::end(), eltlyy::stack< T, S >::height(), eltlyy::stack< T, S >::operator[ ](), eltlyy::stack< T, S >::pop(), and eltlyy::stack< T, S >::push().

The documentation for this class was generated from the following file:

- eltlparse/stack.hh

7.130 ltlyy::stack< T, S > Class Template Reference

`#include <ltlparse/stack.hh>`

Public Types

- typedef S::reverse_iterator iterator
- typedef S::const_reverse_iterator const_iterator

Public Member Functions

- stack ()
- stack (unsigned int n)
- T & operator[ ] (unsigned int i)
- const T & operator[ ] (unsigned int i) const
- void push (const T &t)
- void pop (unsigned int n=1)
- unsigned int height () const
- const_iterator begin () const
- const_iterator end () const

Private Attributes

- S seq_

template<class T, class S = std::deque<T>> class ltlyy::stack< T, S >

7.130.1 Member Typedef Documentation

7.130.1.1 template<class T , class S = std::deque<T>> typedef S::const_reverse_iterator ltlyy::stack< T, S >::const_iterator

7.130.1.2 template<class T , class S = std::deque<T>> typedef S::reverse_iterator ltlyy::stack< T, S >::iterator

7.130.2 Constructor & Destructor Documentation

7.130.2.1 template<class T , class S = std::deque<T>> ltlyy::stack< T, S >::stack ( ) `[inline]`

7.130.2.2 template<class T , class S = std::deque<T>> ltlyy::stack< T, S >::stack (unsigned int *n*) `[inline]`

7.130.3 Member Function Documentation

7.130.3.1 template<class T , class S = std::deque<T>> const_iterator ltlyy::stack< T, S >::begin ( ) const `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.3.2 template<class T , class S = std::deque<T>> const_iterator ltlyy::stack< T, S >::end ( ) const `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.3.3 template<class T , class S = std::deque<T>> unsigned int ltlyy::stack< T, S >::height ( ) const `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.3.4 template<class T , class S = std::deque<T>> const T& ltlyy::stack< T, S >::operator[ ] (unsigned int *i*) const `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.3.5 template<class T , class S = std::deque<T>> T& ltlyy::stack< T, S >::operator[ ] (unsigned int *i*) `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.3.6 template<class T , class S = std::deque<T>> void ltlyy::stack< T, S >::pop (unsigned int *n* = *1*) `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.3.7 template<class T , class S = std::deque<T>> void ltlyy::stack< T, S >::push (const T & *t*) `[inline]`

References ltlyy::stack< T, S >::seq_.

7.130.4 Member Data Documentation

7.130.4.1 template<class T , class S = std::deque<T>> S ltlyy::stack< T, S >::seq_ `[private]`

Referenced by ltlyy::stack< T, S >::begin(), ltlyy::stack< T, S >::end(), ltlyy::stack< T, S >::height(), ltlyy::stack< T, S >::operator[ ](), ltlyy::stack< T, S >::pop(), and ltlyy::stack< T, S >::push().

The documentation for this class was generated from the following file:

- ltlparse/stack.hh

7.131 spot::evtgba_explicit::state Struct Reference

`#include <evtgba/explicit.hh>`

Public Attributes

- transition_list in
- transition_list out

7.131.1 Member Data Documentation

7.131.1.1 transition_list spot::evtgba_explicit::state::in

7.131.1.2 transition_list spot::evtgba_explicit::state::out

The documentation for this struct was generated from the following file:

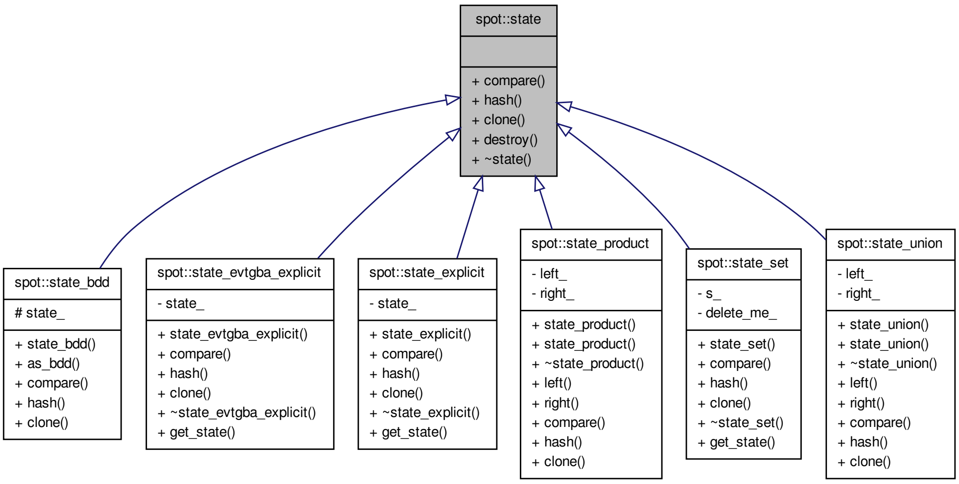
- evtgba/explicit.hh

7.132 spot::state Class Reference

Abstract class for states.

`#include <tgba/state.hh>`

Inheritance diagram for spot::state:



Public Member Functions

- virtual int compare (const state ∗other) const =0

  Compares two states (that come from the same automaton).

- virtual size_t hash () const =0

  Hash a state.

- virtual state ∗ clone () const =0

  Duplicate a state.

- virtual void destroy () const

  Release a state.

- virtual ∼state ()

  Destructor.

7.132.1 Detailed Description

Abstract class for states.

7.132.2 Constructor & Destructor Documentation

7.132.2.1 virtual spot::state::∼state ( ) `[inline, virtual]`

Destructor.

Deprecated

> Client code should now call `s->destroy();` instead of `delete s;`.

7.132.3 Member Function Documentation

7.132.3.1 virtual state∗ spot::state::clone ( ) const `[pure virtual]`

Duplicate a state.

Implemented in spot::state_evtgba_explicit, spot::state_bdd, spot::state_set, spot::state_explicit, spot::state_product, and spot::state_union.

7.132.3.2 virtual int spot::state::compare (const state ∗ *other*) const `[pure virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implemented in spot::state_evtgba_explicit, spot::state_bdd, spot::state_set, spot::state_explicit, spot::state_product, and spot::state_union.

Referenced by spot::state_ptr_equal::operator()(), and spot::state_ptr_less_than::operator()().

7.132.3.3 virtual void spot::state::destroy ( ) const `[inline, virtual]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.132.3.4 virtual size_t spot::state::hash ( ) const `[pure virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implemented in spot::state_evtgba_explicit, spot::state_bdd, spot::state_set, spot::state_explicit, spot::state_product, and spot::state_union.

Referenced by spot::state_ptr_hash::operator()().

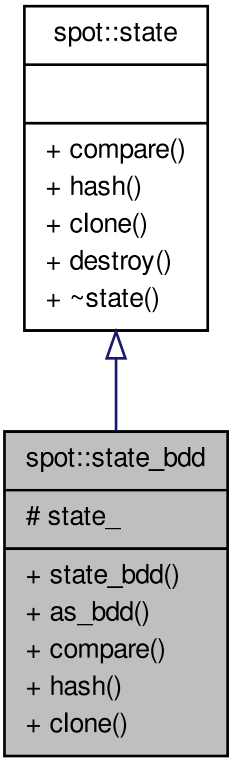
The documentation for this class was generated from the following file:

- tgba/state.hh

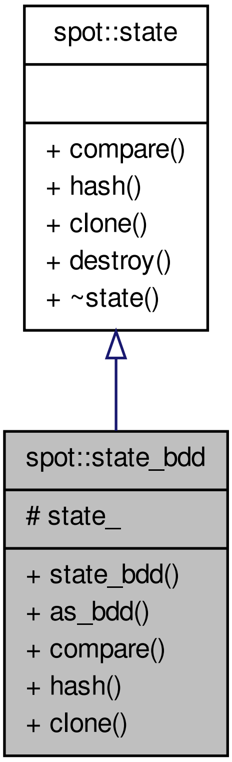
7.133 spot::state_bdd Class Reference

`#include <tgba/statebdd.hh>`

Inheritance diagram for spot::state_bdd:



Collaboration diagram for spot::state_bdd:



Public Member Functions

- state_bdd (bdd s)
- virtual bdd as_bdd () const

  Return the BDD part of the state.

- virtual int compare (const state ∗other) const

  Compares two states (that come from the same automaton).

- virtual size_t hash () const

  Hash a state.

- virtual state_bdd ∗ clone () const

  Duplicate a state.

- virtual void destroy () const

  Release a state.

Protected Attributes

- bdd state_

  BDD representation of the state.

7.133.1 Detailed Description

A state whose representation is a BDD.

7.133.2 Constructor & Destructor Documentation

7.133.2.1 spot::state_bdd::state_bdd (bdd *s*) `[inline]`

7.133.3 Member Function Documentation

7.133.3.1 virtual bdd spot::state_bdd::as_bdd ( ) const `[inline, virtual]`

Return the BDD part of the state.

References state_.

7.133.3.2 virtual state_bdd∗ spot::state_bdd::clone ( ) const `[virtual]`

Duplicate a state.

Implements spot::state.

7.133.3.3 virtual int spot::state_bdd::compare (const state ∗ *other*) const `[virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implements spot::state.

7.133.3.4 virtual void spot::state::destroy ( ) const `[inline, virtual, inherited]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.133.3.5 virtual size_t spot::state_bdd::hash ( ) const `[virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implements spot::state.

7.133.4 Member Data Documentation

7.133.4.1 bdd spot::state_bdd::state_ `[protected]`

BDD representation of the state.

Referenced by as_bdd().

The documentation for this class was generated from the following file:

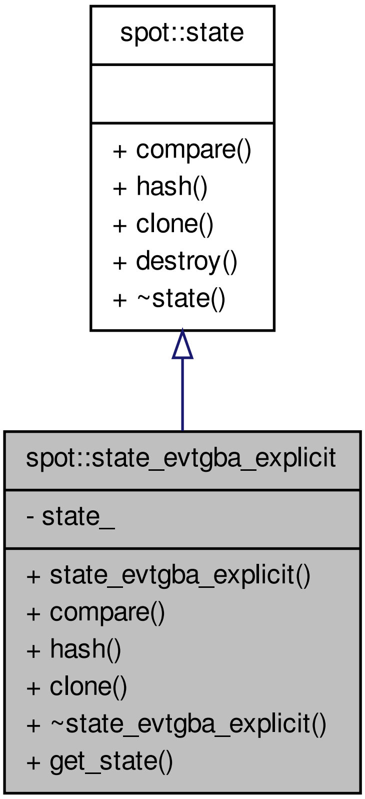
- tgba/statebdd.hh

7.134 spot::state_evtgba_explicit Class Reference

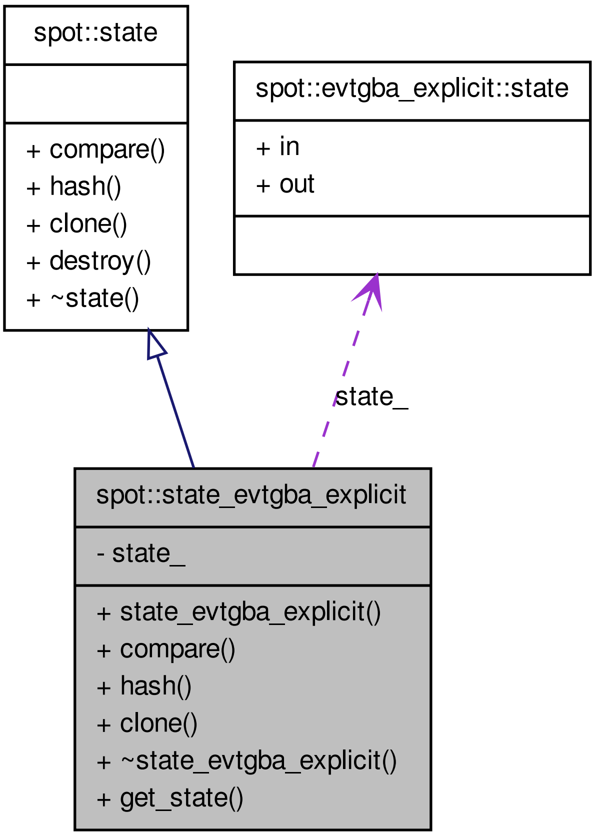
States used by spot::tgba_evtgba_explicit.

`#include <evtgba/explicit.hh>`

Inheritance diagram for spot::state_evtgba_explicit:



Collaboration diagram for spot::state_evtgba_explicit:



Public Member Functions

- state_evtgba_explicit (const evtgba_explicit::state ∗s)
- virtual int compare (const spot::state ∗other) const

  Compares two states (that come from the same automaton).

- virtual size_t hash () const

  Hash a state.

- virtual state_evtgba_explicit ∗ clone () const

  Duplicate a state.

- virtual ∼state_evtgba_explicit ()
- const evtgba_explicit::state ∗ get_state () const
- virtual void destroy () const

Release a state.

Private Attributes

- const evtgba_explicit::state ∗ state_

7.134.1 Detailed Description

States used by spot::tgba_evtgba_explicit.

7.134.2 Constructor & Destructor Documentation

7.134.2.1 spot::state_evtgba_explicit::state_evtgba_explicit (const evtgba_explicit::state ∗ *s*) `[inline]`

7.134.2.2 virtual spot::state_evtgba_explicit::∼state_evtgba_explicit ( ) `[inline, virtual]`

7.134.3 Member Function Documentation

7.134.3.1 virtual state_evtgba_explicit∗ spot::state_evtgba_explicit::clone ( ) const `[virtual]`

Duplicate a state.

Implements spot::state.

7.134.3.2 virtual int spot::state_evtgba_explicit::compare (const spot::state ∗ *other*) const `[virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implements spot::state.

7.134.3.3 virtual void spot::state::destroy ( ) const `[inline, virtual, inherited]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.134.3.4 const evtgba_explicit::state∗ spot::state_evtgba_explicit::get_state ( ) const

7.134.3.5 virtual size_t spot::state_evtgba_explicit::hash ( ) const `[virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implements spot::state.

7.134.4 Member Data Documentation

7.134.4.1 const evtgba_explicit::state∗ spot::state_evtgba_explicit::state_ `[private]`

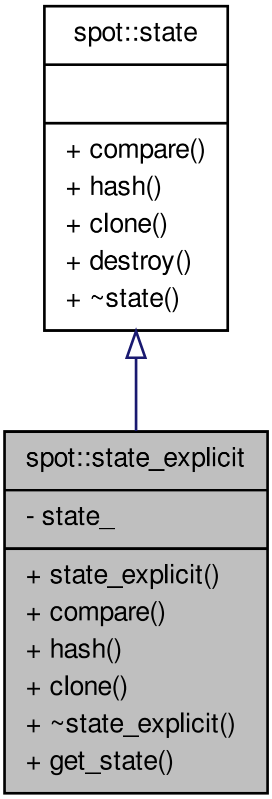
The documentation for this class was generated from the following file:

- evtgba/explicit.hh

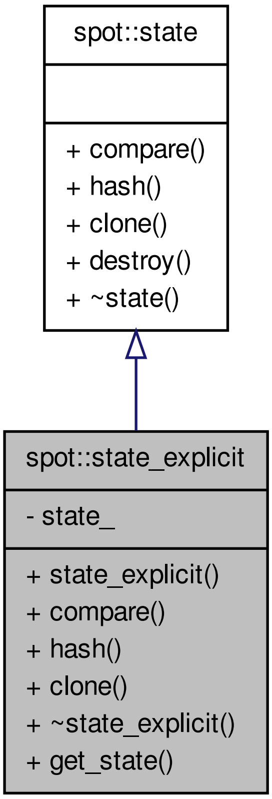
7.135 spot::state_explicit Class Reference

`#include <tgba/tgbaexplicit.hh>`

Inheritance diagram for spot::state_explicit:



Collaboration diagram for spot::state_explicit:



Public Member Functions

- state_explicit (const tgba_explicit::state ∗s)
- virtual int compare (const spot::state ∗other) const

  Compares two states (that come from the same automaton).

- virtual size_t hash () const

  Hash a state.

- virtual state_explicit ∗ clone () const

  Duplicate a state.

- virtual ∼state_explicit ()
- const tgba_explicit::state ∗ get_state () const
- virtual void destroy () const

  Release a state.

Private Attributes

- const tgba_explicit::state ∗ state_

7.135.1 Detailed Description

States used by spot::tgba_explicit.

7.135.2 Constructor & Destructor Documentation

7.135.2.1 spot::state_explicit::state_explicit (const tgba_explicit::state ∗ *s*) `[inline]`

7.135.2.2 virtual spot::state_explicit::∼state_explicit ( ) `[inline, virtual]`

7.135.3 Member Function Documentation

7.135.3.1 virtual state_explicit∗ spot::state_explicit::clone ( ) const `[virtual]`

Duplicate a state.

Implements spot::state.

7.135.3.2 virtual int spot::state_explicit::compare (const spot::state ∗ *other*) const `[virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implements spot::state.

7.135.3.3 virtual void spot::state::destroy ( ) const `[inline, virtual, inherited]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.135.3.4 const tgba_explicit::state∗ spot::state_explicit::get_state ( ) const

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::get_label().

7.135.3.5 virtual size_t spot::state_explicit::hash ( ) const `[virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implements spot::state.

7.135.4 Member Data Documentation

7.135.4.1 const tgba_explicit::state∗ spot::state_explicit::state_ `[private]`

The documentation for this class was generated from the following file:

- tgba/tgbaexplicit.hh

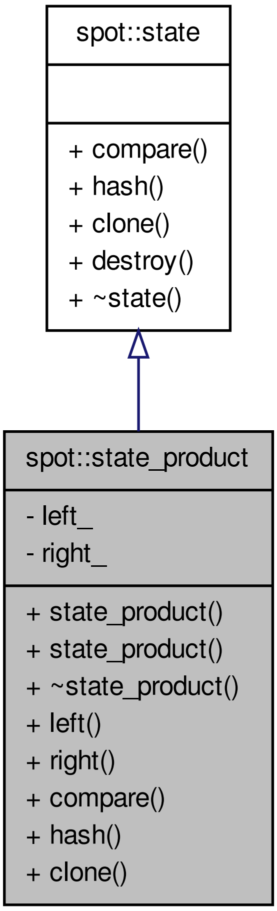
7.136 spot::state_product Class Reference

A state for spot::tgba_product.

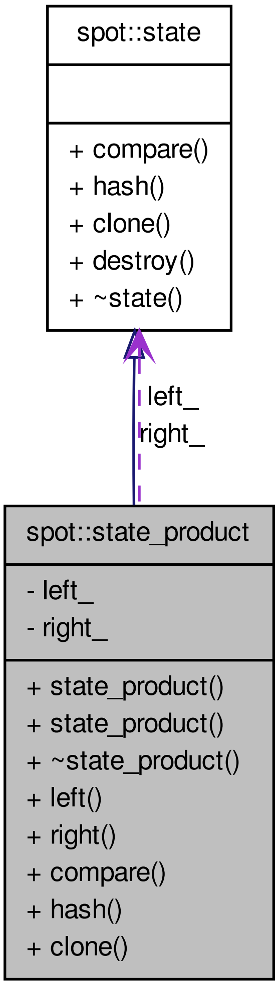
This state is in fact a pair of state: the state from the left automaton and that of the right.

`#include <tgba/tgbaproduct.hh>`

Inheritance diagram for spot::state_product:



Collaboration diagram for spot::state_product:



Public Member Functions

- state_product (state ∗left, state ∗right)

  Constructor.

- state_product (const state_product &o)

  Copy constructor.

- virtual ∼state_product ()
- state ∗ left () const
- state ∗ right () const

- virtual int compare (const state ∗other) const

  Compares two states (that come from the same automaton).
- virtual size_t hash () const

  Hash a state.
- virtual state_product ∗ clone () const

  Duplicate a state.
- virtual void destroy () const

  Release a state.

Private Attributes

- state ∗ left_

  State from the left automaton.
- state ∗ right_

  State from the right automaton.

7.136.1 Detailed Description

A state for spot::tgba_product.

This state is in fact a pair of state: the state from the left automaton and that of the right.

7.136.2 Constructor & Destructor Documentation

7.136.2.1 spot::state_product::state_product (state ∗ *left*, state ∗ *right*) `[inline]`

Constructor.

Parameters

left The state from the left automaton.

right The state from the right automaton. These states are acquired by spot::state_product, and will be destroyed on destruction.

7.136.2.2 spot::state_product::state_product (const state_product & *o*)

Copy constructor.

7.136.2.3 virtual spot::state_product::∼state_product ( ) `[virtual]`

7.136.3 Member Function Documentation

7.136.3.1 virtual state_product∗ spot::state_product::clone ( ) const `[virtual]`

Duplicate a state.

Implements spot::state.

7.136.3.2 virtual int spot::state_product::compare (const state ∗ *other*) const `[virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implements spot::state.

7.136.3.3 virtual void spot::state::destroy ( ) const `[inline, virtual, inherited]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.136.3.4 virtual size_t spot::state_product::hash ( ) const `[virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implements spot::state.

7.136.3.5 state∗ spot::state_product::left ( ) const `[inline]`

References left_.

7.136.3.6 state∗ spot::state_product::right ( ) const `[inline]`

References right_.

7.136.4 Member Data Documentation

7.136.4.1 state∗ spot::state_product::left_ `[private]`

State from the left automaton.

Referenced by left().

7.136.4.2 state∗ spot::state_product::right_ `[private]`

State from the right automaton.

Referenced by right().

The documentation for this class was generated from the following file:

- tgba/tgbaproduct.hh

7.137 spot::state_ptr_equal Struct Reference

An Equivalence Relation for `state*`.

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `state*`.

`#include <tgba/state.hh>`

Public Member Functions

- bool operator() (const state ∗left, const state ∗right) const

7.137.1 Detailed Description

An Equivalence Relation for `state*`.

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `state*`. For instance here is how one could declare a map of `state*`.

```
// Remember how many times each state has been visited.
Sgi::hash_map<spot::state*, int, spot::state_ptr_hash,
                                 spot::state_ptr_equal> seen;
```

7.137.2 Member Function Documentation

7.137.2.1 bool spot::state_ptr_equal::operator() (const state ∗ *left*, const state ∗ *right*) const `[inline]`

References spot::state::compare().

The documentation for this struct was generated from the following file:

- tgba/state.hh

7.138 spot::state_ptr_hash Struct Reference

Hash Function for `state*`.

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `state*`.

`#include <tgba/state.hh>`

Public Member Functions

- size_t operator() (const state ∗that) const

7.138.1 Detailed Description

Hash Function for `state*`.

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `state*`. For instance here is how one could declare a map of `state*`.

```
// Remember how many times each state has been visited.
Sgi::hash_map<spot::state*, int, spot::state_ptr_hash,
                                 spot::state_ptr_equal> seen;
```

7.138.2 Member Function Documentation

7.138.2.1 size_t spot::state_ptr_hash::operator() (const state ∗ *that*) const `[inline]`

References spot::state::hash().

The documentation for this struct was generated from the following file:

- tgba/state.hh

7.139 spot::state_ptr_less_than Struct Reference

Strict Weak Ordering for `state*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `state*`.

`#include <tgba/state.hh>`

Public Member Functions

- bool operator() (const state ∗left, const state ∗right) const

7.139.1 Detailed Description

Strict Weak Ordering for `state*`.

This is meant to be used as a comparison functor for STL `map` whose key are of type `state*`. For instance here is how one could declare a map of `state*`.

```
// Remember how many times each state has been visited.
std::map<spot::state*, int, spot::state_ptr_less_than> seen;
```

7.139.2 Member Function Documentation

7.139.2.1 bool spot::state_ptr_less_than::operator() (const state ∗ *left,* const state ∗ *right*) const `[inline]`

References spot::state::compare().

The documentation for this struct was generated from the following file:

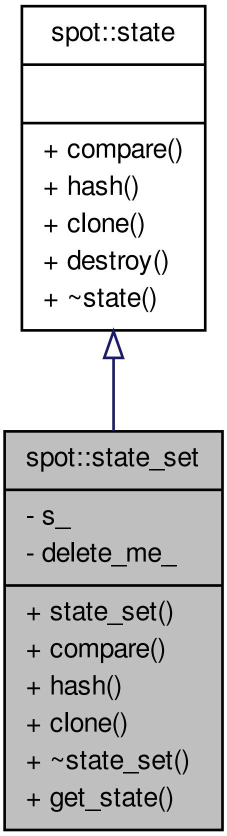
- tgba/state.hh

7.140 spot::state_set Class Reference

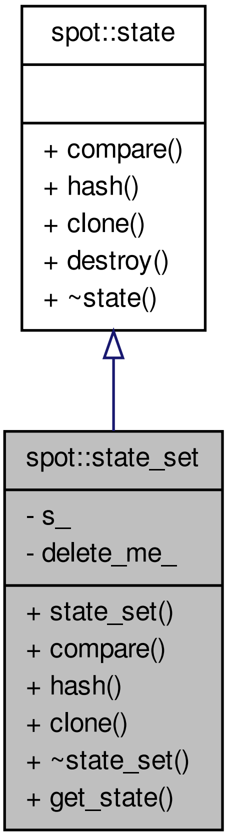
Set of states deriving from spot::state.

`#include <tgba/taatgba.hh>`

Inheritance diagram for spot::state_set:



Collaboration diagram for spot::state_set:



Public Member Functions

- state_set (const taa_tgba::state_set ∗s, bool delete_me=false)
- virtual int compare (const spot::state ∗) const

  Compares two states (that come from the same automaton).

- virtual size_t hash () const

  Hash a state.

- virtual state_set ∗ clone () const

  Duplicate a state.

- virtual ∼state_set ()
- const taa_tgba::state_set ∗ get_state () const
- virtual void destroy () const

Release a state.

Private Attributes

- const taa_tgba::state_set ∗ s_
- bool delete_me_

7.140.1 Detailed Description

Set of states deriving from spot::state.

7.140.2 Constructor & Destructor Documentation

7.140.2.1 spot::state_set::state_set (const taa_tgba::state_set ∗ *s*, bool *delete_me* = `false`) `[inline]`

7.140.2.2 virtual spot::state_set::∼state_set ( ) `[inline, virtual]`

References delete_me_, and s_.

7.140.3 Member Function Documentation

7.140.3.1 virtual state_set∗ spot::state_set::clone ( ) const `[virtual]`

Duplicate a state.

Implements spot::state.

7.140.3.2 virtual int spot::state_set::compare (const spot::state ∗ *other*) const `[virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implements spot::state.

7.140.3.3 virtual void spot::state::destroy ( ) const `[inline, virtual, inherited]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.140.3.4 const taa_tgba::state_set∗ spot::state_set::get_state ( ) const

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::format_state().

7.140.3.5 virtual size_t spot::state_set::hash ( ) const `[virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implements spot::state.

7.140.4 Member Data Documentation

7.140.4.1 bool spot::state_set::delete_me_ `[private]`

Referenced by ∼state_set().

7.140.4.2 const taa_tgba::state_set∗ spot::state_set::s_ `[private]`

Referenced by ∼state_set().

The documentation for this class was generated from the following file:

- tgba/taatgba.hh

7.141 spot::state_shared_ptr_equal Struct Reference

An Equivalence Relation for `shared_state` (shared_ptr<const state∗>).

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `shared_state`.

`#include <tgba/state.hh>`

Public Member Functions

- bool operator() (shared_state left, shared_state right) const

7.141.1 Detailed Description

An Equivalence Relation for `shared_state` (shared_ptr<const state∗>).

This is meant to be used as a comparison functor for Sgi `hash_map` whose key are of type `shared_state`. For instance here is how one could declare a map of `shared_state`

```
// Remember how many times each state has been visited.
Sgi::hash_map<shared_state, int,
              spot::state_shared_ptr_hash,
              spot::state_shared_ptr_equal> seen;
```

7.141.2 Member Function Documentation

7.141.2.1 bool spot::state_shared_ptr_equal::operator() (shared_state *left*, shared_state *right*) const [inline]

The documentation for this struct was generated from the following file:

- tgba/state.hh

7.142 spot::state_shared_ptr_hash Struct Reference

Hash Function for `shared_state` (shared_ptr<const state∗>).

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `shared_state`.

`#include <tgba/state.hh>`

Public Member Functions

- size_t operator() (shared_state that) const

7.142.1 Detailed Description

Hash Function for `shared_state` (shared_ptr<const state∗>).

This is meant to be used as a hash functor for Sgi's `hash_map` whose key are of type `shared_state`. For instance here is how one could declare a map of `shared_state`.

```
// Remember how many times each state has been visited.
Sgi::hash_map<shared_state, int,
              spot::state_shared_ptr_hash,
              spot::state_shared_ptr_equal> seen;
```

7.142.2 Member Function Documentation

7.142.2.1 size_t spot::state_shared_ptr_hash::operator() (shared_state *that*) const `[inline]`

The documentation for this struct was generated from the following file:

- tgba/state.hh

7.143 spot::state_shared_ptr_less_than Struct Reference

Strict Weak Ordering for `shared_state` (shared_ptr<const state∗>).

This is meant to be used as a comparison functor for STL `map` whose key are of type `shared_state`.

`#include <tgba/state.hh>`

Public Member Functions

- bool operator() (shared_state left, shared_state right) const

7.143.1 Detailed Description

Strict Weak Ordering for `shared_state` (shared_ptr<const state∗>).

This is meant to be used as a comparison functor for STL `map` whose key are of type `shared_state`. For instance here is how one could declare a map of `shared_state`.

```
// Remember how many times each state has been visited.
std::map<shared_state, int, spot::state_shared_ptr_less_than> seen;
```

7.143.2 Member Function Documentation

7.143.2.1 bool spot::state_shared_ptr_less_than::operator() (shared_state *left*, shared_state *right*) const `[inline]`

The documentation for this struct was generated from the following file:

- tgba/state.hh

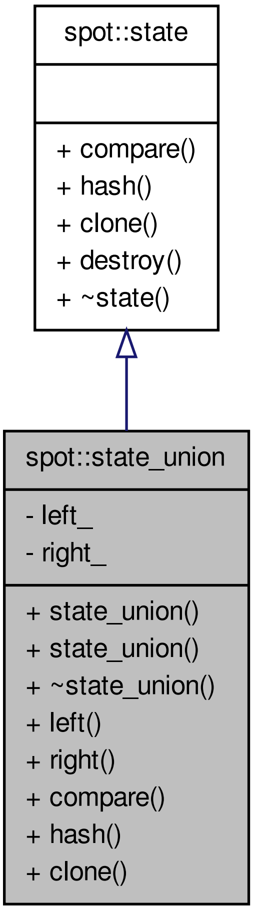
7.144 spot::state_union Class Reference

A state for spot::tgba_union.

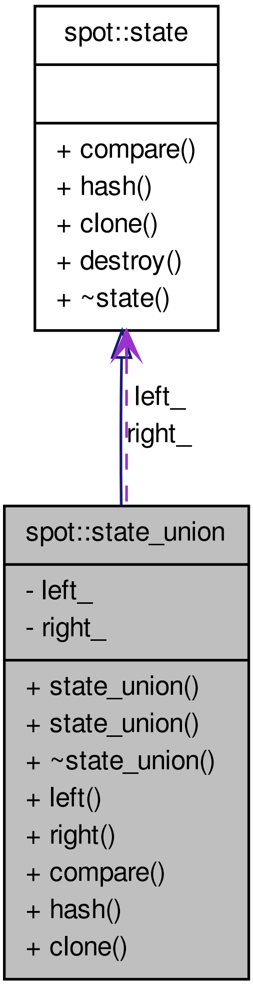
This state is in fact a pair. If the first member equals 0 and the second is different from 0, the state belongs to the left automaton. If the first member is different from 0 and the second is 0, the state belongs to the right automaton. If both members are 0, the state is the initial state.

`#include <tgba/tgbaunion.hh>`

Inheritance diagram for spot::state_union:



Collaboration diagram for spot::state_union:



Public Member Functions

- state_union (state ∗left, state ∗right)

  Constructor.

- state_union (const state_union &o)

  Copy constructor.

- virtual ∼state_union ()
- state ∗ left () const
- state ∗ right () const

- virtual int compare (const state ∗other) const

  Compares two states (that come from the same automaton).

- virtual size_t hash () const

  Hash a state.

- virtual state_union ∗ clone () const

  Duplicate a state.

- virtual void destroy () const

  Release a state.

Private Attributes

- state ∗ left_
- state ∗ right_

7.144.1 Detailed Description

A state for spot::tgba_union.

This state is in fact a pair. If the first member equals 0 and the second is different from 0, the state belongs to the left automaton. If the first member is different from 0 and the second is 0, the state belongs to the right automaton. If both members are 0, the state is the initial state.

7.144.2 Constructor & Destructor Documentation

7.144.2.1 spot::state_union::state_union (state ∗ *left*, state ∗ *right*) `[inline]`

Constructor.

Parameters

left The state from the left automaton.

right The state from the right automaton. These states are acquired by spot::state_union, and will be destroyed on destruction.

7.144.2.2 spot::state_union::state_union (const state_union & *o*)

Copy constructor.

7.144.2.3 virtual spot::state_union::∼state_union ( ) `[virtual]`

7.144.3 Member Function Documentation

7.144.3.1 virtual state_union∗ spot::state_union::clone ( ) const `[virtual]`

Duplicate a state.

Implements spot::state.

7.144.3.2 virtual int spot::state_union::compare (const state ∗ *other*) const `[virtual]`

Compares two states (that come from the same automaton).

This method returns an integer less than, equal to, or greater than zero if *this* is found, respectively, to be less than, equal to, or greater than *other* according to some implicit total order.

This method should not be called to compare states from different automata.

See also

spot::state_ptr_less_than

Implements spot::state.

7.144.3.3 virtual void spot::state::destroy ( ) const `[inline, virtual, inherited]`

Release a state.

Methods from the tgba or tgba_succ_iterator always return a new state that you should deallocate with this function. Before Spot 0.7, you had to "delete" your state directly. Starting with Spot 0.7, you update your code to this function instead (which simply calls "delete"). In a future version, some subclasses will redefine destroy() to allow better memory management (e.g. no memory allocation for explicit automata).

Referenced by spot::power_map::canonicalize(), spot::shared_state_deleter(), and spot::power_map::∼power_map().

7.144.3.4 virtual size_t spot::state_union::hash ( ) const `[virtual]`

Hash a state.

This method returns an integer that can be used as a hash value for this state.

Note that the hash value is guaranteed to be unique for all equal states (in compare()'s sense) for only has long has one of these states exists. So it's OK to use a spot::state as a key in a `hash_map` because the mere use of the state as a key in the hash will ensure the state continues to exist.

However if you create the state, get its hash key, delete the state, recreate the same state, and get its hash key, you may obtain two different hash keys if the same state were not already used elsewhere. In practice this weird situation can occur only when the state is BDD-encoded, because BDD numbers (used to build the hash value) can be reused for other formulas. That probably doesn't matter, since the hash value is meant to be used in a `hash_map`, but it had to be noted.

Implements spot::state.

7.144.3.5 state∗ spot::state_union::left ( ) const `[inline]`

References left_.

7.144.3.6 state∗ spot::state_union::right ( ) const `[inline]`

References right_.

7.144.4 Member Data Documentation

7.144.4.1 state∗ spot::state_union::left_ `[private]`

Does the state belongs to the left automaton ?

Referenced by left().

7.144.4.2 state∗ spot::state_union::right_ `[private]`

Does the state belongs to the right automaton ?

Referenced by right().

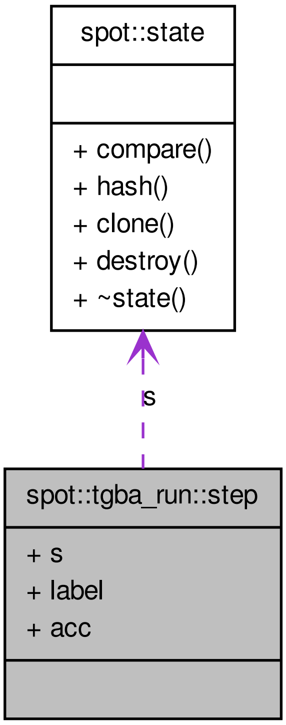
The documentation for this class was generated from the following file:

- tgba/tgbaunion.hh

7.145 spot::tgba_run::step Struct Reference

`#include <tgbaalgos/emptiness.hh>`

Collaboration diagram for spot::tgba_run::step:



Public Attributes

- const state ∗ s
- bdd label
- bdd acc

7.145.1 Member Data Documentation

7.145.1.1 bdd spot::tgba_run::step::acc

7.145.1.2 bdd spot::tgba_run::step::label

7.145.1.3 const state∗ spot::tgba_run::step::s

The documentation for this struct was generated from the following file:

- tgbaalgos/emptiness.hh

7.146 spot::string_hash Struct Reference

A hash function for strings.

`#include <misc/hash.hh>`

Public Member Functions

- size_t operator() (const std::string &s) const

7.146.1 Detailed Description

A hash function for strings.

7.146.2 Member Function Documentation

7.146.2.1 size_t spot::string_hash::operator() (const std::string & *s*) const `[inline]`

The documentation for this struct was generated from the following file:

- misc/hash.hh

7.147 spot::ltl::succ_iterator Class Reference

`#include <ltlast/nfa.hh>`

Public Member Functions

- succ_iterator (const nfa::state::const_iterator s)
- void operator++ ()
- bool operator!= (const succ_iterator &rhs) const
- const nfa::transition ∗ operator∗ () const

Private Attributes

- nfa::state::const_iterator i_

7.147.1 Constructor & Destructor Documentation

7.147.1.1 spot::ltl::succ_iterator::succ_iterator (const nfa::state::const_iterator *s*) `[inline]`

7.147.2 Member Function Documentation

7.147.2.1 bool spot::ltl::succ_iterator::operator!= (const succ_iterator & *rhs*) const `[inline]`

References i_.

7.147.2.2 const nfa::transition∗ spot::ltl::succ_iterator::operator∗ ( ) const `[inline]`

References i_.

7.147.2.3 void spot::ltl::succ_iterator::operator++ ( ) `[inline]`

References i_.

7.147.3 Member Data Documentation

7.147.3.1 nfa::state::const_iterator spot::ltl::succ_iterator::i_ `[private]`

Referenced by operator!=(), operator∗(), and operator++().

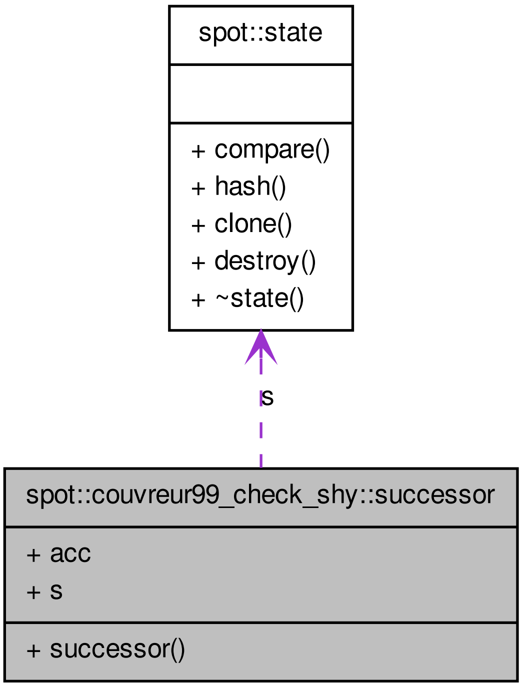
The documentation for this class was generated from the following file:

- ltlast/nfa.hh

7.148 spot::couvreur99_check_shy::successor Struct Reference

`#include <tgbaalgos/gtec/gtec.hh>`

Collaboration diagram for spot::couvreur99_check_shy::successor:



Public Member Functions

- successor (bdd acc, const spot::state ∗s)

Public Attributes

- bdd acc
- const spot::state ∗ s

7.148.1 Constructor & Destructor Documentation

7.148.1.1 spot::couvreur99_check_shy::successor::successor (bdd *acc*, const spot::state ∗ *s*) `[inline]`

7.148.2 Member Data Documentation

7.148.2.1 bdd spot::couvreur99_check_shy::successor::acc

7.148.2.2 const spot::state∗ spot::couvreur99_check_shy::successor::s

The documentation for this struct was generated from the following file:

- tgbaalgos/gtec/gtec.hh

7.149 spot::symbol Class Reference

`#include <evtgba/symbol.hh>`

Public Member Functions

- const std::string & name () const
- void ref () const
- void unref () const

Static Public Member Functions

- static const symbol ∗ instance (const std::string &name)
- static unsigned instance_count ()

  Number of instantiated atomic propositions. For debugging.

- static std::ostream & dump_instances (std::ostream &os)

  List all instances of atomic propositions. For debugging.

Protected Types

- typedef std::map< const std::string, const symbol ∗ > map

Protected Member Functions

- int ref_count_ () const
- symbol (const std::string ∗name)
- ∼symbol ()

Static Protected Attributes

- static map instances_

Private Member Functions

- symbol (const symbol &)

Private Attributes

- const std::string ∗ name_

  Undefined.

- int refs_

7.149.1 Member Typedef Documentation

7.149.1.1 typedef std::map<const std::string, const symbol∗> spot::symbol::map `[protected]`

7.149.2 Constructor & Destructor Documentation

7.149.2.1 spot::symbol::symbol (const std::string ∗ *name*) `[protected]`

7.149.2.2 spot::symbol::∼symbol ( ) `[protected]`

7.149.2.3 spot::symbol::symbol (const symbol &) `[private]`

7.149.3 Member Function Documentation

7.149.3.1 static std::ostream& spot::symbol::dump_instances (std::ostream & *os*) `[static]`

List all instances of atomic propositions. For debugging.

7.149.3.2 static const symbol∗ spot::symbol::instance (const std::string & *name*) `[static]`

7.149.3.3 static unsigned spot::symbol::instance_count ( ) `[static]`

Number of instantiated atomic propositions. For debugging.

7.149.3.4 const std::string& spot::symbol::name ( ) const

7.149.3.5 void spot::symbol::ref ( ) const

Referenced by spot::rsymbol::rsymbol().

7.149.3.6 int spot::symbol::ref_count_ ( ) const `[protected]`

7.149.3.7 void spot::symbol::unref ( ) const

Referenced by spot::rsymbol::∼rsymbol().

7.149.4 Member Data Documentation

7.149.4.1 map spot::symbol::instances_ `[static, protected]`

7.149.4.2 const std::string∗ spot::symbol::name_ `[private]`

Undefined.

7.149.4.3 int spot::symbol::refs_ `[mutable, private]`

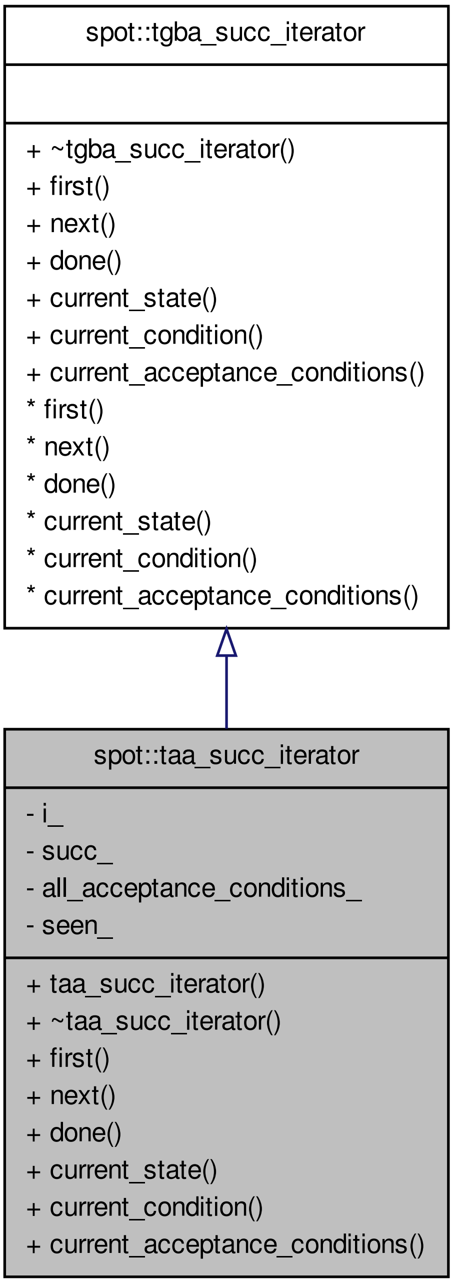
The documentation for this class was generated from the following file:

- evtgba/symbol.hh

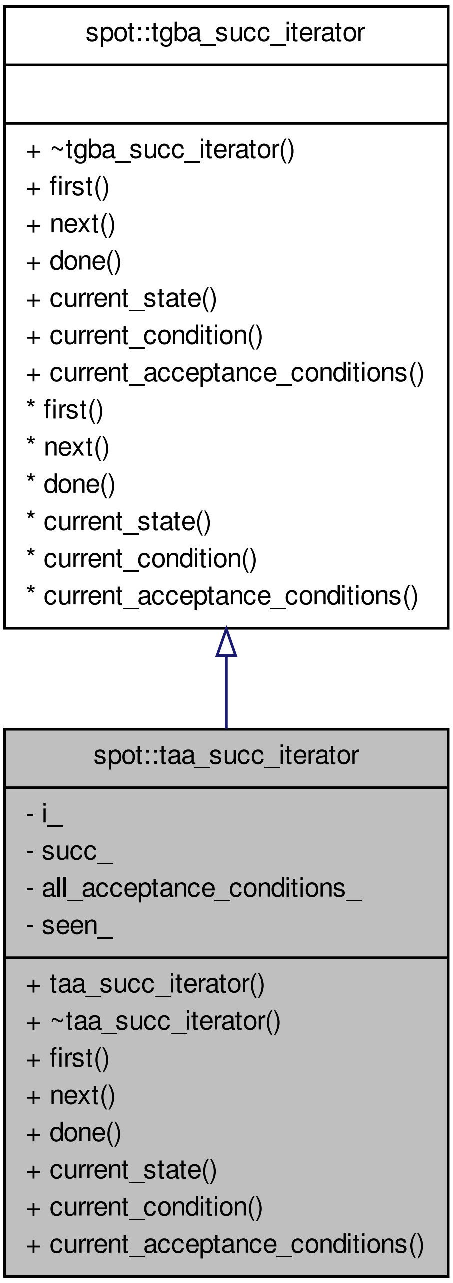
7.150 spot::taa_succ_iterator Class Reference

`#include <tgba/taatgba.hh>`

Inheritance diagram for spot::taa_succ_iterator:



Collaboration diagram for spot::taa_succ_iterator:



Classes

- struct distance_sort

Public Member Functions

- taa_succ_iterator (const taa_tgba::state_set ∗s, bdd all_acc)
- virtual ∼taa_succ_iterator ()
- virtual void first ()

  Position the iterator on the first successor (if any).

- virtual void next ()

  Jump to the next successor (if any).

- virtual bool done () const

  Check whether the iteration is finished.

- virtual state_set ∗ current_state () const

  Get the state of the current successor.

- virtual bdd current_condition () const

  Get the condition on the transition leading to this successor.

- virtual bdd current_acceptance_conditions () const

  Get the acceptance conditions on the transition leading to this successor.

Private Types

- typedef taa_tgba::state::const_iterator iterator
- typedef std::pair< iterator, iterator > iterator_pair
- typedef std::vector< iterator_pair > bounds_t
- typedef Sgi::hash_map< const spot::state_set ∗, std::vector< taa_tgba::transition ∗ >, state_ptr_hash, state_ptr_equal > seen_map

Private Attributes

- std::vector< taa_tgba::transition ∗ >::const_iterator i_
- std::vector< taa_tgba::transition ∗ > succ_
- bdd all_acceptance_conditions_
- seen_map seen_

7.150.1 Member Typedef Documentation

7.150.1.1 typedef std::vector<iterator_pair> spot::taa_succ_iterator::bounds_t `[private]`

7.150.1.2 typedef taa_tgba::state::const_iterator spot::taa_succ_iterator::iterator `[private]`

Those typedefs are used to generate all possible successors in the constructor using a cartesian product.

7.150.1.3 typedef std::pair<iterator, iterator> spot::taa_succ_iterator::iterator_pair `[private]`

7.150.1.4 typedef Sgi::hash_map< const spot::state_set*, std::vector<taa_tgba::transition*>, state_ptr_hash, state_ptr_equal> spot::taa_succ_iterator::seen_map `[private]`

7.150.2 Constructor & Destructor Documentation

7.150.2.1 spot::taa_succ_iterator::taa_succ_iterator (const taa_tgba::state_set * *s*, bdd *all_acc*)

7.150.2.2 virtual spot::taa_succ_iterator::~taa_succ_iterator ( ) `[virtual]`

7.150.3 Member Function Documentation

7.150.3.1 virtual bdd spot::taa_succ_iterator::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.150.3.2 virtual bdd spot::taa_succ_iterator::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.150.3.3 virtual state_set* spot::taa_succ_iterator::current_state ( ) const `[virtual]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implements spot::tgba_succ_iterator.

7.150.3.4 virtual bool spot::taa_succ_iterator::done ( ) const `[virtual]`

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implements spot::tgba_succ_iterator.

7.150.3.5 virtual void spot::taa_succ_iterator::first ( ) `[virtual]`

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implements spot::tgba_succ_iterator.

7.150.3.6 virtual void spot::taa_succ_iterator::next ( ) `[virtual]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implements spot::tgba_succ_iterator.

7.150.4 Member Data Documentation

7.150.4.1 bdd spot::taa_succ_iterator::all_acceptance_conditions_ `[private]`

7.150.4.2 std::vector<taa_tgba::transition∗>::const_iterator spot::taa_succ_iterator::i_ `[private]`

7.150.4.3 seen_map spot::taa_succ_iterator::seen_ `[private]`

7.150.4.4 std::vector<taa_tgba::transition∗> spot::taa_succ_iterator::succ_ `[private]`

The documentation for this class was generated from the following file:

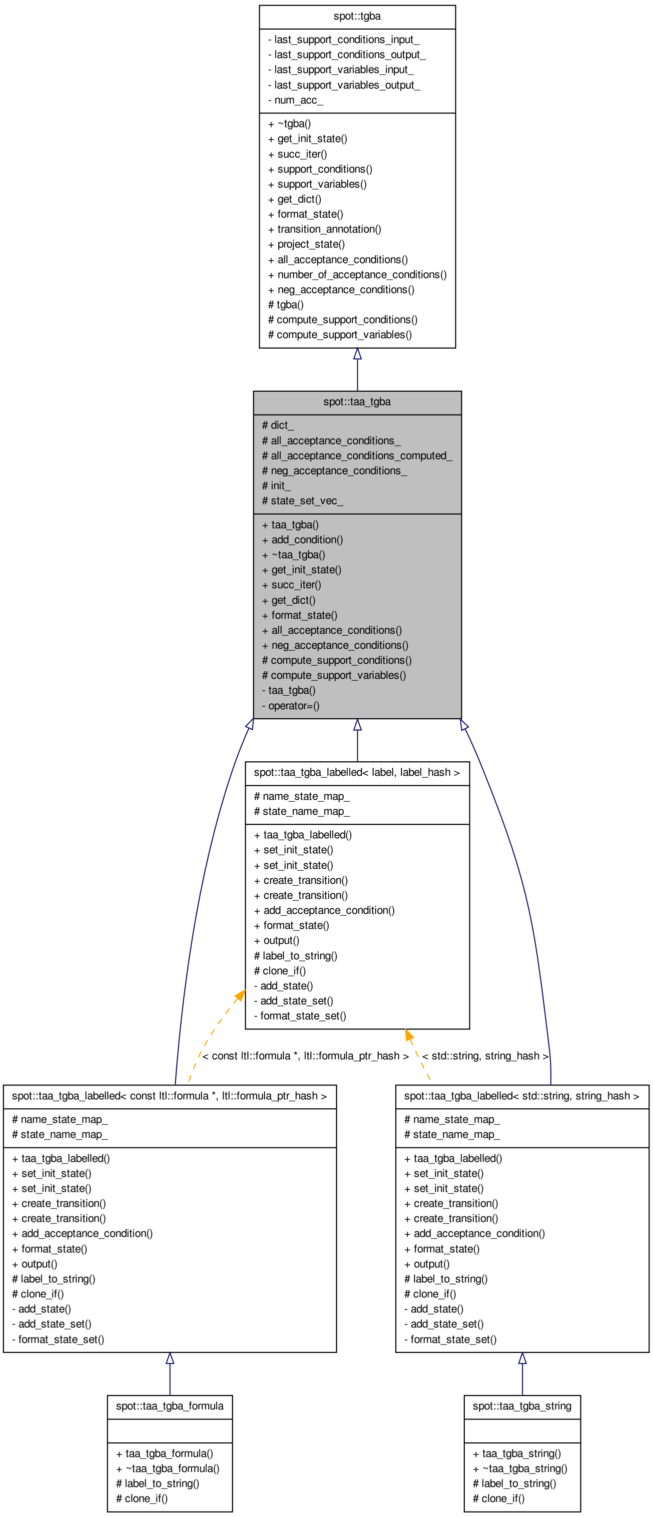
- tgba/taatgba.hh

7.151 spot::taa_tgba Class Reference

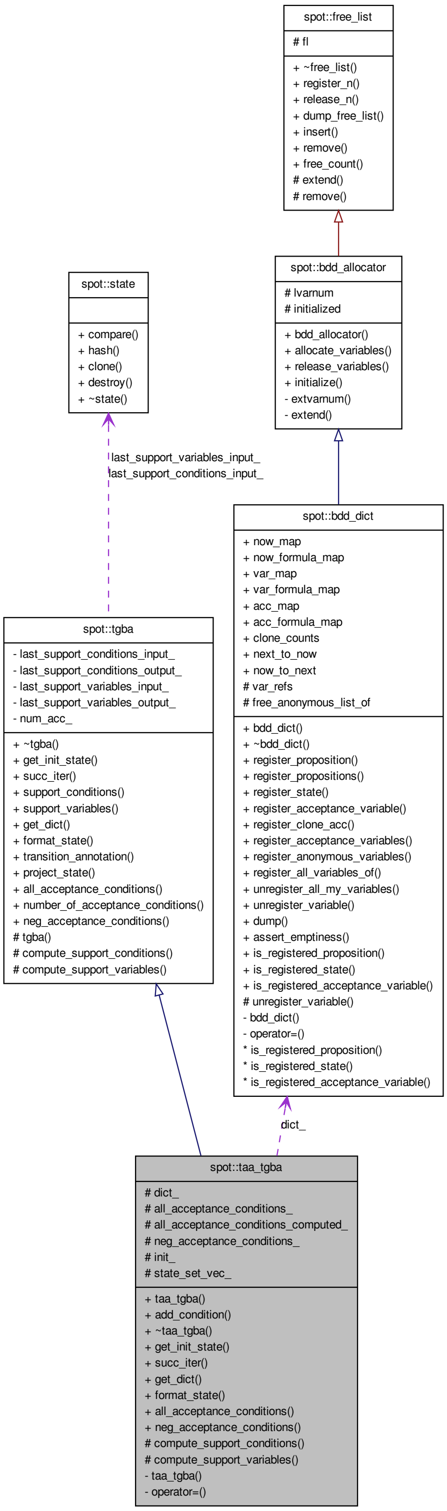
A self-loop Transition-based Alternating Automaton (TAA) which is seen as a TGBA (abstract class, see below).

`#include <tgba/taatgba.hh>`

Inheritance diagram for spot::taa_tgba:



Collaboration diagram for spot::taa_tgba:



Classes

- struct transition

  Explicit transitions.

Public Types

- typedef std::list< transition ∗ > state
- typedef std::set< state ∗ > state_set

Public Member Functions

- taa_tgba (bdd_dict ∗dict)
- void add_condition (transition ∗t, const ltl::formula ∗f)
- virtual ∼taa_tgba ()

  TGBA interface.

- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const spot::state ∗state) const =0

  Format the state as a string for printing.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef std::vector< taa_tgba::state_set ∗ > ss_vec

Protected Member Functions

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

Protected Attributes

- bdd_dict ∗ dict_
- bdd all_acceptance_conditions_
- bool all_acceptance_conditions_computed_
- bdd neg_acceptance_conditions_
- taa_tgba::state_set ∗ init_
- ss_vec state_set_vec_

Private Member Functions

- taa_tgba (const taa_tgba &other)
- taa_tgba & operator= (const taa_tgba &other)

7.151.1 Detailed Description

A self-loop Transition-based Alternating Automaton (TAA) which is seen as a TGBA (abstract class, see below).

7.151.2 Member Typedef Documentation

7.151.2.1 typedef std::vector<taa_tgba::state_set∗> spot::taa_tgba::ss_vec `[protected]`

7.151.2.2 typedef std::list<transition∗> spot::taa_tgba::state

7.151.2.3 typedef std::set<state∗> spot::taa_tgba::state_set

7.151.3 Constructor & Destructor Documentation

7.151.3.1 spot::taa_tgba::taa_tgba (bdd_dict ∗ *dict*)

7.151.3.2 virtual spot::taa_tgba::∼taa_tgba ( ) `[virtual]`

TGBA interface.

7.151.3.3 spot::taa_tgba::taa_tgba (const taa_tgba & *other*) `[private]`

7.151.4 Member Function Documentation

7.151.4.1 void spot::taa_tgba::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*)

7.151.4.2 virtual bdd spot::taa_tgba::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.151.4.3 virtual bdd spot::taa_tgba::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.151.4.4 virtual bdd spot::taa_tgba::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.151.4.5 virtual std::string spot::taa_tgba::format_state (const spot::state ∗ *state*) const `[pure virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

Implemented in spot::taa_tgba_labelled< label, label_hash >, spot::taa_tgba_labelled< const ltl::formula ∗, ltl::formula_ptr_hash >, and spot::taa_tgba_labelled< std::string, string_hash >.

7.151.4.6 virtual bdd_dict∗ spot::taa_tgba::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.151.4.7 virtual spot::state∗ spot::taa_tgba::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.151.4.8 virtual bdd spot::taa_tgba::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.151.4.9 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.151.4.10 taa_tgba& spot::taa_tgba::operator= (const taa_tgba & *other*) `[private]`

7.151.4.11 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.151.4.12 virtual tgba_succ_iterator∗ spot::taa_tgba::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

- ***local_state*** The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).
- ***global_state*** In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.
- ***global_automaton*** In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.151.4.13 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.151.4.14 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.151.4.15 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.151.5 Member Data Documentation

7.151.5.1 bdd spot::taa_tgba::all_acceptance_conditions_ `[mutable, protected]`

7.151.5.2 bool spot::taa_tgba::all_acceptance_conditions_computed_ `[mutable, protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.151.5.3 bdd_dict∗ spot::taa_tgba::dict_ `[protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.151.5.4 taa_tgba::state_set∗ spot::taa_tgba::init_ `[protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::set_init_state().

7.151.5.5 bdd spot::taa_tgba::neg_acceptance_conditions_ `[protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.151.5.6 ss_vec spot::taa_tgba::state_set_vec_ `[protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state_set().

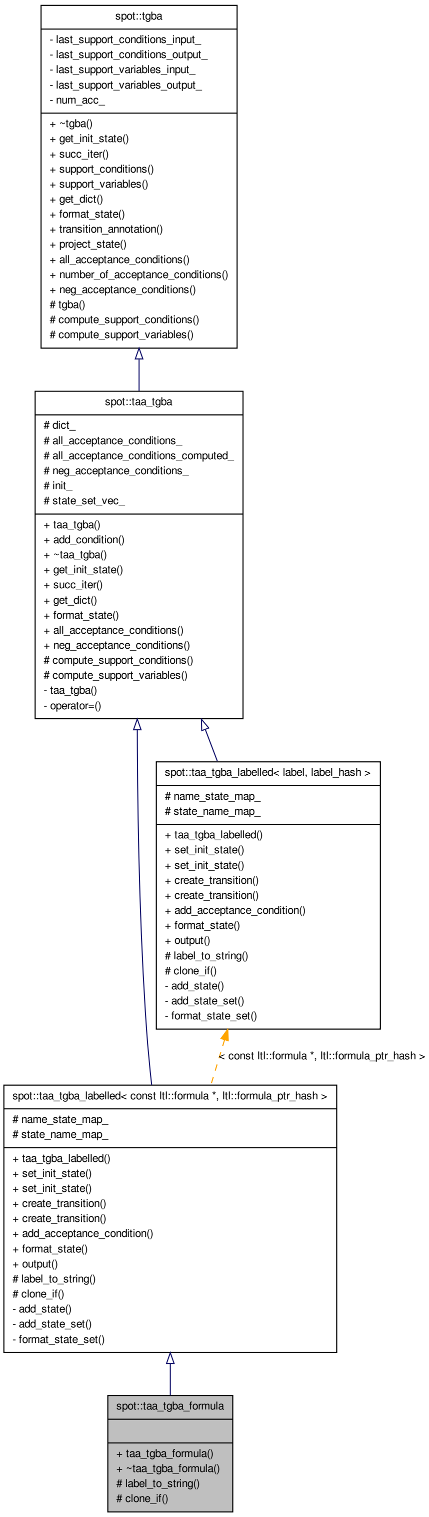
The documentation for this class was generated from the following file:

- tgba/taatgba.hh

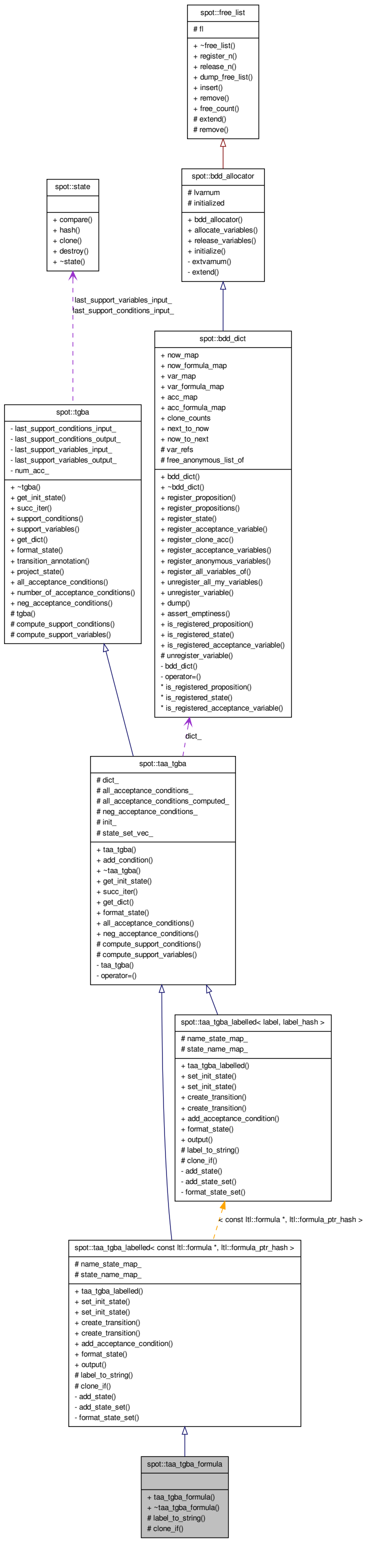
7.152 spot::taa_tgba_formula Class Reference

`#include <tgba/taatgba.hh>`

Inheritance diagram for spot::taa_tgba_formula:



Collaboration diagram for spot::taa_tgba_formula:



Public Types

- typedef std::list< transition ∗ > state
- typedef std::set< state ∗ > state_set

Public Member Functions

- taa_tgba_formula (bdd_dict ∗dict)
- ∼taa_tgba_formula ()
- void set_init_state (const const ltl::formula ∗&s)
- void set_init_state (const std::vector< const ltl::formula ∗ > &s)
- transition ∗ create_transition (const const ltl::formula ∗&s, const std::vector< const ltl::formula ∗ > &d)
- transition ∗ create_transition (const const ltl::formula ∗&s, const const ltl::formula ∗&d)
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- void output (std::ostream &os) const

  Output a TAA in a stream.

- void add_condition (transition ∗t, const ltl::formula ∗f)
- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef const ltl::formula ∗ label_t
- typedef Sgi::hash_map< const const ltl::formula ∗, taa_tgba::state ∗, ltl::formula_ptr_hash > ns_map
- typedef Sgi::hash_map< const taa_tgba::state ∗, const ltl::formula ∗, ptr_hash< taa_tgba::state > > sn_map
- typedef std::vector< taa_tgba::state_set ∗ > ss_vec

Protected Member Functions

- virtual std::string label_to_string (const label_t &label) const

  Return a label as a string.

- virtual ltl::formula ∗ clone_if (const label_t &label) const

  Clone the label if necessary to assure it is owned by this, avoiding memory issues when label is a pointer.

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- bdd all_acceptance_conditions_
- bool all_acceptance_conditions_computed_
- bdd neg_acceptance_conditions_
- taa_tgba::state_set ∗ init_
- ss_vec state_set_vec_

7.152.1 Member Typedef Documentation

7.152.1.1 typedef const ltl::formula ∗ spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::label_t `[protected, inherited]`

7.152.1.2 typedef Sgi::hash_map< const const ltl::formula ∗ , taa_tgba::state∗, ltl::formula_ptr_hash > spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::ns_map `[protected, inherited]`

7.152.1.3 typedef Sgi::hash_map< const taa_tgba::state∗, const ltl::formula ∗ , ptr_hash<taa_tgba::state> > spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::sn_map `[protected, inherited]`

7.152.1.4 typedef std::vector<taa_tgba::state_set∗> spot::taa_tgba::ss_vec `[protected, inherited]`

7.152.1.5 typedef std::list<transition∗> spot::taa_tgba::state `[inherited]`

7.152.1.6 typedef std::set<state∗> spot::taa_tgba::state_set `[inherited]`

7.152.2 Constructor & Destructor Documentation

7.152.2.1 spot::taa_tgba_formula::taa_tgba_formula (bdd_dict ∗ *dict*) `[inline]`

7.152.2.2 spot::taa_tgba_formula::∼taa_tgba_formula ( )

7.152.3 Member Function Documentation

7.152.3.1 void spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inline, inherited]`

7.152.3.2 void spot::taa_tgba::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.152.3.3 virtual bdd spot::taa_tgba::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.152.3.4 virtual ltl::formula∗ spot::taa_tgba_formula::clone_if (const label_t & *lbl*) const `[protected, virtual]`

Clone the label if necessary to assure it is owned by this, avoiding memory issues when label is a pointer.

Implements spot::taa_tgba_labelled< const ltl::formula ∗, ltl::formula_ptr_hash >.

7.152.3.5 virtual bdd spot::taa_tgba::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.152.3.6 virtual bdd spot::taa_tgba::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.152.3.7 transition∗ spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::create_transition (const const ltl::formula ∗ & *s*, const std::vector< const ltl::formula ∗ > & *d*) `[inline, inherited]`

7.152.3.8 transition∗ spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::create_transition (const const ltl::formula ∗ & *s*, const const ltl::formula ∗ & *d*) `[inline, inherited]`

7.152.3.9 virtual std::string spot::taa_tgba_labelled< const ltl::formula $*$, ltl::formula_ptr_hash >::format_state (const spot::state $*$ *s*) const `[inline, virtual, inherited]`

Format the state as a string for printing.

If state is a spot::state_set of only one element, then the string corresponding to state->get_state() is returned.

Otherwise a string composed of each string corresponding to each state->get_state() in the spot::state_set is returned, e.g. like {string_1,...,string_n}.

Implements spot::taa_tgba.

7.152.3.10 virtual bdd_dict$*$ spot::taa_tgba::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.152.3.11 virtual spot::state$*$ spot::taa_tgba::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.152.3.12 virtual std::string spot::taa_tgba_formula::label_to_string (const label_t & *lbl*) const `[protected, virtual]`

Return a label as a string.

Implements spot::taa_tgba_labelled< const ltl::formula $*$, ltl::formula_ptr_hash >.

7.152.3.13 virtual bdd spot::taa_tgba::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.152.3.14 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.152.3.15 void spot::taa_tgba_labelled< const ltl::formula $*$, ltl::formula_ptr_hash >::output (std::ostream & *os*) const `[inline, inherited]`

Output a TAA in a stream.

7.152.3.16 virtual state$*$ spot::tgba::project_state (const state $*$ *s*, const tgba $*$ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

> 0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.152.3.17 void spot::taa_tgba_labelled< const ltl::formula $*$, ltl::formula_ptr_hash >::set_init_state (const std::vector< const ltl::formula $*$ > & *s*) `[inline, inherited]`

7.152.3.18 void spot::taa_tgba_labelled< const ltl::formula $*$, ltl::formula_ptr_hash >::set_init_state (const const ltl::formula $*$ & *s*) `[inline, inherited]`

7.152.3.19 virtual tgba_succ_iterator$*$ spot::taa_tgba::succ_iter (const spot::state $*$ *local_state*, const spot::state $*$ *global_state* = 0, const tgba $*$ *global_automaton* = 0) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.152.3.20 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.152.3.21 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.152.3.22 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.152.4 Member Data Documentation

7.152.4.1 bdd spot::taa_tgba::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.152.4.2 bool spot::taa_tgba::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.152.4.3 bdd_dict∗ spot::taa_tgba::dict_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.152.4.4 taa_tgba::state_set∗ spot::taa_tgba::init_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::set_init_state().

7.152.4.5 ns_map spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::name_state_map_ `[protected, inherited]`

7.152.4.6 bdd spot::taa_tgba::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.152.4.7 sn_map spot::taa_tgba_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::state_name_map_ `[protected, inherited]`

7.152.4.8 ss_vec spot::taa_tgba::state_set_vec_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state_set().

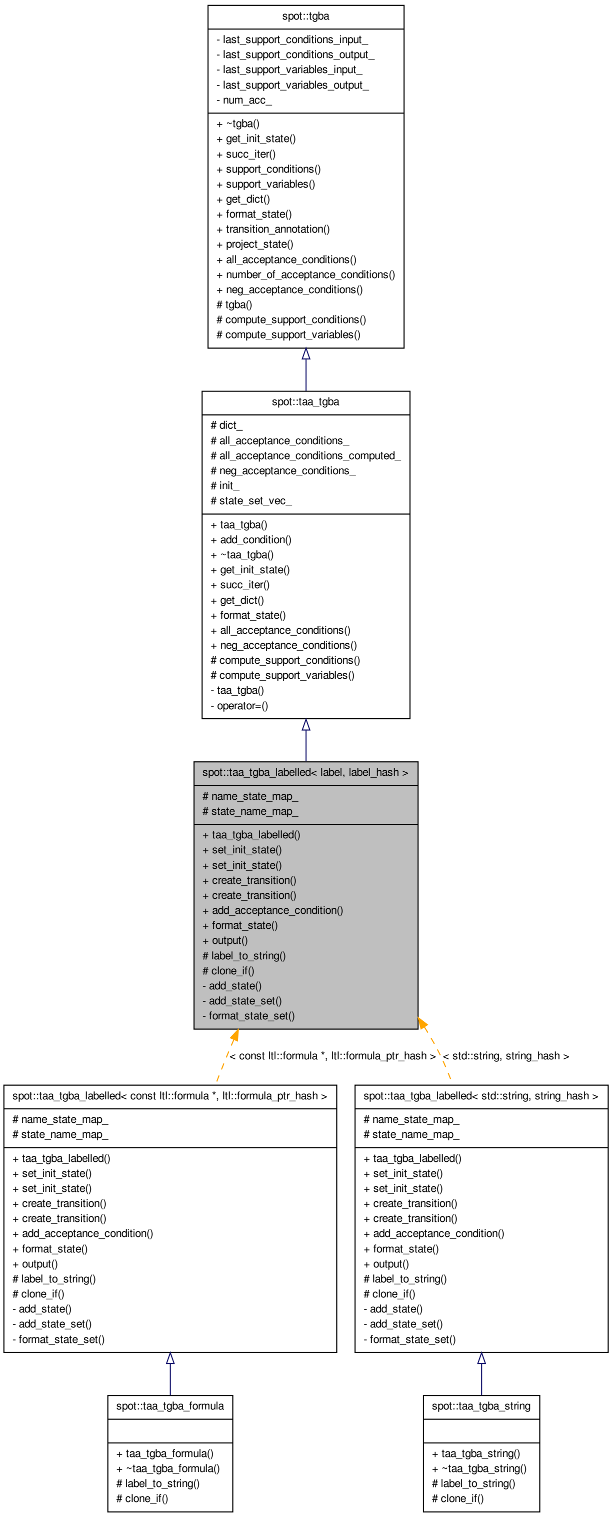
The documentation for this class was generated from the following file:

- tgba/taatgba.hh

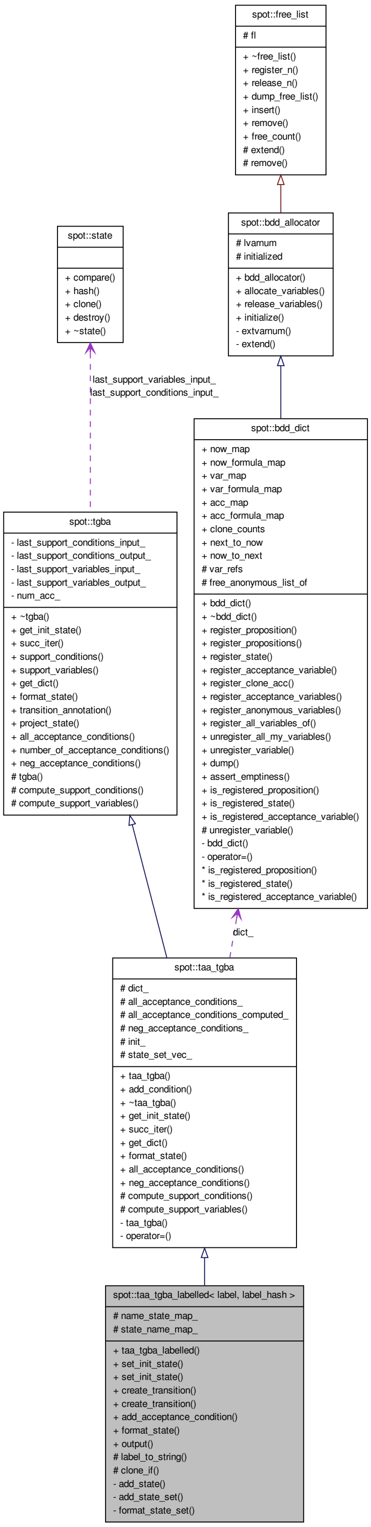
7.153 spot::taa_tgba_labelled< label, label_hash > Class Template Reference

`#include <tgba/taatgba.hh>`

Inheritance diagram for spot::taa_tgba_labelled< label, label_hash >:



Collaboration diagram for spot::taa_tgba_labelled< label, label_hash >:



Public Types

- typedef std::list< transition ∗ > state
- typedef std::set< state ∗ > state_set

Public Member Functions

- taa_tgba_labelled (bdd_dict ∗dict)
- void set_init_state (const label &s)
- void set_init_state (const std::vector< label > &s)
- transition ∗ create_transition (const label &s, const std::vector< label > &d)
- transition ∗ create_transition (const label &s, const label &d)
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- void output (std::ostream &os) const

  Output a TAA in a stream.

- void add_condition (transition ∗t, const ltl::formula ∗f)
- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef label label_t
- typedef Sgi::hash_map< const label, taa_tgba::state ∗, label_hash > ns_map
- typedef Sgi::hash_map< const taa_tgba::state ∗, label, ptr_hash< taa_tgba::state > > sn_map
- typedef std::vector< taa_tgba::state_set ∗ > ss_vec

Protected Member Functions

- virtual std::string label_to_string (const label_t &lbl) const =0

  Return a label as a string.

- virtual label_t clone_if (const label_t &lbl) const =0

  Clone the label if necessary to assure it is owned by this, avoiding memory issues when label is a pointer.

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- bdd all_acceptance_conditions_
- bool all_acceptance_conditions_computed_
- bdd neg_acceptance_conditions_
- taa_tgba::state_set ∗ init_
- ss_vec state_set_vec_

Private Member Functions

- taa_tgba::state ∗ add_state (const label &name)

  Return the taa_tgba::state for name, creating it when it does not exist already.

- taa_tgba::state_set ∗ add_state_set (const std::vector< label > &names)

  Return the taa::state_set for names.

- std::string format_state_set (const taa_tgba::state_set ∗ss) const

7.153.1 Detailed Description

template<typename label, typename label_hash> class spot::taa_tgba_labelled< label, label_hash >

A taa_tgba instance with states labeled by a given type. Still an abstract class, see below.

7.153.2 Member Typedef Documentation

7.153.2.1 template<typename label, typename label_hash> typedef label spot::taa_tgba_labelled< label, label_hash >::label_t `[protected]`

7.153.2.2 template<typename label, typename label_hash> typedef Sgi::hash_map< const label, taa_tgba::state∗, label_hash > spot::taa_tgba_labelled< label, label_hash >::ns_map `[protected]`

7.153.2.3 template<typename label, typename label_hash> typedef Sgi::hash_map< const taa_tgba::state∗, label, ptr_hash<taa_tgba::state> > spot::taa_tgba_labelled< label, label_hash >::sn_map `[protected]`

7.153.2.4 typedef std::vector<taa_tgba::state_set∗> spot::taa_tgba::ss_vec `[protected, inherited]`

7.153.2.5 typedef std::list<transition∗> spot::taa_tgba::state `[inherited]`

7.153.2.6 typedef std::set<state∗> spot::taa_tgba::state_set `[inherited]`

7.153.3 Constructor & Destructor Documentation

7.153.3.1 template<typename label, typename label_hash> spot::taa_tgba_labelled< label, label_hash >::taa_tgba_labelled (bdd_dict ∗ *dict*) `[inline]`

7.153.4 Member Function Documentation

7.153.4.1 template<typename label, typename label_hash> void spot::taa_tgba_labelled< label, label_hash >::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inline]`

7.153.4.2 void spot::taa_tgba::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.153.4.3 template<typename label, typename label_hash> taa_tgba::state∗ spot::taa_tgba_labelled< label, label_hash >::add_state (const label & *name*) `[inline, private]`

Return the taa_tgba::state for *name*, creating it when it does not exist already.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state_set(), and spot::taa_tgba_labelled< std::string, string_hash >::create_transition().

7.153.4.4 template<typename label, typename label_hash> taa_tgba::state_set∗ spot::taa_tgba_labelled< label, label_hash >::add_state_set (const std::vector< label > & *names*) `[inline, private]`

Return the taa::state_set for *names*.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::create_transition(), and spot::taa_tgba_labelled< std::string, string_hash >::set_init_state().

7.153.4.5 virtual bdd spot::taa_tgba::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.153.4.6 template<typename label, typename label_hash> virtual label_t spot::taa_tgba_labelled< label, label_hash >::clone_if (const label_t & *lbl*) const `[protected, pure virtual]`

Clone the label if necessary to assure it is owned by this, avoiding memory issues when label is a pointer.

Implemented in spot::taa_tgba_formula.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state().

7.153.4.7 virtual bdd spot::taa_tgba::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.153.4.8 virtual bdd spot::taa_tgba::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.153.4.9 template<typename label, typename label_hash> transition∗ spot::taa_tgba_labelled< label, label_hash >::create_transition (const label & *s*, const std::vector< label > & *d*) `[inline]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::create_transition().

7.153.4.10 template<typename label, typename label_hash> transition∗ spot::taa_tgba_labelled< label, label_hash >::create_transition (const label & *s*, const label & *d*) `[inline]`

7.153.4.11 template<typename label, typename label_hash> virtual std::string spot::taa_tgba_labelled< label, label_hash >::format_state (const spot::state ∗ *s*) const `[inline, virtual]`

Format the state as a string for printing.

If state is a spot::state_set of only one element, then the string corresponding to state->get_state() is returned.

Otherwise a string composed of each string corresponding to each state->get_state() in the spot::state_set is returned, e.g. like {string_1,...,string_n}.

Implements spot::taa_tgba.

7.153.4.12 template<typename label, typename label_hash> std::string spot::taa_tgba_labelled< label, label_hash >::format_state_set (const taa_tgba::state_set ∗ *ss*) const `[inline, private]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::format_state(), and spot::taa_tgba_labelled< std::string, string_hash >::output().

7.153.4.13 virtual bdd_dict* spot::taa_tgba::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.153.4.14 virtual spot::state* spot::taa_tgba::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.153.4.15 template<typename label, typename label_hash> virtual std::string spot::taa_tgba_labelled< label, label_hash >::label_to_string (const label_t & *lbl*) const `[protected, pure virtual]`

Return a label as a string.

Implemented in spot::taa_tgba_formula.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::format_state_set(), and spot::taa_tgba_labelled< std::string, string_hash >::output().

7.153.4.16 virtual bdd spot::taa_tgba::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.153.4.17 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.153.4.18 template<typename label, typename label_hash> void spot::taa_tgba_labelled< label, label_hash >::output (std::ostream & *os*) const `[inline]`

Output a TAA in a stream.

7.153.4.19 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.153.4.20 template<typename label, typename label_hash> void spot::taa_tgba_labelled< label, label_hash >::set_init_state (const std::vector< label > & *s*) `[inline]`

7.153.4.21 template<typename label, typename label_hash> void spot::taa_tgba_labelled< label, label_hash >::set_init_state (const label & *s*) `[inline]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::set_init_state().

7.153.4.22 virtual tgba_succ_iterator∗ spot::taa_tgba::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

- ***local_state*** The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).
- ***global_state*** In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.
- ***global_automaton*** In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.153.4.23 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.153.4.24 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.153.4.25 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

- ***t*** a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.153.5 Member Data Documentation

7.153.5.1 bdd spot::taa_tgba::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.153.5.2 bool spot::taa_tgba::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.153.5.3 bdd_dict∗ spot::taa_tgba::dict_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.153.5.4 taa_tgba::state_set∗ spot::taa_tgba::init_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::set_init_state().

7.153.5.5 template<typename label, typename label_hash> ns_map spot::taa_tgba_labelled< label, label_hash >::name_state_map_ `[protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), spot::taa_tgba_labelled< std::string, string_hash >::add_state(), and spot::taa_tgba_labelled< std::string, string_hash >::output().

7.153.5.6 bdd spot::taa_tgba::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.153.5.7 template<typename label, typename label_hash> sn_map spot::taa_tgba_labelled< label, label_hash >::state_name_map_ `[protected]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state(), and spot::taa_tgba_labelled< std::string, string_hash >::format_state_set().

7.153.5.8 ss_vec spot::taa_tgba::state_set_vec_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state_set().

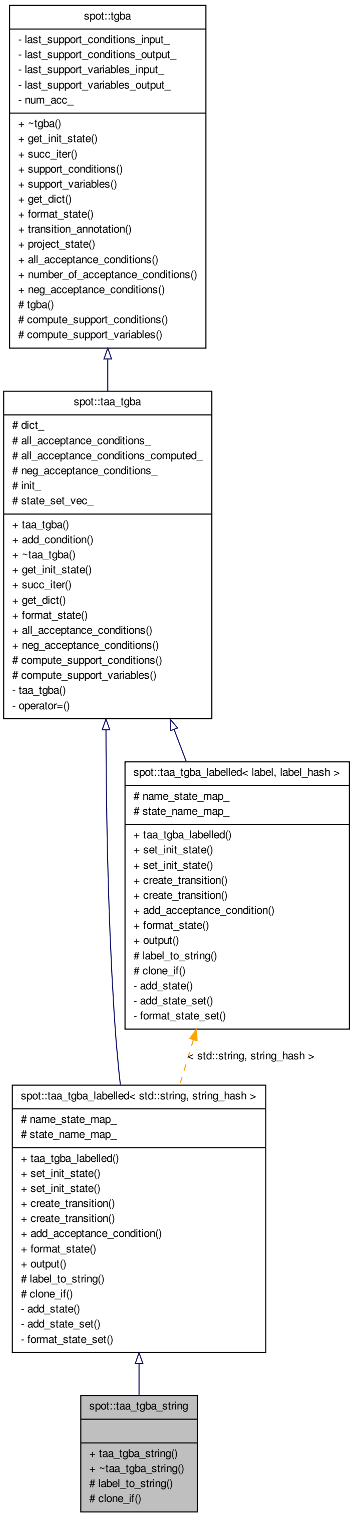
The documentation for this class was generated from the following file:

- tgba/taatgba.hh

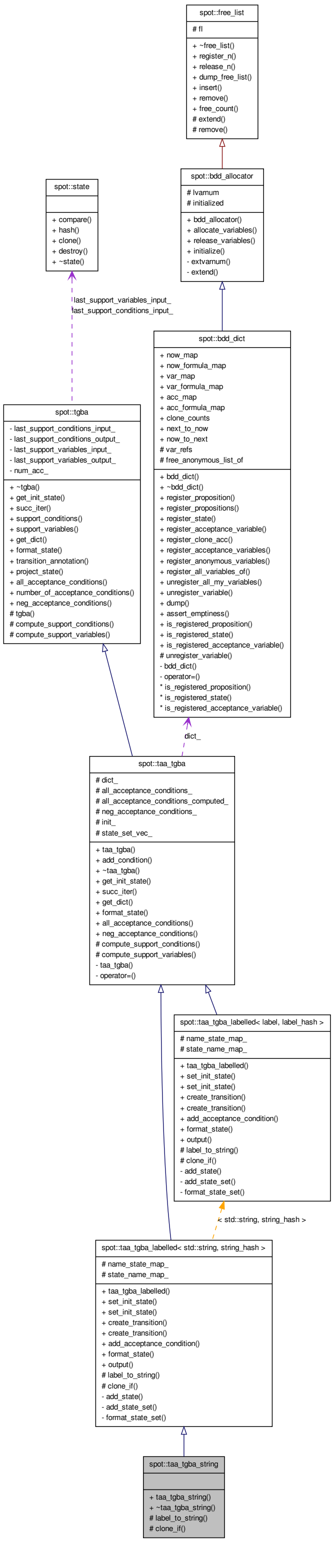
7.154 spot::taa_tgba_string Class Reference

`#include <tgba/taatgba.hh>`

Inheritance diagram for spot::taa_tgba_string:



Collaboration diagram for spot::taa_tgba_string:



Public Types

- typedef std::list< transition ∗ > state
- typedef std::set< state ∗ > state_set

Public Member Functions

- taa_tgba_string (bdd_dict ∗dict)
- ∼taa_tgba_string ()
- void set_init_state (const std::string &s)
- void set_init_state (const std::vector< std::string > &s)
- transition ∗ create_transition (const std::string &s, const std::vector< std::string > &d)
- transition ∗ create_transition (const std::string &s, const std::string &d)
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- void output (std::ostream &os) const

  Output a TAA in a stream.

- void add_condition (transition ∗t, const ltl::formula ∗f)
- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef std::string label_t
- typedef Sgi::hash_map< const std::string, taa_tgba::state ∗, string_hash > ns_map
- typedef Sgi::hash_map< const taa_tgba::state ∗, std::string, ptr_hash< taa_tgba::state > > sn_map
- typedef std::vector< taa_tgba::state_set ∗ > ss_vec

Protected Member Functions

- virtual std::string label_to_string (const std::string &label) const
- virtual std::string clone_if (const std::string &label) const
- virtual std::string label_to_string (const label_t &lbl) const =0

  Return a label as a string.

- virtual label_t clone_if (const label_t &lbl) const =0

  Clone the label if necessary to assure it is owned by this, avoiding memory issues when label is a pointer.

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- bdd all_acceptance_conditions_
- bool all_acceptance_conditions_computed_
- bdd neg_acceptance_conditions_
- taa_tgba::state_set ∗ init_
- ss_vec state_set_vec_

7.154.1 Member Typedef Documentation

7.154.1.1 typedef std::string spot::taa_tgba_labelled< std::string , string_hash >::label_t `[protected, inherited]`

7.154.1.2 typedef Sgi::hash_map< const std::string , taa_tgba::state∗, string_hash > spot::taa_tgba_labelled< std::string , string_hash >::ns_map `[protected, inherited]`

7.154.1.3 typedef Sgi::hash_map< const taa_tgba::state∗, std::string , ptr_hash<taa_tgba::state> > spot::taa_tgba_labelled< std::string , string_hash >::sn_map `[protected, inherited]`

7.154.1.4 typedef std::vector<taa_tgba::state_set∗> spot::taa_tgba::ss_vec `[protected, inherited]`

7.154.1.5 typedef std::list<transition∗> spot::taa_tgba::state `[inherited]`

7.154.1.6 typedef std::set<state∗> spot::taa_tgba::state_set `[inherited]`

7.154.2 Constructor & Destructor Documentation

7.154.2.1 spot::taa_tgba_string::taa_tgba_string (bdd_dict ∗ *dict*) `[inline]`

7.154.2.2 spot::taa_tgba_string::∼taa_tgba_string ( )

7.154.3 Member Function Documentation

7.154.3.1 void spot::taa_tgba_labelled< std::string , string_hash >::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inline, inherited]`

References spot::bdd_dict::acc_map, spot::taa_tgba::transition::acceptance_conditions, spot::taa_tgba::all_acceptance_conditions_computed_, spot::ltl::formula::destroy(), spot::taa_tgba::dict_, spot::taa_tgba_labelled< label, label_hash >::name_state_map_, spot::taa_tgba::neg_acceptance_conditions_, and spot::bdd_dict::register_acceptance_variable().

7.154.3.2 void spot::taa_tgba::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.154.3.3 virtual bdd spot::taa_tgba::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.154.3.4 virtual label_t spot::taa_tgba_labelled< std::string , string_hash >::clone_if (const label_t & *lbl*) const `[protected, pure virtual, inherited]`

Clone the label if necessary to assure it is owned by this, avoiding memory issues when label is a pointer.

7.154.3.5 virtual std::string spot::taa_tgba_string::clone_if (const std::string & *label*) const `[protected, virtual]`

7.154.3.6 virtual bdd spot::taa_tgba::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.154.3.7 virtual bdd spot::taa_tgba::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.154.3.8 transition∗ spot::taa_tgba_labelled< std::string , string_hash >::create_transition (const std::string & *s*, const std::vector< std::string > & *d*) `[inline, inherited]`

References spot::taa_tgba::transition::acceptance_conditions, spot::taa_tgba_labelled< label, label_hash >::add_state(), spot::taa_tgba_labelled< label, label_hash >::add_state_set(), spot::taa_tgba::transition::condition, and spot::taa_tgba::transition::dst.

7.154.3.9 transition∗ spot::taa_tgba_labelled< std::string , string_hash >::create_transition (const std::string & *s*, const std::string & *d*) `[inline, inherited]`

References spot::taa_tgba_labelled< label, label_hash >::create_transition().

7.154.3.10 virtual std::string spot::taa_tgba_labelled< std::string , string_hash >::format_state (const spot::state ∗ *s*) const `[inline, virtual, inherited]`

Format the state as a string for printing.

If state is a spot::state_set of only one element, then the string corresponding to state->get_state() is returned.

Otherwise a string composed of each string corresponding to each state->get_state() in the spot::state_set is returned, e.g. like {string_1,...,string_n}.

Implements spot::taa_tgba.

References spot::taa_tgba_labelled< label, label_hash >::format_state_set(), and spot::state_set::get_state().

7.154.3.11 virtual bdd_dict∗ spot::taa_tgba::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.154.3.12 virtual spot::state∗ spot::taa_tgba::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.154.3.13 virtual std::string spot::taa_tgba_labelled< std::string , string_hash >::label_to_string (const label_t & *lbl*) const `[protected, pure virtual, inherited]`

Return a label as a string.

7.154.3.14 virtual std::string spot::taa_tgba_string::label_to_string (const std::string & *label*) const `[protected, virtual]`

7.154.3.15 virtual bdd spot::taa_tgba::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.154.3.16 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.154.3.17 void spot::taa_tgba_labelled< std::string , string_hash >::output (std::ostream & *os*) const `[inline, inherited]`

Output a TAA in a stream.

References spot::taa_tgba_labelled< label, label_hash >::format_state_set(), spot::taa_tgba_labelled< label, label_hash >::label_to_string(), and spot::taa_tgba_labelled< label, label_hash >::name_state_map_.

7.154.3.18 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

> 0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.154.3.19 void spot::taa_tgba_labelled< std::string , string_hash >::set_init_state (const std::vector< std::string > & *s*) `[inline, inherited]`

References spot::taa_tgba_labelled< label, label_hash >::add_state_set(), and spot::taa_tgba::init_.

7.154.3.20 void spot::taa_tgba_labelled< std::string , string_hash >::set_init_state (const std::string & *s*) `[inline, inherited]`

References spot::taa_tgba_labelled< label, label_hash >::set_init_state().

7.154.3.21 virtual tgba_succ_iterator∗ spot::taa_tgba::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.154.3.22 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.154.3.23 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.154.3.24 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.154.4 Member Data Documentation

7.154.4.1 bdd spot::taa_tgba::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.154.4.2 bool spot::taa_tgba::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.154.4.3 bdd_dict∗ spot::taa_tgba::dict_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.154.4.4 taa_tgba::state_set∗ spot::taa_tgba::init_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::set_init_state().

7.154.4.5 ns_map spot::taa_tgba_labelled< std::string , string_hash >::name_state_map_ `[protected, inherited]`

7.154.4.6 bdd spot::taa_tgba::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition().

7.154.4.7 sn_map spot::taa_tgba_labelled< std::string , string_hash >::state_name_map_ `[protected, inherited]`

7.154.4.8 ss_vec spot::taa_tgba::state_set_vec_ `[protected, inherited]`

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_state_set().

The documentation for this class was generated from the following file:

- tgba/taatgba.hh

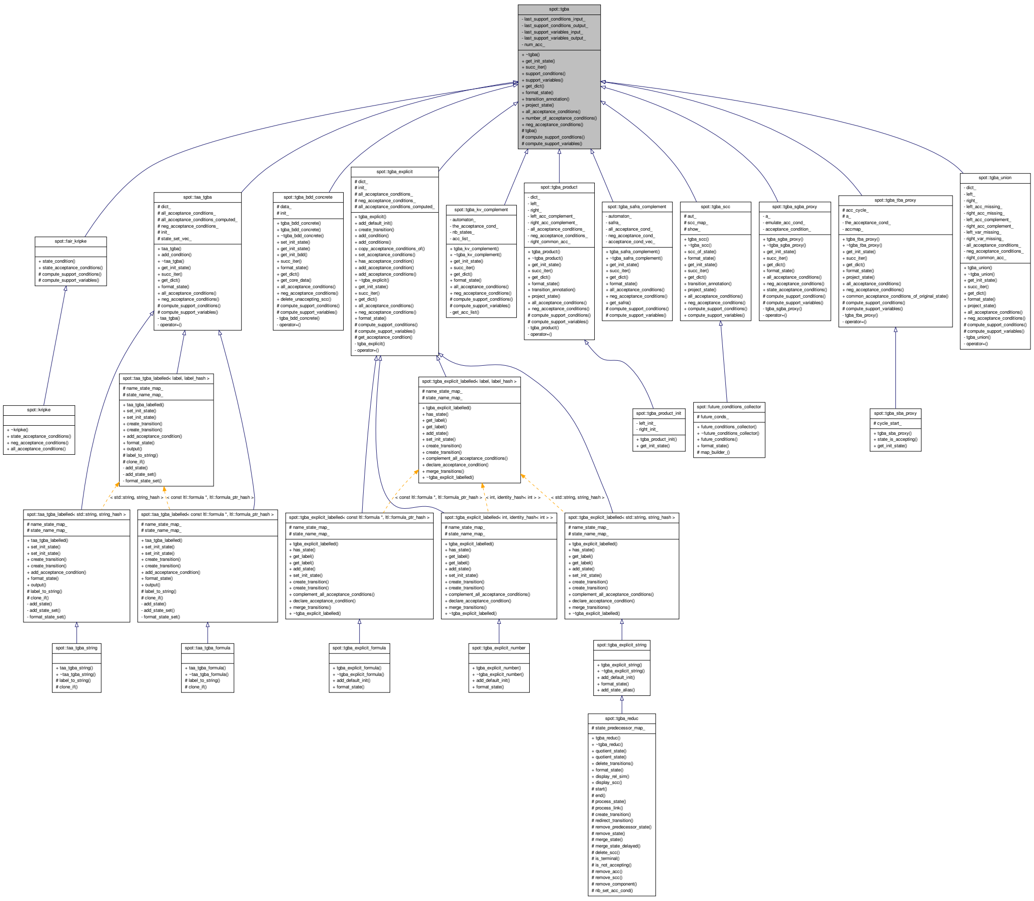
7.155 spot::tgba Class Reference

A Transition-based Generalized Büchi Automaton.

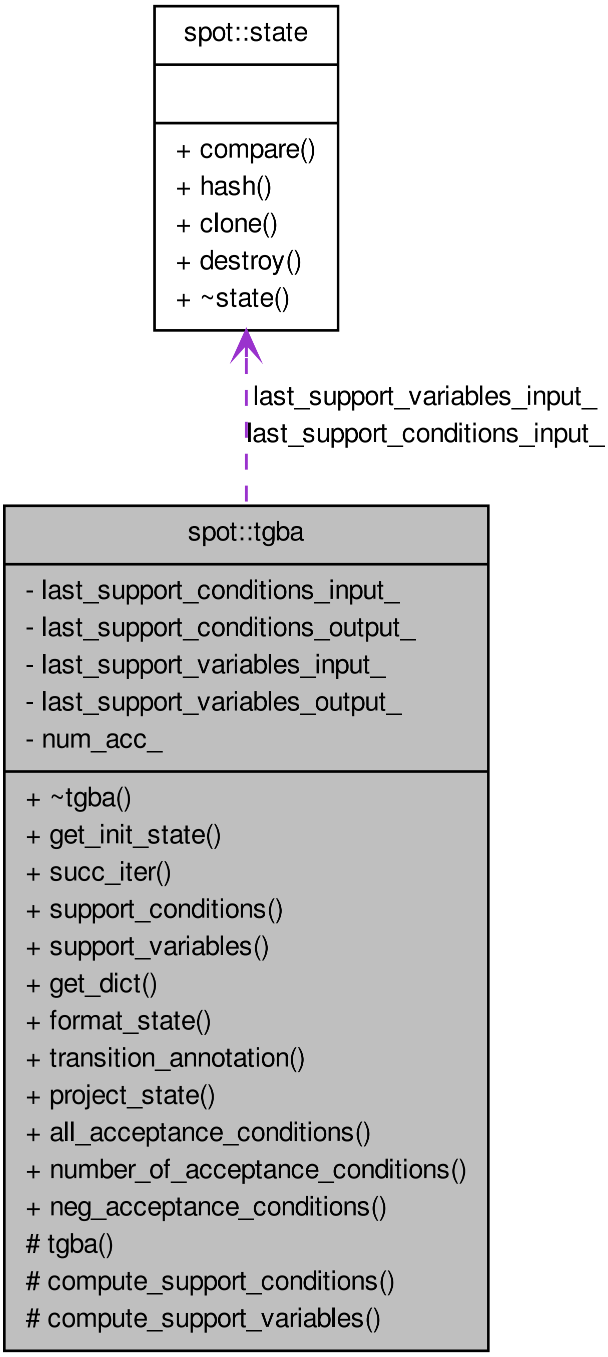
The acronym TGBA (Transition-based Generalized Büchi Automaton) was coined by Dimitra Giannakopoulou and Flavio Lerda in "From States to Transitions: Improving Translation of LTL Formulae to Büchi Automata". (FORTE'02).

`#include <tgba/tgba.hh>`

Inheritance diagram for spot::tgba:



Collaboration diagram for spot::tgba:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()

Public Member Functions

- virtual ∼tgba ()
- virtual state ∗ get_init_state () const =0

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const =0

  Get an iterator over the successors of local_state.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual bdd_dict ∗ get_dict () const =0

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const =0

  Format the state as a string for printing.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const =0

  Return the set of all acceptance conditions used by this automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

- virtual bdd neg_acceptance_conditions () const =0

  Return the conjuction of all negated acceptance variables.

Protected Member Functions

- tgba ()
- virtual bdd compute_support_conditions (const state ∗state) const =0

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const =0

  Do the actual computation of tgba::support_variables().

Private Attributes

- const state ∗ last_support_conditions_input_
- bdd last_support_conditions_output_
- const state ∗ last_support_variables_input_
- bdd last_support_variables_output_
- int num_acc_

7.155.1 Detailed Description

A Transition-based Generalized Büchi Automaton.

The acronym TGBA (Transition-based Generalized Büchi Automaton) was coined by Dimitra Giannakopoulou and Flavio Lerda in "From States to Transitions: Improving Translation of LTL Formulae to Büchi Automata". (FORTE'02). TGBAs are transition-based, meanings their labels are put on arcs, not on nodes. They use Generalized Büchi acceptance conditions: there are several acceptance sets (of transitions), and a path can be accepted only if it traverses at least one transition of each set infinitely often.

Browsing such automaton can be achieved using two functions: `get_init_state`, and `succ_iter`. The former returns the initial state while the latter lists the successor states of any state.

Note that although this is a transition-based automata, we never represent transitions! Transition informations are obtained by querying the iterator over the successors of a state.

7.155.2 Constructor & Destructor Documentation

7.155.2.1 spot::tgba::tgba ( ) `[protected]`

7.155.2.2 virtual spot::tgba::∼tgba ( ) `[virtual]`

7.155.3 Member Function Documentation

7.155.3.1 virtual bdd spot::tgba::all_acceptance_conditions ( ) const `[pure virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implemented in spot::kripke, spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.2 virtual bdd spot::tgba::compute_support_conditions (const state ∗ *state*) const `[protected, pure virtual]`

Do the actual computation of tgba::support_conditions().

Implemented in spot::fair_kripke, spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.3 virtual bdd spot::tgba::compute_support_variables (const state ∗ *state*) const `[protected, pure virtual]`

Do the actual computation of tgba::support_variables().

Implemented in spot::fair_kripke, spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.4 virtual std::string spot::tgba::format_state (const state ∗ *state*) const `[pure virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implemented in spot::future_conditions_collector, spot::taa_tgba, spot::taa_tgba_labelled< label, label_hash >, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_explicit_string, spot::tgba_explicit_formula, spot::tgba_explicit_number, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, spot::tgba_union, spot::taa_tgba_labelled< const ltl::formula ∗, ltl::formula_ptr_hash >, and spot::taa_tgba_labelled< std::string, string_hash >.

7.155.3.5 virtual bdd_dict∗ spot::tgba::get_dict ( ) const `[pure virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.6 virtual state∗ spot::tgba::get_init_state ( ) const `[pure virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_product_init, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, spot::tgba_sba_proxy, and spot::tgba_union.

7.155.3.7 virtual bdd spot::tgba::neg_acceptance_conditions ( ) const `[pure virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implemented in spot::kripke, spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual]`

The number of acceptance conditions.

7.155.3.9 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.10 virtual tgba_succ_iterator∗ spot::tgba::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[pure virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchronized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implemented in spot::taa_tgba, spot::tgba_bdd_concrete, spot::tgba_explicit, spot::tgba_kv_complement, spot::tgba_product, spot::tgba_safra_complement, spot::tgba_scc, spot::tgba_sgba_proxy, spot::tgba_tba_proxy, and spot::tgba_union.

7.155.3.11 bdd spot::tgba::support_conditions (const state * *state*) const

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.155.3.12 bdd spot::tgba::support_variables (const state * *state*) const

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.155.3.13 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator * *t*) const `[virtual]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.155.4 Member Data Documentation

7.155.4.1 const state∗ spot::tgba::last_support_conditions_input_ `[mutable, private]`

7.155.4.2 bdd spot::tgba::last_support_conditions_output_ `[mutable, private]`

7.155.4.3 const state∗ spot::tgba::last_support_variables_input_ `[mutable, private]`

7.155.4.4 bdd spot::tgba::last_support_variables_output_ `[mutable, private]`

7.155.4.5 int spot::tgba::num_acc_ `[mutable, private]`

The documentation for this class was generated from the following file:

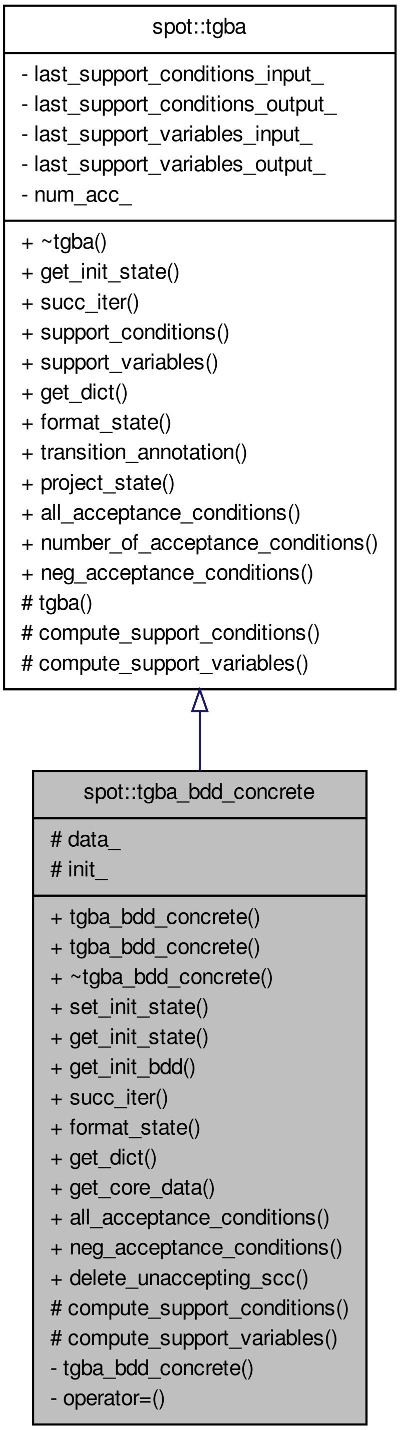
- tgba/tgba.hh

7.156 spot::tgba_bdd_concrete Class Reference

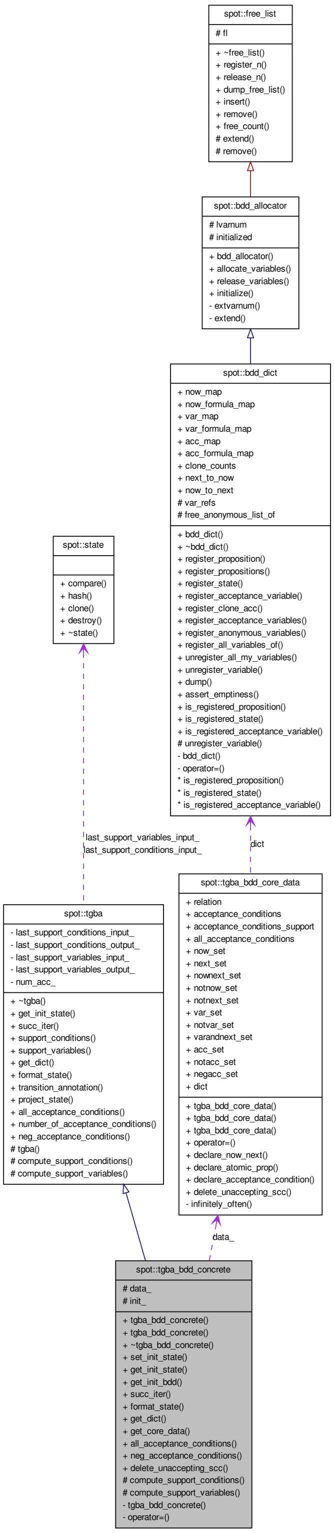
A concrete spot::tgba implemented using BDDs.

`#include <tgba/tgbabddconcrete.hh>`

Inheritance diagram for spot::tgba_bdd_concrete:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_bdd_concrete
# data_
# init_
+ tgba_bdd_concrete()
+ tgba_bdd_concrete()
+ ~tgba_bdd_concrete()
+ set_init_state()
+ get_init_state()
+ get_init_bdd()
+ succ_iter()
+ format_state()
+ get_dict()
+ get_core_data()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ delete_unaccepting_scc()
# compute_support_conditions()
# compute_support_variables()
- tgba_bdd_concrete()
- operator=()

Collaboration diagram for spot::tgba_bdd_concrete:



Public Member Functions

- tgba_bdd_concrete (const tgba_bdd_factory &fact)

  Construct a tgba_bdd_concrete with unknown initial state.

- tgba_bdd_concrete (const tgba_bdd_factory &fact, bdd init)

  Construct a tgba_bdd_concrete with known initial state.

- virtual ∼tgba_bdd_concrete ()
- virtual void set_init_state (bdd s)

  Set the initial state.

- virtual state_bdd ∗ get_init_state () const

  Get the initial state of the automaton.

- bdd get_init_bdd () const

  Get the initial state directly as a BDD.

- virtual tgba_succ_iterator_concrete ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- const tgba_bdd_core_data & get_core_data () const

  Get the core data associated to this automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- void delete_unaccepting_scc ()

  Delete SCCs (Strongly Connected Components) from the TGBA which cannot be accepting.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Protected Attributes

- tgba_bdd_core_data data_

  Core data associated to the automaton.

- bdd init_

  Initial state.

Private Member Functions

- tgba_bdd_concrete (const tgba_bdd_concrete &)
- tgba_bdd_concrete & operator= (const tgba_bdd_concrete &)

7.156.1 Detailed Description

A concrete spot::tgba implemented using BDDs.

7.156.2 Constructor & Destructor Documentation

7.156.2.1 spot::tgba_bdd_concrete::tgba_bdd_concrete (const tgba_bdd_factory & *fact*)

Construct a tgba_bdd_concrete with unknown initial state.

set_init_state() should be called later.

7.156.2.2 spot::tgba_bdd_concrete::tgba_bdd_concrete (const tgba_bdd_factory & *fact*, bdd *init*)

Construct a tgba_bdd_concrete with known initial state.

7.156.2.3 virtual spot::tgba_bdd_concrete::∼tgba_bdd_concrete ( ) `[virtual]`

7.156.2.4 spot::tgba_bdd_concrete::tgba_bdd_concrete (const tgba_bdd_concrete &) `[private]`

7.156.3 Member Function Documentation

7.156.3.1 virtual bdd spot::tgba_bdd_concrete::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.156.3.2 virtual bdd spot::tgba_bdd_concrete::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.156.3.3 virtual bdd spot::tgba_bdd_concrete::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.156.3.4 void spot::tgba_bdd_concrete::delete_unaccepting_scc ( )

Delete SCCs (Strongly Connected Components) from the TGBA which cannot be accepting.

7.156.3.5 virtual std::string spot::tgba_bdd_concrete::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.156.3.6 const tgba_bdd_core_data& spot::tgba_bdd_concrete::get_core_data ( ) const

Get the core data associated to this automaton.

These data includes the various BDD used to represent the relation, encode variable sets, Next-to-Now rewrite rules, etc.

7.156.3.7 virtual bdd_dict∗ spot::tgba_bdd_concrete::get_dict ( ) const [virtual]

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.156.3.8 bdd spot::tgba_bdd_concrete::get_init_bdd ( ) const

Get the initial state directly as a BDD.

The sole point of this method is to prevent writing horrors such as

```
state_bdd* s = automata.get_init_state();
some_class some_instance(s->as_bdd());
s->destroy();
```

7.156.3.9 virtual state_bdd∗ spot::tgba_bdd_concrete::get_init_state ( ) const [virtual]

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.156.3.10 virtual bdd spot::tgba_bdd_concrete::neg_acceptance_conditions ( ) const [virtual]

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.156.3.11 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.156.3.12 tgba_bdd_concrete& spot::tgba_bdd_concrete::operator= (const tgba_bdd_concrete &) `[private]`

7.156.3.13 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.156.3.14 virtual void spot::tgba_bdd_concrete::set_init_state (bdd *s*) `[virtual]`

Set the initial state.

7.156.3.15 virtual tgba_succ_iterator_concrete∗ spot::tgba_bdd_concrete::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand.

global_automaton designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.156.3.16 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.156.3.17 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.156.3.18 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.156.4 Member Data Documentation

7.156.4.1 tgba_bdd_core_data spot::tgba_bdd_concrete::data_ `[protected]`

Core data associated to the automaton.

7.156.4.2 bdd spot::tgba_bdd_concrete::init_ `[protected]`

Initial state.

The documentation for this class was generated from the following file:

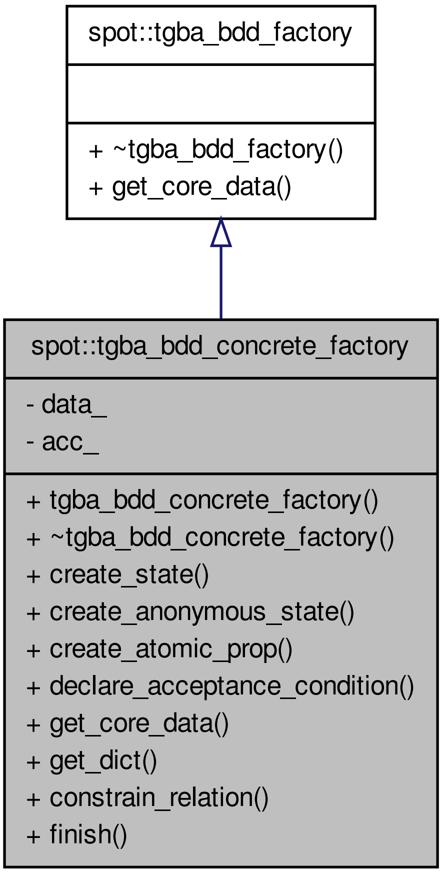
- tgba/tgbabddconcrete.hh

7.157 spot::tgba_bdd_concrete_factory Class Reference

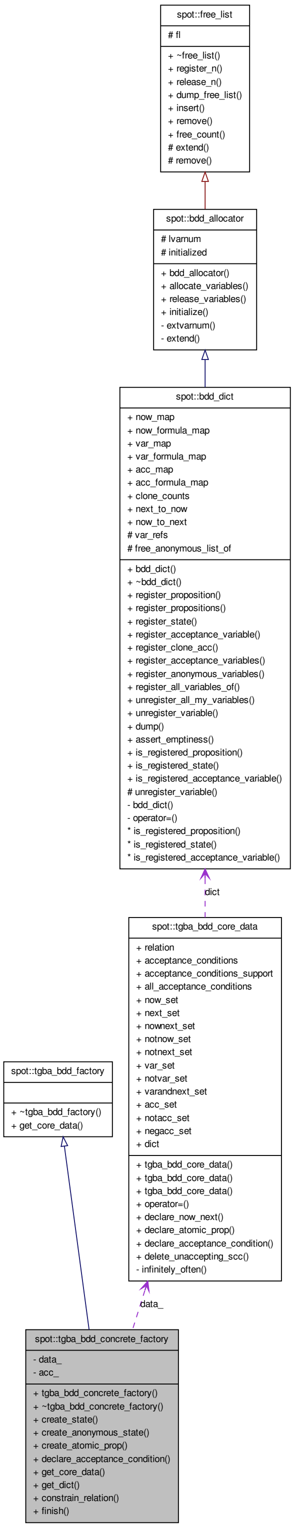
Helper class to build a spot::tgba_bdd_concrete object.

`#include <tgba/tgbabddconcretefactory.hh>`

Inheritance diagram for spot::tgba_bdd_concrete_factory:



Collaboration diagram for spot::tgba_bdd_concrete_factory:



Public Member Functions

- tgba_bdd_concrete_factory (bdd_dict ∗dict)
- virtual ∼tgba_bdd_concrete_factory ()
- int create_state (const ltl::formula ∗f)
- int create_anonymous_state ()
- int create_atomic_prop (const ltl::formula ∗f)
- void declare_acceptance_condition (bdd b, const ltl::formula ∗a)
- const tgba_bdd_core_data & get_core_data () const

  Get the core data for the new automata.

- bdd_dict ∗ get_dict () const
- void constrain_relation (bdd new_rel)

  Add a new constraint to the relation.

- void finish ()

  Perfom final computations before the relation can be used.

Private Types

- typedef Sgi::hash_map< const ltl::formula ∗, bdd, ltl::formula_ptr_hash > acc_map_

Private Attributes

- tgba_bdd_core_data data_

  Core data for the new automata.

- acc_map_ acc_

  BDD associated to each acceptance condition.

7.157.1 Detailed Description

Helper class to build a spot::tgba_bdd_concrete object.

7.157.2 Member Typedef Documentation

7.157.2.1 typedef Sgi::hash_map<const ltl::formula∗, bdd, ltl::formula_ptr_hash> spot::tgba_bdd_concrete_factory::acc_map_ `[private]`

7.157.3 Constructor & Destructor Documentation

7.157.3.1 spot::tgba_bdd_concrete_factory::tgba_bdd_concrete_factory (bdd_dict ∗ *dict*)

7.157.3.2 virtual spot::tgba_bdd_concrete_factory::∼tgba_bdd_concrete_factory ( ) `[virtual]`

7.157.4 Member Function Documentation

7.157.4.1 void spot::tgba_bdd_concrete_factory::constrain_relation (bdd *new_rel*)

Add a new constraint to the relation.

7.157.4.2 int spot::tgba_bdd_concrete_factory::create_anonymous_state ( )

Create a anonymous Now/Next variables.

Returns

The BDD variable number v for the Now state. The Next BDD corresponds to v+1.

7.157.4.3 int spot::tgba_bdd_concrete_factory::create_atomic_prop (const ltl::formula ∗ *f*)

Create an atomic proposition variable for formula *f*.

Parameters

f The formula to create an aotmic proposition for.

Returns

The variable number for this state.

The atomic proposition is not created if it already exists. Instead its existing variable number is returned. Variable numbers can be turned into BDD using ithvar().

7.157.4.4 int spot::tgba_bdd_concrete_factory::create_state (const ltl::formula ∗ *f*)

Create a Now/Next variables for formula *f*.

Parameters

f The formula to create a state for.

Returns

The BDD variable number v for the Now state. The Next BDD corresponds to v+1.

The state variables are not created if they already exist. Instead their existing variable numbers are returned. Variable numbers can be turned into BDD using ithvar().

7.157.4.5 void spot::tgba_bdd_concrete_factory::declare_acceptance_condition (bdd *b*, const ltl::formula ∗ *a*)

Declare an acceptance condition.

Formula such as 'f U g' or 'F g' make the promise that 'g' will be fulfilled eventually. So once one of this formula has been translated into a BDD, we use declare_acceptance_condition() to associate all other states to the acceptance set of 'g'.

Parameters

b	a BDD indicating which variables are in the acceptance set
a	the formula associated

7.157.4.6 void spot::tgba_bdd_concrete_factory::finish ( )

Perfom final computations before the relation can be used.

This function should be called after all propositions, state, acceptance conditions, and constraints have been declared, and before calling get_code_data() or get_dict().

7.157.4.7 const tgba_bdd_core_data& spot::tgba_bdd_concrete_factory::get_core_data ( ) const `[virtual]`

Get the core data for the new automata.

Implements spot::tgba_bdd_factory.

7.157.4.8 bdd_dict∗ spot::tgba_bdd_concrete_factory::get_dict ( ) const

7.157.5 Member Data Documentation

7.157.5.1 acc_map_ spot::tgba_bdd_concrete_factory::acc_ `[private]`

BDD associated to each acceptance condition.

7.157.5.2 tgba_bdd_core_data spot::tgba_bdd_concrete_factory::data_ `[private]`

Core data for the new automata.

The documentation for this class was generated from the following file:

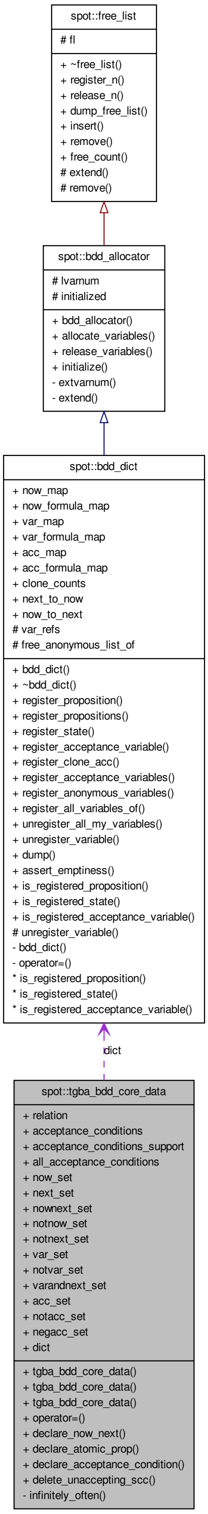
- tgba/tgbabddconcretefactory.hh

7.158 spot::tgba_bdd_core_data Struct Reference

Core data for a TGBA encoded using BDDs.

`#include <tgba/tgbabddcoredata.hh>`

Collaboration diagram for spot::tgba_bdd_core_data:



Public Member Functions

- tgba_bdd_core_data (bdd_dict ∗dict)

  Default constructor.

- tgba_bdd_core_data (const tgba_bdd_core_data &copy)

  Copy constructor.

- tgba_bdd_core_data (const tgba_bdd_core_data &left, const tgba_bdd_core_data &right)

  Merge two tgba_bdd_core_data.

- const tgba_bdd_core_data & operator= (const tgba_bdd_core_data &copy)
- void declare_now_next (bdd now, bdd next)

  Update the variable sets to take a new pair of variables into account.

- void declare_atomic_prop (bdd var)

  Update the variable sets to take a new automic proposition into account.

- void declare_acceptance_condition (bdd prom)

  Update the variable sets to take a new acceptance condition into account.

- void delete_unaccepting_scc (bdd init)

  Delete SCCs (Strongly Connected Components) from the relation which cannot be accepting.

Public Attributes

- bdd relation

  encodes the transition relation of the TGBA.

- bdd acceptance_conditions

  encodes the acceptance conditions

- bdd acceptance_conditions_support

  The value of `bdd_support(acceptance_conditions)`*.*

- bdd all_acceptance_conditions

  The set of all acceptance conditions used by the Automaton.

- bdd now_set

  The conjunction of all Now variables, in their positive form.

- bdd next_set

  The conjunction of all Next variables, in their positive form.

- bdd nownext_set

  The conjunction of all Now and Next variables, in their positive form.

- bdd notnow_set

  The (positive) conjunction of all variables which are not Now variables.

- bdd notnext_set

  The (positive) conjunction of all variables which are not Next variables.

- bdd var_set

  The (positive) conjunction of all variables which are atomic propositions.

- bdd notvar_set

  The (positive) conjunction of all variables which are not atomic propositions.

- bdd varandnext_set

  The (positive) conjunction of all Next variables and atomic propositions.

- bdd acc_set

  The (positive) conjunction of all variables which are acceptance conditions.

- bdd notacc_set

  The (positive) conjunction of all variables which are not acceptance conditions.

- bdd negacc_set

  The negative conjunction of all variables which are acceptance conditions.

- bdd_dict ∗ dict

  The dictionary used by the automata.

Private Member Functions

- bdd infinitely_often (bdd s, bdd acc, bdd er)

7.158.1 Detailed Description

Core data for a TGBA encoded using BDDs.

7.158.2 Constructor & Destructor Documentation

7.158.2.1 spot::tgba_bdd_core_data::tgba_bdd_core_data (bdd_dict ∗ *dict*)

Default constructor.

Initially all variable set are empty and the `relation` is true.

7.158.2.2 spot::tgba_bdd_core_data::tgba_bdd_core_data (const tgba_bdd_core_data & *copy*)

Copy constructor.

7.158.2.3 spot::tgba_bdd_core_data::tgba_bdd_core_data (const tgba_bdd_core_data & *left*, const tgba_bdd_core_data & *right*)

Merge two tgba_bdd_core_data.

This is used when building a product of two automata.

7.158.3 Member Function Documentation

7.158.3.1 void spot::tgba_bdd_core_data::declare_acceptance_condition (bdd *prom*)

Update the variable sets to take a new acceptance condition into account.

7.158.3.2 void spot::tgba_bdd_core_data::declare_atomic_prop (bdd *var*)

Update the variable sets to take a new automic proposition into account.

7.158.3.3 void spot::tgba_bdd_core_data::declare_now_next (bdd *now*, bdd *next*)

Update the variable sets to take a new pair of variables into account.

7.158.3.4 void spot::tgba_bdd_core_data::delete_unaccepting_scc (bdd *init*)

Delete SCCs (Strongly Connected Components) from the relation which cannot be accepting.

7.158.3.5 bdd spot::tgba_bdd_core_data::infinitely_often (bdd *s*, bdd *acc*, bdd *er*) `[private]`

7.158.3.6 const tgba_bdd_core_data& spot::tgba_bdd_core_data::operator= (const tgba_bdd_core_data & *copy*)

7.158.4 Member Data Documentation

7.158.4.1 bdd spot::tgba_bdd_core_data::acc_set

The (positive) conjunction of all variables which are acceptance conditions.

7.158.4.2 bdd spot::tgba_bdd_core_data::acceptance_conditions

encodes the acceptance conditions

`a U b`, or `F b`, both imply that `b` should be verified eventually. We encode this with generalized Büchi acceptating conditions. An acceptance set, called `Acc[b]`, hold all the state that do not promise to verify `b` eventually. (I.e., all the states that contain `b`, or do not contain `a U b`, or `F b`.)

The spot::succ_iter::current_acceptance_conditions() method will return the `Acc`[x] variables of the acceptance sets in which a transition is. Actually we never return `Acc`[x] alone, but `Acc`[x] and all other acceptance variables negated.

So if there is three acceptance set `a`, `b`, and `c`, and a transition is in set `a`, we'll return `Acc[a]&!Acc[b]&!Acc[c]`. If the transition is in both `a` and `b`, we'll return `(Acc[a]&!Acc[b]&!Acc[c]) | (!Acc[a]&Acc[b]&!Acc[c])`.

Acceptance conditions are attributed to transitions and are only concerned by atomic propositions (which label the transitions) and Next variables (the destination). Typically, a transition should bear the variable `Acc`[b] if it doesn't check for 'b' and have a destination of the form `a U b`, or `F b`.

To summarize, `acceptance_conditions` contains three kinds of variables:

- "Next" variables, that encode the destination state,
- atomic propositions, which are things to verify before going on to the next state,
- "Acc" variables.

7.158.4.3 bdd spot::tgba_bdd_core_data::acceptance_conditions_support

The value of `bdd_support(acceptance_conditions)`.

7.158.4.4 bdd spot::tgba_bdd_core_data::all_acceptance_conditions

The set of all acceptance conditions used by the Automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

7.158.4.5 bdd_dict∗ spot::tgba_bdd_core_data::dict

The dictionary used by the automata.

7.158.4.6 bdd spot::tgba_bdd_core_data::negacc_set

The negative conjunction of all variables which are acceptance conditions.

7.158.4.7 bdd spot::tgba_bdd_core_data::next_set

The conjunction of all Next variables, in their positive form.

7.158.4.8 bdd spot::tgba_bdd_core_data::notacc_set

The (positive) conjunction of all variables which are not acceptance conditions.

7.158.4.9 bdd spot::tgba_bdd_core_data::notnext_set

The (positive) conjunction of all variables which are not Next variables.

7.158.4.10 bdd spot::tgba_bdd_core_data::notnow_set

The (positive) conjunction of all variables which are not Now variables.

7.158.4.11 bdd spot::tgba_bdd_core_data::notvar_set

The (positive) conjunction of all variables which are not atomic propositions.

7.158.4.12 bdd spot::tgba_bdd_core_data::now_set

The conjunction of all Now variables, in their positive form.

7.158.4.13 bdd spot::tgba_bdd_core_data::nownext_set

The conjunction of all Now and Next variables, in their positive form.

7.158.4.14 bdd spot::tgba_bdd_core_data::relation

encodes the transition relation of the TGBA.

`relation` uses three kinds of variables:

- "Now" variables, that encode the current state
- "Next" variables, that encode the destination state

- atomic propositions, which are things to verify before going on to the next state

7.158.4.15 bdd spot::tgba_bdd_core_data::var_set

The (positive) conjunction of all variables which are atomic propositions.

7.158.4.16 bdd spot::tgba_bdd_core_data::varandnext_set

The (positive) conjunction of all Next variables and atomic propositions.

The documentation for this struct was generated from the following file:

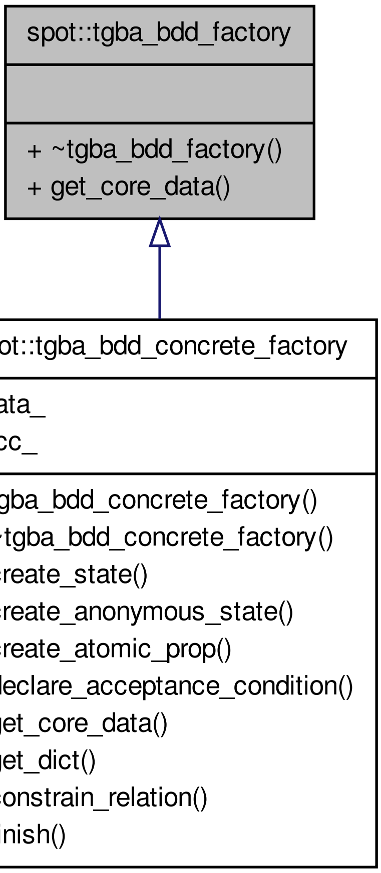
- tgba/tgbabddcoredata.hh

7.159 spot::tgba_bdd_factory Class Reference

Abstract class for spot::tgba_bdd_concrete factories.

`#include <tgba/tgbabddfactory.hh>`

Inheritance diagram for spot::tgba_bdd_factory:



Public Member Functions

- virtual ~tgba_bdd_factory ()
- virtual const tgba_bdd_core_data & get_core_data () const =0

  Get the core data for the new automata.

7.159.1 Detailed Description

Abstract class for spot::tgba_bdd_concrete factories. A spot::tgba_bdd_concrete can be constructed from anything that supplies core data and their associated dictionary.

7.159.2 Constructor & Destructor Documentation

7.159.2.1 virtual spot::tgba_bdd_factory::~tgba_bdd_factory ( ) `[inline, virtual]`

7.159.3 Member Function Documentation

7.159.3.1 virtual const tgba_bdd_core_data& spot::tgba_bdd_factory::get_core_data ( ) const `[pure virtual]`

Get the core data for the new automata.

Implemented in spot::tgba_bdd_concrete_factory.

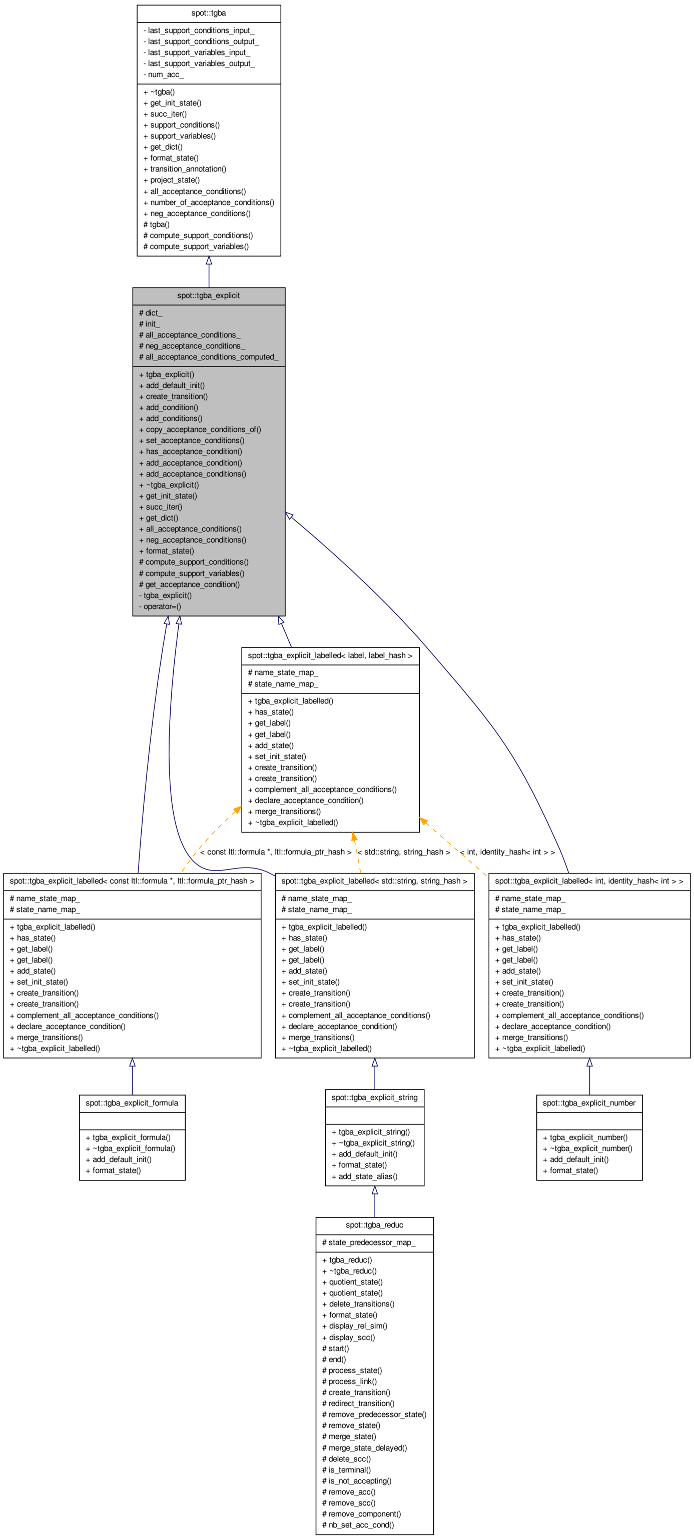
The documentation for this class was generated from the following file:

- tgba/tgbabddfactory.hh

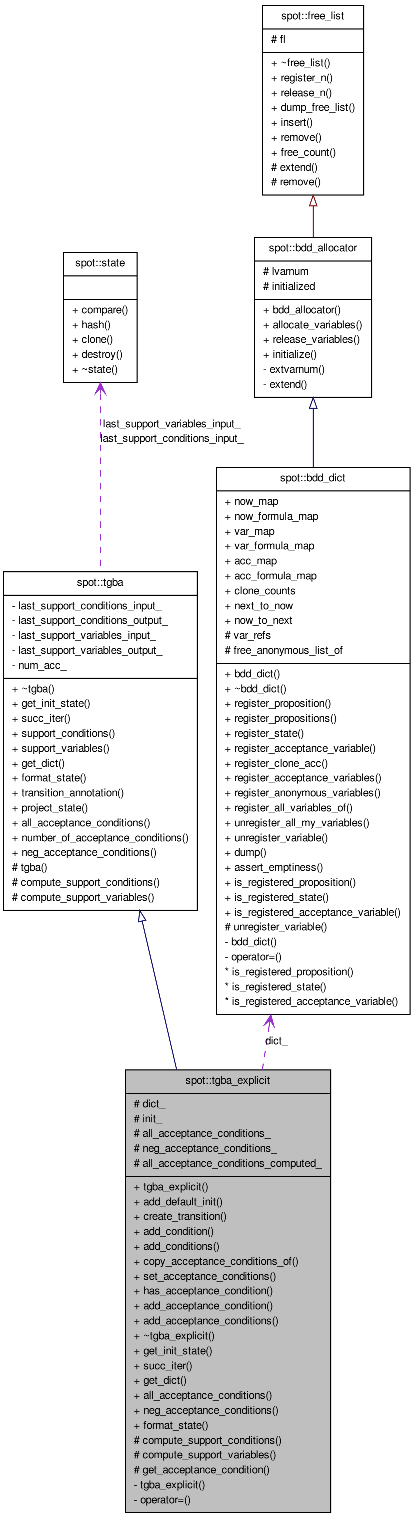
7.160 spot::tgba_explicit Class Reference

```
#include <tgba/tgbaexplicit.hh>
```

Inheritance diagram for spot::tgba_explicit:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_explicit
# dict_
# init_
# all_acceptance_conditions_
# neg_acceptance_conditions_
# all_acceptance_conditions_computed_
+ tgba_explicit()
+ add_default_init()
+ create_transition()
+ add_condition()
+ add_conditions()
+ copy_acceptance_conditions_of()
+ set_acceptance_conditions()
+ has_acceptance_condition()
+ add_acceptance_condition()
+ add_acceptance_conditions()
+ ~tgba_explicit()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ format_state()
# compute_support_conditions()
# compute_support_variables()
# get_acceptance_condition()
- tgba_explicit()
- operator=()
spot::tgba_explicit_labelled< label, label_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
< const ltl::formula *, ltl::formula_ptr_hash >
< std::string, string_hash >
< int, identity_hash< int > >
spot::tgba_explicit_labelled< const ltl::formula *, ltl::formula_ptr_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_labelled< std::string, string_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_labelled< int, identity_hash< int > >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_formula
+ tgba_explicit_formula()
+ ~tgba_explicit_formula()
+ add_default_init()
+ format_state()
spot::tgba_explicit_string
+ tgba_explicit_string()
+ ~tgba_explicit_string()
+ add_default_init()
+ format_state()
+ add_state_alias()
spot::tgba_explicit_number
+ tgba_explicit_number()
+ ~tgba_explicit_number()
+ add_default_init()
+ format_state()
spot::tgba_reduc
# state_predecessor_map_
+ tgba_reduc()
+ ~tgba_reduc()
+ quotient_state()
+ quotient_state()
+ delete_transitions()
+ format_state()
+ display_rel_sim()
+ display_scc()
# start()
# end()
# process_state()
# process_link()
# create_transition()
# redirect_transition()
# remove_predecessor_state()
# remove_state()
# merge_state()
# merge_state_delayed()
# delete_scc()
# is_terminal()
# is_not_accepting()
# remove_acc()
# remove_scc()
# remove_component()
# nb_set_acc_cond()

Collaboration diagram for spot::tgba_explicit:



Classes

- struct transition

  Explicit transitions (used by spot::tgba_explicit).

Public Types

- typedef std::list< transition ∗ > state

Public Member Functions

- tgba_explicit (bdd_dict ∗dict)
- virtual state ∗ add_default_init ()=0

  Add a default initial state.

- transition ∗ create_transition (state ∗source, const state ∗dest)
- void add_condition (transition ∗t, const ltl::formula ∗f)
- void add_conditions (transition ∗t, bdd f)

  This assumes that all variables in f are known from dict.

- void copy_acceptance_conditions_of (const tgba ∗a)

  Copy the acceptance conditions of a tgba.

- void set_acceptance_conditions (bdd acc)

  The the acceptance conditions.

- bool has_acceptance_condition (const ltl::formula ∗f) const
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- void add_acceptance_conditions (transition ∗t, bdd f)

  This assumes that all acceptance conditions in f are known from dict.

- virtual ∼tgba_explicit ()
- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- virtual std::string format_state (const spot::state ∗s) const =0

Format the state as a string for printing.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd get_acceptance_condition (const ltl::formula ∗f)

Protected Attributes

- bdd_dict ∗ dict_
- tgba_explicit::state ∗ init_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bool all_acceptance_conditions_computed_

Private Member Functions

- tgba_explicit (const tgba_explicit &other)
- tgba_explicit & operator= (const tgba_explicit &other)

7.160.1 Detailed Description

Explicit representation of a spot::tgba.

7.160.2 Member Typedef Documentation

7.160.2.1 typedef std::list<transition∗> spot::tgba_explicit::state

7.160.3 Constructor & Destructor Documentation

7.160.3.1 spot::tgba_explicit::tgba_explicit (bdd_dict ∗ *dict*)

7.160.3.2 virtual spot::tgba_explicit::∼tgba_explicit ( ) `[virtual]`

7.160.3.3 spot::tgba_explicit::tgba_explicit (const tgba_explicit & *other*) `[private]`

7.160.4 Member Function Documentation

7.160.4.1 void spot::tgba_explicit::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*)

7.160.4.2 void spot::tgba_explicit::add_acceptance_conditions (transition ∗ *t*, bdd *f*)

This assumes that all acceptance conditions in *f* are known from dict.

7.160.4.3 void spot::tgba_explicit::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*)

7.160.4.4 void spot::tgba_explicit::add_conditions (transition ∗ *t*, bdd *f*)

This assumes that all variables in *f* are known from dict.

7.160.4.5 virtual state∗ spot::tgba_explicit::add_default_init ( ) `[pure virtual]`

Add a default initial state.

Implemented in spot::tgba_explicit_string, spot::tgba_explicit_formula, and spot::tgba_explicit_number.

7.160.4.6 virtual bdd spot::tgba_explicit::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_-conditions().

7.160.4.7 virtual bdd spot::tgba_explicit::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.160.4.8 virtual bdd spot::tgba_explicit::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.160.4.9 void spot::tgba_explicit::copy_acceptance_conditions_of (const tgba ∗ *a*)

Copy the acceptance conditions of a tgba.

If used, this function should be called before creating any transition.

7.160.4.10 transition∗ spot::tgba_explicit::create_transition (state ∗ *source,* const state ∗ *dest*)

Reimplemented in spot::tgba_explicit_labelled< label, label_hash >, spot::tgba_explicit_labelled< const ltl::formula ∗, ltl::formula_ptr_hash >, spot::tgba_explicit_labelled< int, identity_hash< int > >, and spot::tgba_explicit_labelled< std::string, string_hash >.

7.160.4.11 virtual std::string spot::tgba_explicit::format_state (const spot::state ∗ *state*) const `[pure virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

Implemented in spot::tgba_explicit_string, spot::tgba_explicit_formula, and spot::tgba_explicit_number.

7.160.4.12 bdd spot::tgba_explicit::get_acceptance_condition (const ltl::formula ∗ *f*) `[protected]`

7.160.4.13 virtual bdd_dict∗ spot::tgba_explicit::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.160.4.14 virtual spot::state∗ spot::tgba_explicit::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.160.4.15 bool spot::tgba_explicit::has_acceptance_condition (const ltl::formula ∗ *f*) const

7.160.4.16 virtual bdd spot::tgba_explicit::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.160.4.17 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.160.4.18 tgba_explicit& spot::tgba_explicit::operator= (const tgba_explicit & *other*) `[private]`

7.160.4.19 virtual state∗ spot::tgba::project_state (const state ∗ *s,* const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.160.4.20 void spot::tgba_explicit::set_acceptance_conditions (bdd *acc*)

The the acceptance conditions.

7.160.4.21 virtual tgba_succ_iterator∗ spot::tgba_explicit::succ_iter (const spot::state ∗ *local_state,* const spot::state ∗ *global_state* = *0,* const tgba ∗ *global_automaton* = *0*) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.160.4.22 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.160.4.23 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.160.4.24 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.160.5 Member Data Documentation

7.160.5.1 bdd spot::tgba_explicit::all_acceptance_conditions_ `[mutable, protected]`

7.160.5.2 bool spot::tgba_explicit::all_acceptance_conditions_computed_ `[mutable, protected]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.160.5.3 bdd_dict∗ spot::tgba_explicit::dict_ `[protected]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.160.5.4 tgba_explicit::state∗ spot::tgba_explicit::init_ `[protected]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.160.5.5 bdd spot::tgba_explicit::neg_acceptance_conditions_ `[protected]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

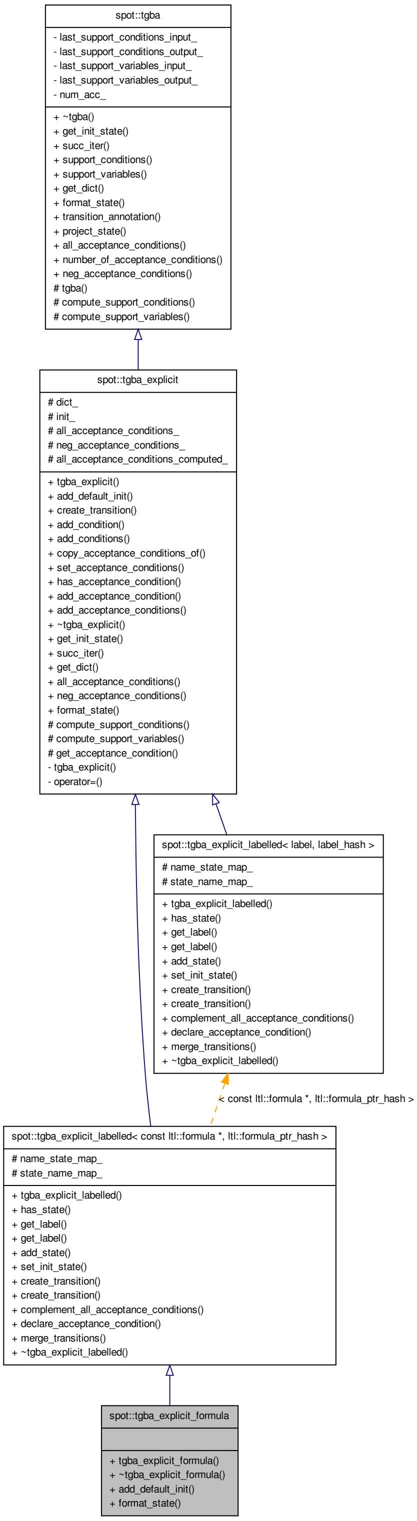
The documentation for this class was generated from the following file:

- tgba/tgbaexplicit.hh

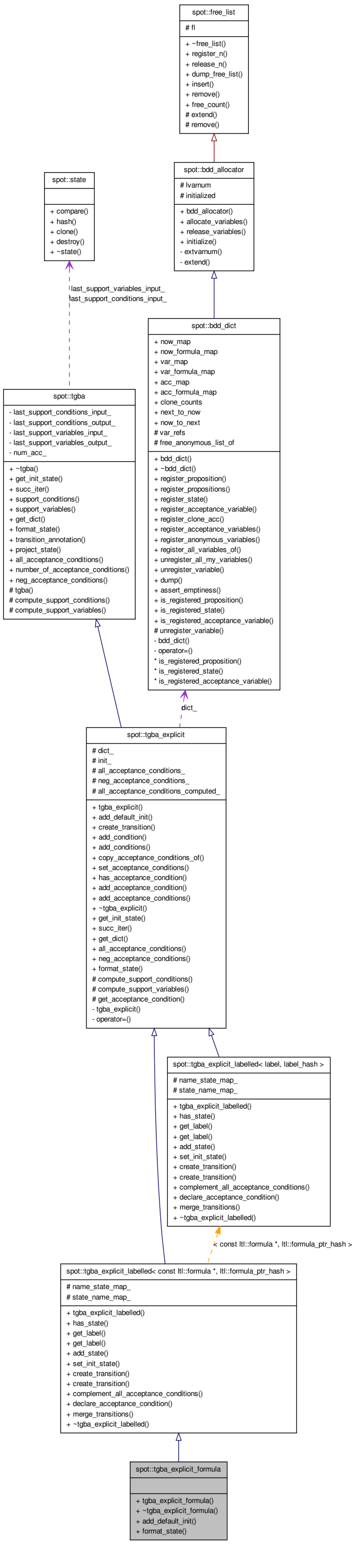
7.161 spot::tgba_explicit_formula Class Reference

`#include <tgba/tgbaexplicit.hh>`

Inheritance diagram for spot::tgba_explicit_formula:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_explicit
# dict_
# init_
# all_acceptance_conditions_
# neg_acceptance_conditions_
# all_acceptance_conditions_computed_
+ tgba_explicit()
+ add_default_init()
+ create_transition()
+ add_condition()
+ add_conditions()
+ copy_acceptance_conditions_of()
+ set_acceptance_conditions()
+ has_acceptance_condition()
+ add_acceptance_condition()
+ add_acceptance_conditions()
+ ~tgba_explicit()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ format_state()
# compute_support_conditions()
# compute_support_variables()
# get_acceptance_condition()
- tgba_explicit()
- operator=()
spot::tgba_explicit_labelled< label, label_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
< const ltl::formula *, ltl::formula_ptr_hash >
spot::tgba_explicit_labelled< const ltl::formula *, ltl::formula_ptr_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_formula
+ tgba_explicit_formula()
+ ~tgba_explicit_formula()
+ add_default_init()
+ format_state()

Collaboration diagram for spot::tgba_explicit_formula:


spot::free_list
# fl
+ ~free_list()
+ register_n()
+ release_n()
+ dump_free_list()
+ insert()
+ remove()
+ free_count()
# extend()
# remove()
spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
spot::bdd_allocator
# lvarnum
# initialized
+ bdd_allocator()
+ allocate_variables()
+ release_variables()
+ initialize()
- extvarnum()
- extend()
last_support_variables_input_
last_support_conditions_input_
spot::bdd_dict
+ now_map
+ now_formula_map
+ var_map
+ var_formula_map
+ acc_map
+ acc_formula_map
+ clone_counts
+ next_to_now
+ now_to_next
# var_refs
# free_anonymous_list_of
+ bdd_dict()
+ ~bdd_dict()
+ register_proposition()
+ register_propositions()
+ register_state()
+ register_acceptance_variable()
+ register_clone_acc()
+ register_acceptance_variables()
+ register_anonymous_variables()
+ register_all_variables_of()
+ unregister_all_my_variables()
+ unregister_variable()
+ dump()
+ assert_emptiness()
+ is_registered_proposition()
+ is_registered_state()
+ is_registered_acceptance_variable()
# unregister_variable()
- bdd_dict()
- operator=()
* is_registered_proposition()
* is_registered_state()
* is_registered_acceptance_variable()
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
dict_
spot::tgba_explicit
# dict_
# init_
# all_acceptance_conditions_
# neg_acceptance_conditions_
# all_acceptance_conditions_computed_
+ tgba_explicit()
+ add_default_init()
+ create_transition()
+ add_condition()
+ add_conditions()
+ copy_acceptance_conditions_of()
+ set_acceptance_conditions()
+ has_acceptance_condition()
+ add_acceptance_condition()
+ add_acceptance_conditions()
+ ~tgba_explicit()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ format_state()
# compute_support_conditions()
# compute_support_variables()
# get_acceptance_condition()
- tgba_explicit()
- operator=()
spot::tgba_explicit_labelled< label, label_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
< const ltl::formula *, ltl::formula_ptr_hash >
spot::tgba_explicit_labelled< const ltl::formula *, ltl::formula_ptr_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_formula
+ tgba_explicit_formula()
+ ~tgba_explicit_formula()
+ add_default_init()
+ format_state()

Public Types

- typedef std::list< transition ∗ > state

Public Member Functions

- tgba_explicit_formula (bdd_dict ∗dict)
- virtual ~tgba_explicit_formula ()
- virtual state ∗ add_default_init ()

  Add a default initial state.

- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- bool has_state (const const ltl::formula ∗&name)
- const const ltl::formula ∗& get_label (const tgba_explicit::state ∗s) const
- const const ltl::formula ∗& get_label (const spot::state ∗s) const
- state ∗ add_state (const const ltl::formula ∗&name)
- state ∗ set_init_state (const const ltl::formula ∗&state)
- transition ∗ create_transition (state ∗source, const state ∗dest)
- transition ∗ create_transition (const const ltl::formula ∗&source, const const ltl::formula ∗&dest)
- void complement_all_acceptance_conditions ()
- void declare_acceptance_condition (const ltl::formula ∗f)
- void merge_transitions ()
- void add_condition (transition ∗t, const ltl::formula ∗f)
- void add_conditions (transition ∗t, bdd f)

  This assumes that all variables in f are known from dict.

- void copy_acceptance_conditions_of (const tgba ∗a)

  Copy the acceptance conditions of a tgba.

- void set_acceptance_conditions (bdd acc)

  The the acceptance conditions.

- bool has_acceptance_condition (const ltl::formula ∗f) const
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- void add_acceptance_conditions (transition ∗t, bdd f)

  This assumes that all acceptance conditions in f are known from dict.

- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef const ltl::formula ∗ label_t
- typedef Sgi::hash_map< const ltl::formula ∗, tgba_explicit::state ∗, ltl::formula_ptr_hash > ns_map
- typedef Sgi::hash_map< const tgba_explicit::state ∗, const ltl::formula ∗, ptr_hash< tgba_explicit::state > > sn_map

Protected Member Functions

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd get_acceptance_condition (const ltl::formula ∗f)

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- tgba_explicit::state ∗ init_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bool all_acceptance_conditions_computed_

7.161.1 Member Typedef Documentation

7.161.1.1 typedef const ltl::formula ∗ spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::label_t `[protected, inherited]`

7.161.1.2 typedef Sgi::hash_map<const ltl::formula ∗ , tgba_explicit::state∗, ltl::formula_ptr_hash > spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::ns_map `[protected, inherited]`

7.161.1.3 typedef Sgi::hash_map<const tgba_explicit::state∗, const ltl::formula ∗ , ptr_hash<tgba_explicit::state> > spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::sn_map `[protected, inherited]`

7.161.1.4 typedef std::list<transition∗> spot::tgba_explicit::state `[inherited]`

7.161.2 Constructor & Destructor Documentation

7.161.2.1 spot::tgba_explicit_formula::tgba_explicit_formula (bdd_dict ∗ *dict*) `[inline]`

7.161.2.2 virtual spot::tgba_explicit_formula::∼tgba_explicit_formula ( ) `[virtual]`

7.161.3 Member Function Documentation

7.161.3.1 void spot::tgba_explicit::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.161.3.2 void spot::tgba_explicit::add_acceptance_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all acceptance conditions in *f* are known from dict.

7.161.3.3 void spot::tgba_explicit::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.161.3.4 void spot::tgba_explicit::add_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all variables in *f* are known from dict.

7.161.3.5 virtual state∗ spot::tgba_explicit_formula::add_default_init ( ) `[virtual]`

Add a default initial state.

Implements spot::tgba_explicit.

7.161.3.6 state∗ spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::add_state (const const ltl::formula ∗ & *name*) `[inline, inherited]`

Return the tgba_explicit::state for *name*, creating the state if it does not exist.

7.161.3.7 virtual bdd spot::tgba_explicit::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_conditions().

7.161.3.8 void spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::complement_all_acceptance_conditions ( ) `[inline, inherited]`

7.161.3.9 virtual bdd spot::tgba_explicit::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.161.3.10 virtual bdd spot::tgba_explicit::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.161.3.11 void spot::tgba_explicit::copy_acceptance_conditions_of (const tgba ∗ *a*) `[inherited]`

Copy the acceptance conditions of a tgba.

If used, this function should be called before creating any transition.

7.161.3.12 transition∗ spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::create_transition (const const ltl::formula ∗ & *source*, const const ltl::formula ∗ & *dest*) `[inline, inherited]`

7.161.3.13 transition∗ spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::create_transition (state ∗ *source*, const state ∗ *dest*) `[inline, inherited]`

Reimplemented from spot::tgba_explicit.

7.161.3.14 void spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::declare_acceptance_condition (const ltl::formula ∗ *f*) `[inline, inherited]`

7.161.3.15 virtual std::string spot::tgba_explicit_formula::format_state (const spot::state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba_explicit.

7.161.3.16 bdd spot::tgba_explicit::get_acceptance_condition (const ltl::formula ∗ *f*) `[protected, inherited]`

7.161.3.17 virtual bdd_dict∗ spot::tgba_explicit::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.161.3.18 virtual spot::state∗ spot::tgba_explicit::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.161.3.19 const const ltl::formula ∗ & spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::get_label (const spot::state ∗ *s*) const `[inline, inherited]`

7.161.3.20 const const ltl::formula ∗ & spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::get_label (const tgba_explicit::state ∗ *s*) const `[inline, inherited]`

7.161.3.21 bool spot::tgba_explicit::has_acceptance_condition (const ltl::formula ∗ *f*) const `[inherited]`

7.161.3.22 bool spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::has_state (const const ltl::formula ∗ & *name*) `[inline, inherited]`

7.161.3.23 void spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::merge_transitions ( ) `[inline, inherited]`

7.161.3.24 virtual bdd spot::tgba_explicit::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.161.3.25 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.161.3.26 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.161.3.27 void spot::tgba_explicit::set_acceptance_conditions (bdd *acc*) `[inherited]`

The the acceptance conditions.

7.161.3.28 state∗ spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::set_init_state (const const ltl::formula ∗ & *state*) `[inline, inherited]`

7.161.3.29 virtual tgba_succ_iterator∗ spot::tgba_explicit::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.161.3.30 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.161.3.31 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.161.3.32 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.161.4 Member Data Documentation

7.161.4.1 bdd spot::tgba_explicit::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.161.4.2 bool spot::tgba_explicit::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.161.4.3 bdd_dict∗ spot::tgba_explicit::dict_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.161.4.4 tgba_explicit::state∗ spot::tgba_explicit::init_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.161.4.5 ns_map spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::name_state_map_ `[protected, inherited]`

7.161.4.6 bdd spot::tgba_explicit::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.161.4.7 sn_map spot::tgba_explicit_labelled< const ltl::formula ∗ , ltl::formula_ptr_hash >::state_name_map_ `[protected, inherited]`

The documentation for this class was generated from the following file:

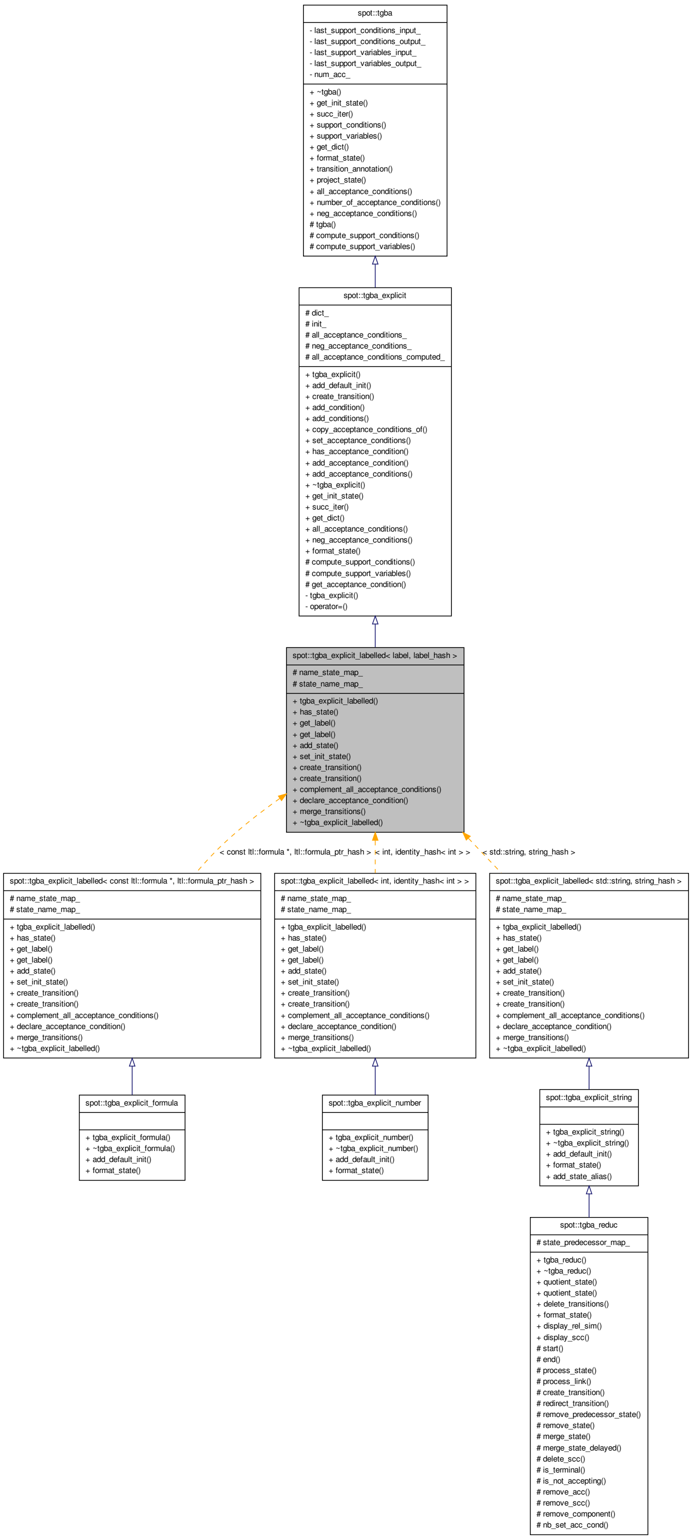
- tgba/tgbaexplicit.hh

7.162 spot::tgba_explicit_labelled< label, label_hash > Class Template Reference

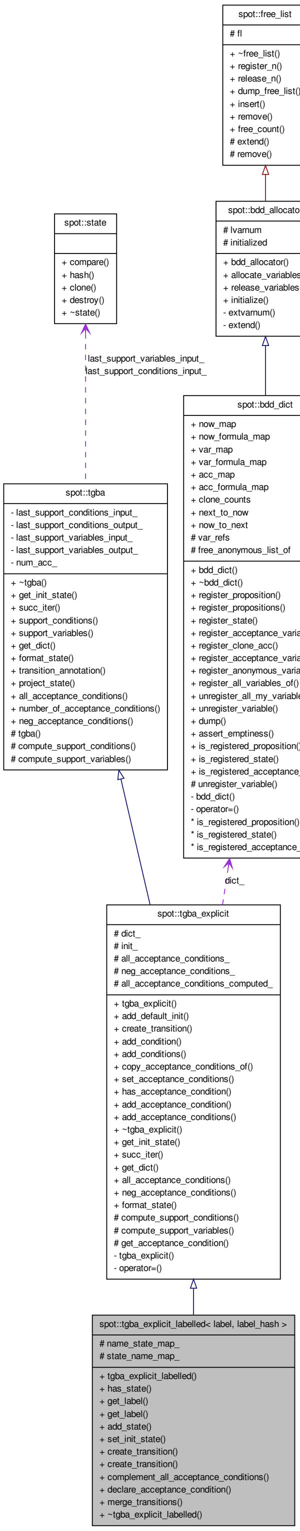
A tgba_explicit instance with states labeled by a given type.

`#include <tgba/tgbaexplicit.hh>`

Inheritance diagram for spot::tgba_explicit_labelled< label, label_hash >:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_explicit
# dict_
# init_
# all_acceptance_conditions_
# neg_acceptance_conditions_
# all_acceptance_conditions_computed_
+ tgba_explicit()
+ add_default_init()
+ create_transition()
+ add_condition()
+ add_conditions()
+ copy_acceptance_conditions_of()
+ set_acceptance_conditions()
+ has_acceptance_condition()
+ add_acceptance_condition()
+ add_acceptance_conditions()
+ ~tgba_explicit()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ format_state()
# compute_support_conditions()
# compute_support_variables()
# get_acceptance_condition()
- tgba_explicit()
- operator=()
spot::tgba_explicit_labelled< label, label_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
< const ltl::formula *, ltl::formula_ptr_hash >
< int, identity_hash< int > >
< std::string, string_hash >
spot::tgba_explicit_labelled< const ltl::formula *, ltl::formula_ptr_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_labelled< int, identity_hash< int > >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_labelled< std::string, string_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_formula
+ tgba_explicit_formula()
+ ~tgba_explicit_formula()
+ add_default_init()
+ format_state()
spot::tgba_explicit_number
+ tgba_explicit_number()
+ ~tgba_explicit_number()
+ add_default_init()
+ format_state()
spot::tgba_explicit_string
+ tgba_explicit_string()
+ ~tgba_explicit_string()
+ add_default_init()
+ format_state()
+ add_state_alias()
spot::tgba_reduc
# state_predecessor_map_
+ tgba_reduc()
+ ~tgba_reduc()
+ quotient_state()
+ quotient_state()
+ delete_transitions()
+ format_state()
+ display_rel_sim()
+ display_scc()
# start()
# end()
# process_state()
# process_link()
# create_transition()
# redirect_transition()
# remove_predecessor_state()
# remove_state()
# merge_state()
# merge_state_delayed()
# delete_scc()
# is_terminal()
# is_not_accepting()
# remove_acc()
# remove_scc()
# remove_component()
# nb_set_acc_cond()

Collaboration diagram for spot::tgba_explicit_labelled< label, label_hash >:



Public Types

- typedef std::list< transition ∗ > state

Public Member Functions

- tgba_explicit_labelled (bdd_dict ∗dict)
- bool has_state (const label &name)
- const label & get_label (const tgba_explicit::state ∗s) const
- const label & get_label (const spot::state ∗s) const
- state ∗ add_state (const label &name)
- state ∗ set_init_state (const label &state)
- transition ∗ create_transition (state ∗source, const state ∗dest)
- transition ∗ create_transition (const label &source, const label &dest)
- void complement_all_acceptance_conditions ()
- void declare_acceptance_condition (const ltl::formula ∗f)
- void merge_transitions ()
- virtual ∼tgba_explicit_labelled ()
- virtual state ∗ add_default_init ()=0

  Add a default initial state.

- void add_condition (transition ∗t, const ltl::formula ∗f)
- void add_conditions (transition ∗t, bdd f)

  This assumes that all variables in f are known from dict.

- void copy_acceptance_conditions_of (const tgba ∗a)

  Copy the acceptance conditions of a tgba.

- void set_acceptance_conditions (bdd acc)

  The the acceptance conditions.

- bool has_acceptance_condition (const ltl::formula ∗f) const
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- void add_acceptance_conditions (transition ∗t, bdd f)

  This assumes that all acceptance conditions in f are known from dict.

- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

Return the conjuction of all negated acceptance variables.

- virtual std::string format_state (const spot::state ∗s) const =0

  Format the state as a string for printing.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef label label_t
- typedef Sgi::hash_map< label, tgba_explicit::state ∗, label_hash > ns_map
- typedef Sgi::hash_map< const tgba_explicit::state ∗, label, ptr_hash< tgba_explicit::state > > sn_map

Protected Member Functions

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd get_acceptance_condition (const ltl::formula ∗f)

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- tgba_explicit::state ∗ init_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bool all_acceptance_conditions_computed_

7.162.1 Detailed Description

template<typename label, typename label_hash> class spot::tgba_explicit_labelled< label, label_hash >

A tgba_explicit instance with states labeled by a given type.

7.162.2 Member Typedef Documentation

7.162.2.1 template<typename label, typename label_hash> typedef label spot::tgba_explicit_labelled< label, label_hash >::label_t `[protected]`

7.162.2.2 template<typename label, typename label_hash> typedef Sgi::hash_map<label, tgba_explicit::state*, label_hash> spot::tgba_explicit_labelled< label, label_hash >::ns_map `[protected]`

7.162.2.3 template<typename label, typename label_hash> typedef Sgi::hash_map<const tgba_explicit::state*, label, ptr_hash<tgba_explicit::state> > spot::tgba_explicit_labelled< label, label_hash >::sn_map `[protected]`

7.162.2.4 typedef std::list<transition*> spot::tgba_explicit::state `[inherited]`

7.162.3 Constructor & Destructor Documentation

7.162.3.1 template<typename label, typename label_hash> spot::tgba_explicit_labelled< label, label_hash >::tgba_explicit_labelled (bdd_dict * *dict*) `[inline]`

7.162.3.2 template<typename label, typename label_hash> virtual spot::tgba_explicit_labelled< label, label_hash >::~tgba_explicit_labelled ( ) `[inline, virtual]`

7.162.4 Member Function Documentation

7.162.4.1 void spot::tgba_explicit::add_acceptance_condition (transition * *t*, const ltl::formula * *f*) `[inherited]`

7.162.4.2 void spot::tgba_explicit::add_acceptance_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all acceptance conditions in *f* are known from dict.

7.162.4.3 void spot::tgba_explicit::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.162.4.4 void spot::tgba_explicit::add_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all variables in *f* are known from dict.

7.162.4.5 virtual state∗ spot::tgba_explicit::add_default_init ( ) `[pure virtual, inherited]`

Add a default initial state.

Implemented in spot::tgba_explicit_string, spot::tgba_explicit_formula, and spot::tgba_explicit_number.

7.162.4.6 template<typename label, typename label_hash> state∗ spot::tgba_explicit_labelled< label, label_hash >::add_state (const label & *name*) `[inline]`

Return the tgba_explicit::state for *name*, creating the state if it does not exist.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::create_transition(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.162.4.7 virtual bdd spot::tgba_explicit::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_conditions().

7.162.4.8 template<typename label, typename label_hash> void spot::tgba_explicit_labelled< label, label_hash >::complement_all_acceptance_conditions ( ) `[inline]`

7.162.4.9 virtual bdd spot::tgba_explicit::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.162.4.10 virtual bdd spot::tgba_explicit::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.162.4.11 void spot::tgba_explicit::copy_acceptance_conditions_of (const tgba ∗ *a*) `[inherited]`

Copy the acceptance conditions of a tgba.

If used, this function should be called before creating any transition.

7.162.4.12 template<typename label, typename label_hash> transition∗ spot::tgba_explicit_labelled< label, label_hash >::create_transition (state ∗ *source*, const state ∗ *dest*) `[inline]`

Reimplemented from spot::tgba_explicit.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::create_transition().

7.162.4.13 template<typename label, typename label_hash> transition∗ spot::tgba_explicit_labelled< label, label_hash >::create_transition (const label & *source*, const label & *dest*) `[inline]`

7.162.4.14 template<typename label, typename label_hash> void spot::tgba_explicit_labelled< label, label_hash >::declare_acceptance_condition (const ltl::formula ∗ *f*) `[inline]`

7.162.4.15 virtual std::string spot::tgba_explicit::format_state (const spot::state ∗ *state*) const `[pure virtual, inherited]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

Implemented in spot::tgba_explicit_string, spot::tgba_explicit_formula, and spot::tgba_explicit_number.

7.162.4.16 bdd spot::tgba_explicit::get_acceptance_condition (const ltl::formula ∗ *f*) `[protected, inherited]`

7.162.4.17 virtual bdd_dict∗ spot::tgba_explicit::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.162.4.18 virtual spot::state∗ spot::tgba_explicit::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.162.4.19 template<typename label, typename label_hash> const label& spot::tgba_explicit_labelled< label, label_hash >::get_label (const tgba_explicit::state ∗ *s*) const `[inline]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::get_label().

7.162.4.20 template<typename label, typename label_hash> const label& spot::tgba_explicit_labelled< label, label_hash >::get_label (const spot::state ∗ *s*) const `[inline]`

7.162.4.21 bool spot::tgba_explicit::has_acceptance_condition (const ltl::formula ∗ *f*) const `[inherited]`

7.162.4.22 template<typename label, typename label_hash> bool spot::tgba_explicit_labelled< label, label_hash >::has_state (const label & *name*) `[inline]`

7.162.4.23 template<typename label, typename label_hash> void spot::tgba_explicit_labelled< label, label_hash >::merge_transitions ( ) `[inline]`

7.162.4.24 virtual bdd spot::tgba_explicit::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.162.4.25 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.162.4.26 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

> 0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.162.4.27 void spot::tgba_explicit::set_acceptance_conditions (bdd *acc*) `[inherited]`

The the acceptance conditions.

7.162.4.28 template<typename label, typename label_hash> state∗ spot::tgba_explicit_labelled< label, label_hash >::set_init_state (const label & *state*) `[inline]`

7.162.4.29 virtual tgba_succ_iterator∗ spot::tgba_explicit::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.162.4.30 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.162.4.31 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.162.4.32 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

- ***t*** a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.162.5 Member Data Documentation

7.162.5.1 bdd spot::tgba_explicit::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.162.5.2 bool spot::tgba_explicit::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.162.5.3 bdd_dict∗ spot::tgba_explicit::dict_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.162.5.4 tgba_explicit::state∗ spot::tgba_explicit::init_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.162.5.5 template<typename label, typename label_hash> ns_map spot::tgba_explicit_labelled< label, label_hash >::name_state_map_ `[protected]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_conditions(), spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition(), spot::tgba_explicit_labelled< std::string, string_hash >::has_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::merge_transitions().

7.162.5.6 bdd spot::tgba_explicit::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.162.5.7 template<typename label, typename label_hash> sn_map spot::tgba_explicit_labelled< label, label_hash >::state_name_map_ `[protected]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::get_label().

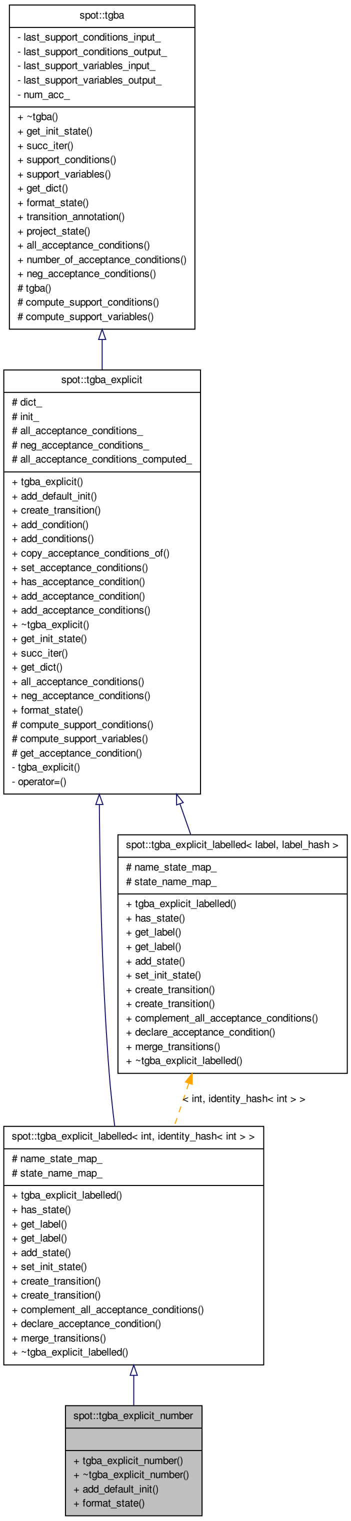
The documentation for this class was generated from the following file:

- tgba/tgbaexplicit.hh

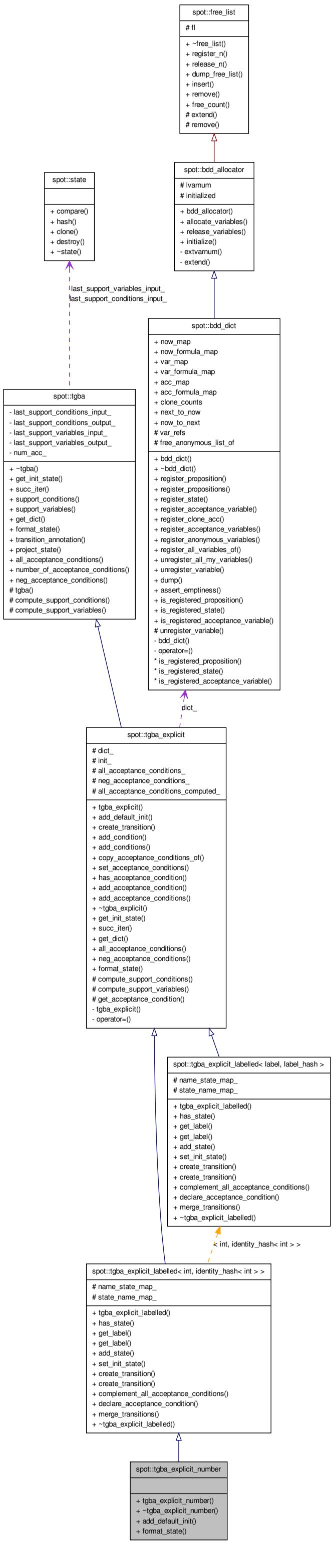
7.163 spot::tgba_explicit_number Class Reference

`#include <tgba/tgbaexplicit.hh>`

Inheritance diagram for spot::tgba_explicit_number:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_explicit
# dict_
# init_
# all_acceptance_conditions_
# neg_acceptance_conditions_
# all_acceptance_conditions_computed_
+ tgba_explicit()
+ add_default_init()
+ create_transition()
+ add_condition()
+ add_conditions()
+ copy_acceptance_conditions_of()
+ set_acceptance_conditions()
+ has_acceptance_condition()
+ add_acceptance_condition()
+ add_acceptance_conditions()
+ ~tgba_explicit()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ format_state()
# compute_support_conditions()
# compute_support_variables()
# get_acceptance_condition()
- tgba_explicit()
- operator=()
spot::tgba_explicit_labelled< label, label_hash >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
< int, identity_hash< int > >
spot::tgba_explicit_labelled< int, identity_hash< int > >
# name_state_map_
# state_name_map_
+ tgba_explicit_labelled()
+ has_state()
+ get_label()
+ get_label()
+ add_state()
+ set_init_state()
+ create_transition()
+ create_transition()
+ complement_all_acceptance_conditions()
+ declare_acceptance_condition()
+ merge_transitions()
+ ~tgba_explicit_labelled()
spot::tgba_explicit_number
+ tgba_explicit_number()
+ ~tgba_explicit_number()
+ add_default_init()
+ format_state()

Collaboration diagram for spot::tgba_explicit_number:



Public Types

- typedef std::list< transition ∗ > state

Public Member Functions

- tgba_explicit_number (bdd_dict ∗dict)
- virtual ∼tgba_explicit_number ()
- virtual state ∗ add_default_init ()

  Add a default initial state.

- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- bool has_state (const int &name)
- const int & get_label (const tgba_explicit::state ∗s) const
- const int & get_label (const spot::state ∗s) const
- state ∗ add_state (const int &name)
- state ∗ set_init_state (const int &state)
- transition ∗ create_transition (state ∗source, const state ∗dest)
- transition ∗ create_transition (const int &source, const int &dest)
- void complement_all_acceptance_conditions ()
- void declare_acceptance_condition (const ltl::formula ∗f)
- void merge_transitions ()
- void add_condition (transition ∗t, const ltl::formula ∗f)
- void add_conditions (transition ∗t, bdd f)

  This assumes that all variables in f are known from dict.

- void copy_acceptance_conditions_of (const tgba ∗a)

  Copy the acceptance conditions of a tgba.

- void set_acceptance_conditions (bdd acc)

  The the acceptance conditions.

- bool has_acceptance_condition (const ltl::formula ∗f) const
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- void add_acceptance_conditions (transition ∗t, bdd f)

  This assumes that all acceptance conditions in f are known from dict.

- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef int label_t
- typedef Sgi::hash_map< int, tgba_explicit::state ∗, identity_hash< int > > ns_map
- typedef Sgi::hash_map< const tgba_explicit::state ∗, int, ptr_hash< tgba_explicit::state > > sn_map

Protected Member Functions

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd get_acceptance_condition (const ltl::formula ∗f)

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- tgba_explicit::state ∗ init_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bool all_acceptance_conditions_computed_

7.163.1 Member Typedef Documentation

7.163.1.1 typedef int spot::tgba_explicit_labelled< int , identity_hash< int > >::label_t `[protected, inherited]`

7.163.1.2 typedef Sgi::hash_map<int , tgba_explicit::state∗, identity_hash< int > > spot::tgba_explicit_labelled< int , identity_hash< int > >::ns_map `[protected, inherited]`

7.163.1.3 typedef Sgi::hash_map<const tgba_explicit::state∗, int , ptr_hash<tgba_explicit::state> > spot::tgba_explicit_labelled< int , identity_hash< int > >::sn_map `[protected, inherited]`

7.163.1.4 typedef std::list<transition∗> spot::tgba_explicit::state `[inherited]`

7.163.2 Constructor & Destructor Documentation

7.163.2.1 spot::tgba_explicit_number::tgba_explicit_number (bdd_dict ∗ *dict*) `[inline]`

7.163.2.2 virtual spot::tgba_explicit_number::∼tgba_explicit_number ( ) `[virtual]`

7.163.3 Member Function Documentation

7.163.3.1 void spot::tgba_explicit::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.163.3.2 void spot::tgba_explicit::add_acceptance_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all acceptance conditions in *f* are known from dict.

7.163.3.3 void spot::tgba_explicit::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.163.3.4 void spot::tgba_explicit::add_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all variables in *f* are known from dict.

7.163.3.5 virtual state∗ spot::tgba_explicit_number::add_default_init ( ) `[virtual]`

Add a default initial state.

Implements spot::tgba_explicit.

7.163.3.6 state∗ spot::tgba_explicit_labelled< int , identity_hash< int > >::add_state (const int & *name*) `[inline, inherited]`

Return the tgba_explicit::state for *name*, creating the state if it does not exist.

7.163.3.7 virtual bdd spot::tgba_explicit::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_conditions().

7.163.3.8 void spot::tgba_explicit_labelled< int , identity_hash< int > >::complement_all_acceptance_conditions ( ) `[inline, inherited]`

7.163.3.9 virtual bdd spot::tgba_explicit::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.163.3.10 virtual bdd spot::tgba_explicit::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.163.3.11 void spot::tgba_explicit::copy_acceptance_conditions_of (const tgba ∗ *a*) `[inherited]`

Copy the acceptance conditions of a tgba.

If used, this function should be called before creating any transition.

7.163.3.12 transition∗ spot::tgba_explicit_labelled< int , identity_hash< int > >::create_transition (const int & *source,* const int & *dest*) `[inline, inherited]`

7.163.3.13 transition∗ spot::tgba_explicit_labelled< int , identity_hash< int > >::create_transition (state ∗ *source,* const state ∗ *dest*) `[inline, inherited]`

Reimplemented from spot::tgba_explicit.

7.163.3.14 void spot::tgba_explicit_labelled< int , identity_hash< int > >::declare_acceptance_condition (const ltl::formula ∗ *f*) `[inline, inherited]`

7.163.3.15 virtual std::string spot::tgba_explicit_number::format_state (const spot::state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba_explicit.

7.163.3.16 bdd spot::tgba_explicit::get_acceptance_condition (const ltl::formula ∗ *f*) `[protected, inherited]`

7.163.3.17 virtual bdd_dict∗ spot::tgba_explicit::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.163.3.18 virtual spot::state∗ spot::tgba_explicit::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.163.3.19 const int & spot::tgba_explicit_labelled< int , identity_hash< int > >::get_label (const spot::state ∗ *s*) const `[inline, inherited]`

7.163.3.20 const int & spot::tgba_explicit_labelled< int , identity_hash< int > >::get_label (const tgba_explicit::state ∗ *s*) const `[inline, inherited]`

7.163.3.21 bool spot::tgba_explicit::has_acceptance_condition (const ltl::formula ∗ *f*) const `[inherited]`

7.163.3.22 bool spot::tgba_explicit_labelled< int , identity_hash< int > >::has_state (const int & *name*) `[inline, inherited]`

7.163.3.23 void spot::tgba_explicit_labelled< int , identity_hash< int > >::merge_transitions ( ) `[inline, inherited]`

7.163.3.24 virtual bdd spot::tgba_explicit::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.163.3.25 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.163.3.26 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.163.3.27 void spot::tgba_explicit::set_acceptance_conditions (bdd *acc*) `[inherited]`

The the acceptance conditions.

7.163.3.28 state∗ spot::tgba_explicit_labelled< int , identity_hash< int > >::set_init_state (const int & *state*) `[inline, inherited]`

7.163.3.29 virtual tgba_succ_iterator∗ spot::tgba_explicit::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.163.3.30 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.163.3.31 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.163.3.32 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator * *t*) const [virtual, inherited]

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.163.4 Member Data Documentation

7.163.4.1 bdd spot::tgba_explicit::all_acceptance_conditions_ [mutable, protected, inherited]

7.163.4.2 bool spot::tgba_explicit::all_acceptance_conditions_computed_ [mutable, protected, inherited]

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.163.4.3 bdd_dict* spot::tgba_explicit::dict_ [protected, inherited]

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.163.4.4 tgba_explicit::state* spot::tgba_explicit::init_ [protected, inherited]

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.163.4.5 ns_map spot::tgba_explicit_labelled< int , identity_hash< int > >::name_state_map_ [protected, inherited]

7.163.4.6 bdd spot::tgba_explicit::neg_acceptance_conditions_ [protected, inherited]

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.163.4.7 sn_map spot::tgba_explicit_labelled< int , identity_hash< int > >::state_name_map_ `[protected, inherited]`

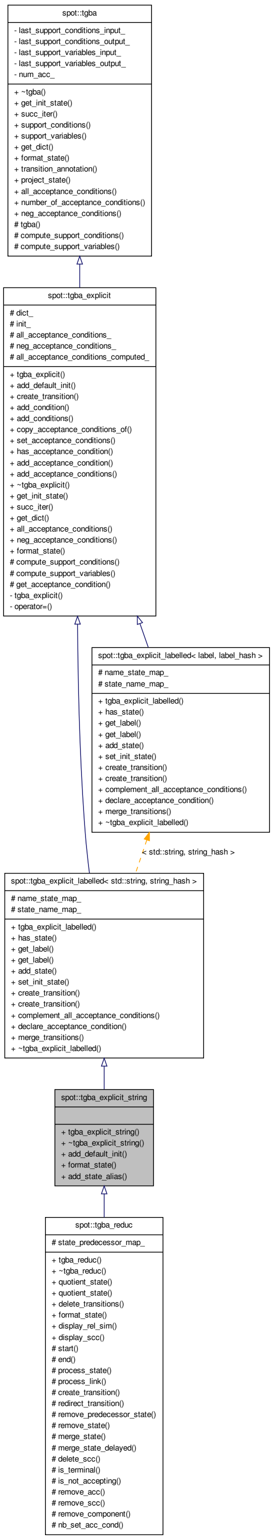
The documentation for this class was generated from the following file:

- tgba/tgbaexplicit.hh

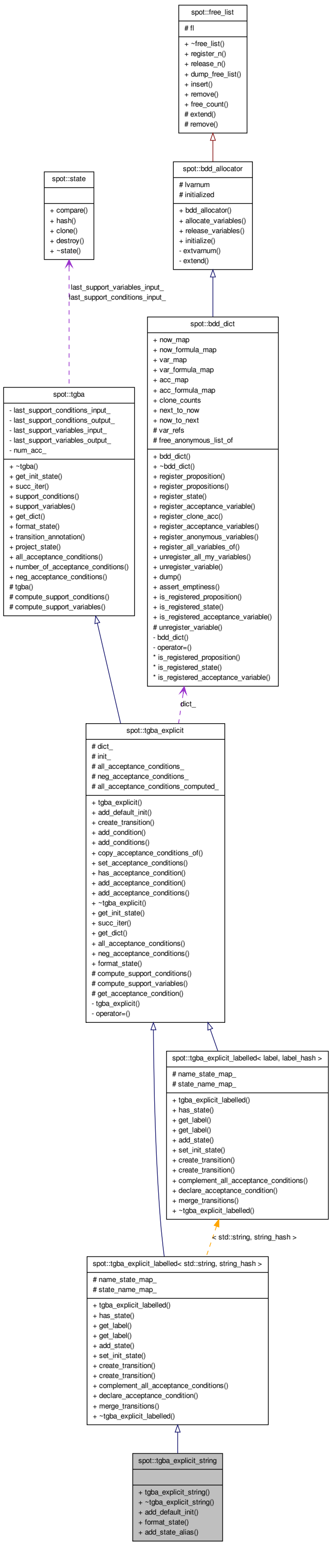
7.164 spot::tgba_explicit_string Class Reference

`#include <tgba/tgbaexplicit.hh>`

Inheritance diagram for spot::tgba_explicit_string:



Collaboration diagram for spot::tgba_explicit_string:



Public Types

- typedef std::list< transition ∗ > state

Public Member Functions

- tgba_explicit_string (bdd_dict ∗dict)
- virtual ∼tgba_explicit_string ()
- virtual state ∗ add_default_init ()

  Add a default initial state.

- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- virtual void add_state_alias (const std::string &alias_name, const std::string &real_name)
- bool has_state (const std::string &name)
- const std::string & get_label (const tgba_explicit::state ∗s) const
- const std::string & get_label (const spot::state ∗s) const
- state ∗ add_state (const std::string &name)
- state ∗ set_init_state (const std::string &state)
- transition ∗ create_transition (state ∗source, const state ∗dest)
- transition ∗ create_transition (const std::string &source, const std::string &dest)
- void complement_all_acceptance_conditions ()
- void declare_acceptance_condition (const ltl::formula ∗f)
- void merge_transitions ()
- void add_condition (transition ∗t, const ltl::formula ∗f)
- void add_conditions (transition ∗t, bdd f)

  This assumes that all variables in f are known from dict.

- void copy_acceptance_conditions_of (const tgba ∗a)

  Copy the acceptance conditions of a tgba.

- void set_acceptance_conditions (bdd acc)

  The the acceptance conditions.

- bool has_acceptance_condition (const ltl::formula ∗f) const
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- void add_acceptance_conditions (transition ∗t, bdd f)

  This assumes that all acceptance conditions in f are known from dict.

- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Types

- typedef std::string label_t
- typedef Sgi::hash_map< std::string, tgba_explicit::state ∗, string_hash > ns_map
- typedef Sgi::hash_map< const tgba_explicit::state ∗, std::string, ptr_hash< tgba_explicit::state > > sn_map

Protected Member Functions

- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd get_acceptance_condition (const ltl::formula ∗f)

Protected Attributes

- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- tgba_explicit::state ∗ init_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bool all_acceptance_conditions_computed_

7.164.1 Member Typedef Documentation

7.164.1.1 typedef std::string spot::tgba_explicit_labelled< std::string , string_hash >::label_t `[protected, inherited]`

7.164.1.2 typedef Sgi::hash_map<std::string , tgba_explicit::state∗, string_hash > spot::tgba_explicit_labelled< std::string , string_hash >::ns_map `[protected, inherited]`

7.164.1.3 typedef Sgi::hash_map<const tgba_explicit::state∗, std::string , ptr_hash<tgba_explicit::state> > spot::tgba_explicit_labelled< std::string , string_hash >::sn_map `[protected, inherited]`

7.164.1.4 typedef std::list<transition∗> spot::tgba_explicit::state `[inherited]`

7.164.2 Constructor & Destructor Documentation

7.164.2.1 spot::tgba_explicit_string::tgba_explicit_string (bdd_dict ∗ *dict*) `[inline]`

7.164.2.2 virtual spot::tgba_explicit_string::∼tgba_explicit_string ( ) `[virtual]`

7.164.3 Member Function Documentation

7.164.3.1 void spot::tgba_explicit::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.164.3.2 void spot::tgba_explicit::add_acceptance_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all acceptance conditions in *f* are known from dict.

7.164.3.3 void spot::tgba_explicit::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.164.3.4 void spot::tgba_explicit::add_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all variables in *f* are known from dict.

7.164.3.5 virtual state∗ spot::tgba_explicit_string::add_default_init ( ) `[virtual]`

Add a default initial state.

Implements spot::tgba_explicit.

7.164.3.6 state∗ spot::tgba_explicit_labelled< std::string , string_hash >::add_state (const std::string & *name*) `[inline, inherited]`

Return the tgba_explicit::state for *name*, creating the state if it does not exist.

References spot::tgba_explicit::init_, spot::tgba_explicit_labelled< label, label_hash >::name_state_map_, and spot::tgba_explicit_labelled< label, label_hash >::state_name_map_.

Referenced by add_state_alias().

7.164.3.7 virtual void spot::tgba_explicit_string::add_state_alias (const std::string & *alias_name*, const std::string & *real_name*) `[inline, virtual]`

Create an alias for a state. Any reference to *alias_name* will act as a reference to *real_name*.

References spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::name_state_map_.

7.164.3.8 virtual bdd spot::tgba_explicit::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_conditions().

7.164.3.9 void spot::tgba_explicit_labelled< std::string , string_hash >::complement_all_acceptance_conditions ( ) `[inline, inherited]`

References spot::tgba_explicit::all_acceptance_conditions(), and spot::tgba_explicit_labelled< label, label_hash >::name_state_map_.

7.164.3.10 virtual bdd spot::tgba_explicit::compute_support_conditions (const spot::state * *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.164.3.11 virtual bdd spot::tgba_explicit::compute_support_variables (const spot::state * *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.164.3.12 void spot::tgba_explicit::copy_acceptance_conditions_of (const tgba * *a*) `[inherited]`

Copy the acceptance conditions of a tgba.

If used, this function should be called before creating any transition.

7.164.3.13 transition* spot::tgba_explicit_labelled< std::string , string_hash >::create_transition (state * *source,* const state * *dest*) `[inline, inherited]`

Reimplemented from spot::tgba_explicit.

References spot::tgba_explicit_labelled< label, label_hash >::create_transition().

7.164.3.14 transition* spot::tgba_explicit_labelled< std::string , string_hash >::create_transition (const std::string & *source,* const std::string & *dest*) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::add_state(), and spot::tgba_explicit_labelled< label, label_hash >::create_transition().

7.164.3.15 void spot::tgba_explicit_labelled< std::string , string_hash >::declare_acceptance_condition (const ltl::formula * *f*) `[inline, inherited]`

References spot::tgba_explicit::all_acceptance_conditions_computed_, spot::ltl::formula::destroy(), spot::tgba_explicit::dict_, spot::tgba_explicit_labelled< label, label_hash >::name_state_map_, spot::tgba_explicit::neg_acceptance_conditions_, and spot::bdd_dict::register_acceptance_variable().

7.164.3.16 virtual std::string spot::tgba_explicit_string::format_state (const spot::state * *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba_explicit.

7.164.3.17 bdd spot::tgba_explicit::get_acceptance_condition (const ltl::formula * *f*) `[protected, inherited]`

7.164.3.18 virtual bdd_dict* spot::tgba_explicit::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.164.3.19 virtual spot::state* spot::tgba_explicit::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.164.3.20 const std::string & spot::tgba_explicit_labelled< std::string , string_hash >::get_label (const spot::state * *s*) const `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::get_label(), and spot::state_explicit::get_state().

7.164.3.21 const std::string & spot::tgba_explicit_labelled< std::string , string_hash >::get_label (const tgba_explicit::state * *s*) const `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::state_name_map_.

7.164.3.22 bool spot::tgba_explicit::has_acceptance_condition (const ltl::formula * *f*) const `[inherited]`

7.164.3.23 bool spot::tgba_explicit_labelled< std::string , string_hash >::has_state (const std::string & *name*) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::name_state_map_.

7.164.3.24 void spot::tgba_explicit_labelled< std::string , string_hash >::merge_transitions ( ) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::name_state_map_.

7.164.3.25 virtual bdd spot::tgba_explicit::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.164.3.26 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.164.3.27 virtual state* spot::tgba::project_state (const state * *s*, const tgba * *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.164.3.28 void spot::tgba_explicit::set_acceptance_conditions (bdd *acc*) `[inherited]`

The the acceptance conditions.

7.164.3.29 state∗ spot::tgba_explicit_labelled< std::string , string_hash >::set_init_state (const std::string & *state*) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::add_state(), and spot::tgba_explicit::init_.

7.164.3.30 virtual tgba_succ_iterator∗ spot::tgba_explicit::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.164.3.31 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.164.3.32 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.164.3.33 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.164.4 Member Data Documentation

7.164.4.1 bdd spot::tgba_explicit::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.164.4.2 bool spot::tgba_explicit::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.164.4.3 bdd_dict∗ spot::tgba_explicit::dict_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.164.4.4 tgba_explicit::state∗ spot::tgba_explicit::init_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.164.4.5 ns_map spot::tgba_explicit_labelled< std::string , string_hash >::name_state_map_ `[protected, inherited]`

Referenced by add_state_alias().

7.164.4.6 bdd spot::tgba_explicit::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.164.4.7 sn_map spot::tgba_explicit_labelled< std::string , string_hash >::state_name_map_ `[protected, inherited]`

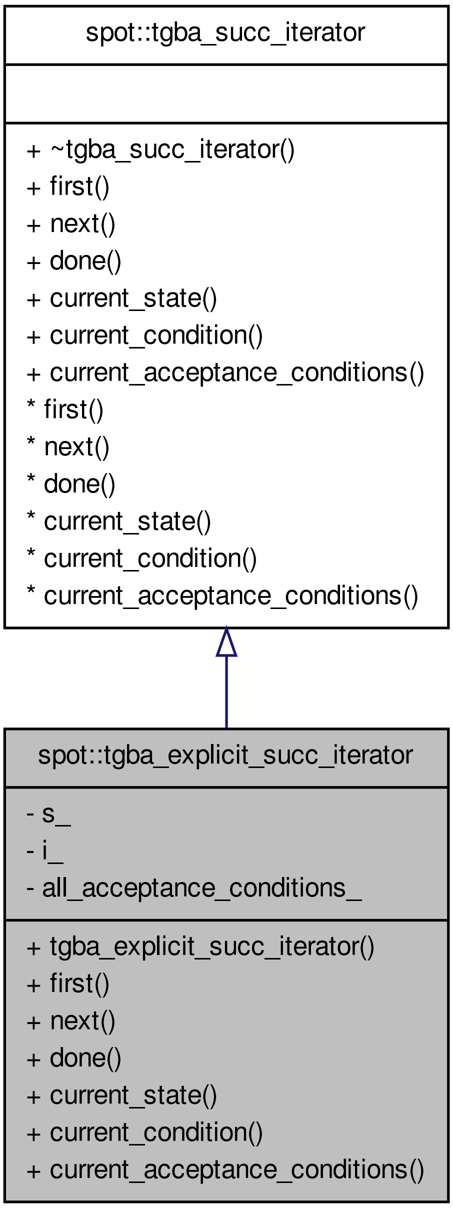
The documentation for this class was generated from the following file:

- tgba/tgbaexplicit.hh

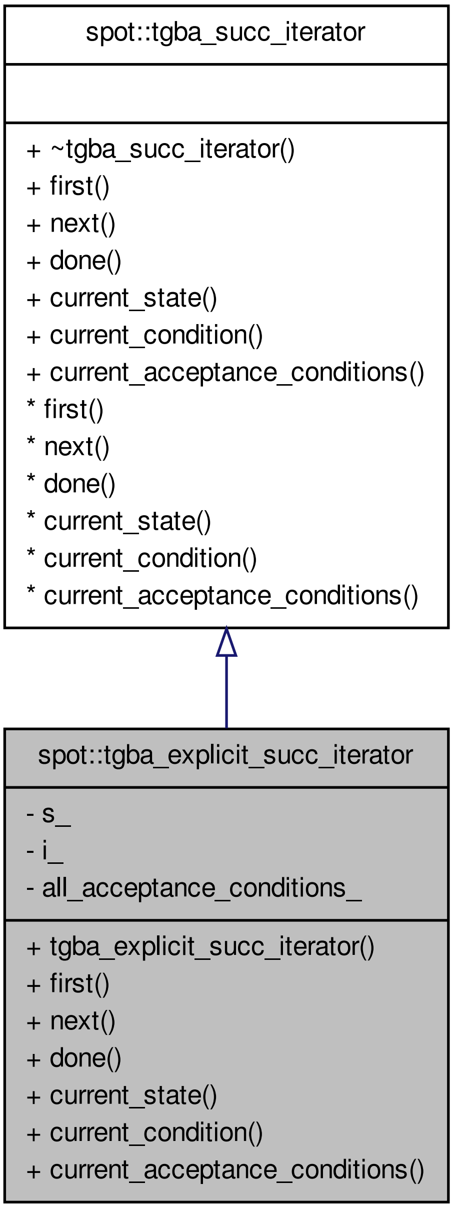
7.165 spot::tgba_explicit_succ_iterator Class Reference

`#include <tgba/tgbaexplicit.hh>`

Inheritance diagram for spot::tgba_explicit_succ_iterator:



Collaboration diagram for spot::tgba_explicit_succ_iterator:



Public Member Functions

- tgba_explicit_succ_iterator (const tgba_explicit::state ∗s, bdd all_acc)
- virtual void first ()

  Position the iterator on the first successor (if any).

- virtual void next ()

  Jump to the next successor (if any).

- virtual bool done () const

  Check whether the iteration is finished.

- virtual state_explicit ∗ current_state () const

  Get the state of the current successor.

- virtual bdd current_condition () const

  Get the condition on the transition leading to this successor.

- virtual bdd current_acceptance_conditions () const

  Get the acceptance conditions on the transition leading to this successor.

Private Attributes

- const tgba_explicit::state ∗ s_
- tgba_explicit::state::const_iterator i_
- bdd all_acceptance_conditions_

7.165.1 Detailed Description

Successor iterators used by spot::tgba_explicit.

7.165.2 Constructor & Destructor Documentation

7.165.2.1 spot::tgba_explicit_succ_iterator::tgba_explicit_succ_iterator (const tgba_explicit::state ∗ *s*, bdd *all_acc*)

7.165.3 Member Function Documentation

7.165.3.1 virtual bdd spot::tgba_explicit_succ_iterator::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.165.3.2 virtual bdd spot::tgba_explicit_succ_iterator::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.165.3.3 virtual state_explicit* spot::tgba_explicit_succ_iterator::current_state ( ) const [virtual]

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implements spot::tgba_succ_iterator.

7.165.3.4 virtual bool spot::tgba_explicit_succ_iterator::done ( ) const [virtual]

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implements spot::tgba_succ_iterator.

7.165.3.5 virtual void spot::tgba_explicit_succ_iterator::first ( ) [virtual]

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implements spot::tgba_succ_iterator.

7.165.3.6 virtual void spot::tgba_explicit_succ_iterator::next ( ) [virtual]

Jump to the next successor (if any).

Warning

Again, one should always call `done()` to ensure there is a successor.

Implements spot::tgba_succ_iterator.

7.165.4 Member Data Documentation

7.165.4.1 bdd spot::tgba_explicit_succ_iterator::all_acceptance_conditions_ `[private]`

7.165.4.2 tgba_explicit::state::const_iterator spot::tgba_explicit_succ_iterator::i_ `[private]`

7.165.4.3 const tgba_explicit::state∗ spot::tgba_explicit_succ_iterator::s_ `[private]`

The documentation for this class was generated from the following file:

- tgba/tgbaexplicit.hh

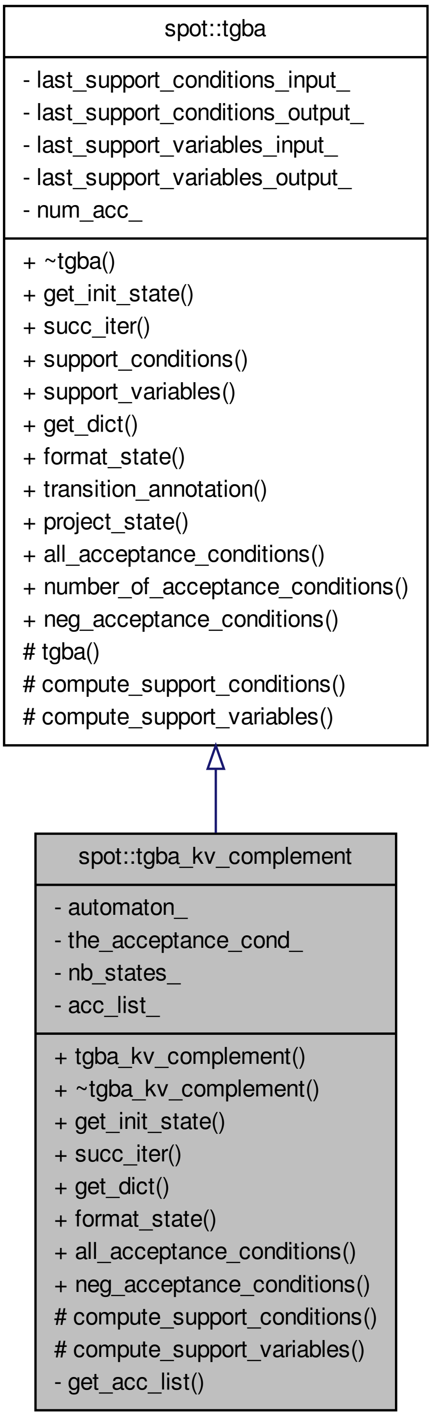
7.166 spot::tgba_kv_complement Class Reference

Build a complemented automaton.

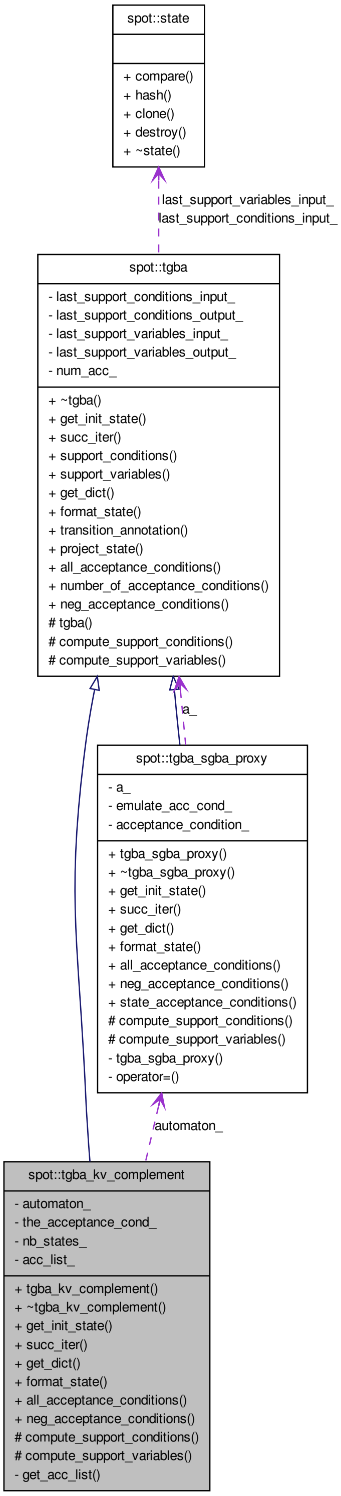
The construction comes from:

`#include <tgba/tgbakvcomplement.hh>`

Inheritance diagram for spot::tgba_kv_complement:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_kv_complement
- automaton_
- the_acceptance_cond_
- nb_states_
- acc_list_
+ tgba_kv_complement()
+ ~tgba_kv_complement()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- get_acc_list()

Collaboration diagram for spot::tgba_kv_complement:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
a_
spot::tgba_sgba_proxy
- a_
- emulate_acc_cond_
- acceptance_condition_
+ tgba_sgba_proxy()
+ ~tgba_sgba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- tgba_sgba_proxy()
- operator=()
automaton_
spot::tgba_kv_complement
- automaton_
- the_acceptance_cond_
- nb_states_
- acc_list_
+ tgba_kv_complement()
+ ~tgba_kv_complement()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- get_acc_list()

Public Member Functions

- tgba_kv_complement (const tgba ∗a)
- virtual ∼tgba_kv_complement ()
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Private Member Functions

- void get_acc_list ()

Private Attributes

- const tgba_sgba_proxy ∗ automaton_
- bdd the_acceptance_cond_
- unsigned nb_states_
- acc_list_t acc_list_

7.166.1 Detailed Description

Build a complemented automaton.

The construction comes from:

```
/// @Article{         kupferman.05.tcs,
///   title           = {From complementation to certification},
///   author          = {Kupferman, O. and Vardi, M.Y.},
///   journal         = {Theoretical Computer Science},
///   volume   = {345},
///   number          = {1},
///   pages = {83--100},
///   year = {2005},
///   publisher = {Elsevier}
/// }
///
```

The original automaton is used as a States-based Generalized Büchi Automaton.

The construction is done on-the-fly, by the `tgba_kv_complement_succ_iterator` class.

See also

tgba_kv_complement_succ_iterator

7.166.2 Constructor & Destructor Documentation

7.166.2.1 spot::tgba_kv_complement::tgba_kv_complement (const tgba ∗ *a*)

7.166.2.2 virtual spot::tgba_kv_complement::∼tgba_kv_complement ( ) `[virtual]`

7.166.3 Member Function Documentation

7.166.3.1 virtual bdd spot::tgba_kv_complement::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.166.3.2 virtual bdd spot::tgba_kv_complement::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.166.3.3 virtual bdd spot::tgba_kv_complement::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.166.3.4 virtual std::string spot::tgba_kv_complement::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.166.3.5 void spot::tgba_kv_complement::get_acc_list ( ) `[private]`

Retrieve all the atomic acceptance conditions of the automaton. They are inserted into *acc_list_*.

7.166.3.6 virtual bdd_dict∗ spot::tgba_kv_complement::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.166.3.7 virtual state∗ spot::tgba_kv_complement::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.166.3.8 virtual bdd spot::tgba_kv_complement::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.166.3.9 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.166.3.10 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.166.3.11 virtual tgba_succ_iterator∗ spot::tgba_kv_complement::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.166.3.12 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.166.3.13 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.166.3.14 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.166.4 Member Data Documentation

7.166.4.1 acc_list_t spot::tgba_kv_complement::acc_list_ `[private]`

7.166.4.2 const tgba_sgba_proxy* spot::tgba_kv_complement::automaton_ `[private]`

7.166.4.3 unsigned spot::tgba_kv_complement::nb_states_ `[private]`

7.166.4.4 bdd spot::tgba_kv_complement::the_acceptance_cond_ `[private]`

The documentation for this class was generated from the following file:

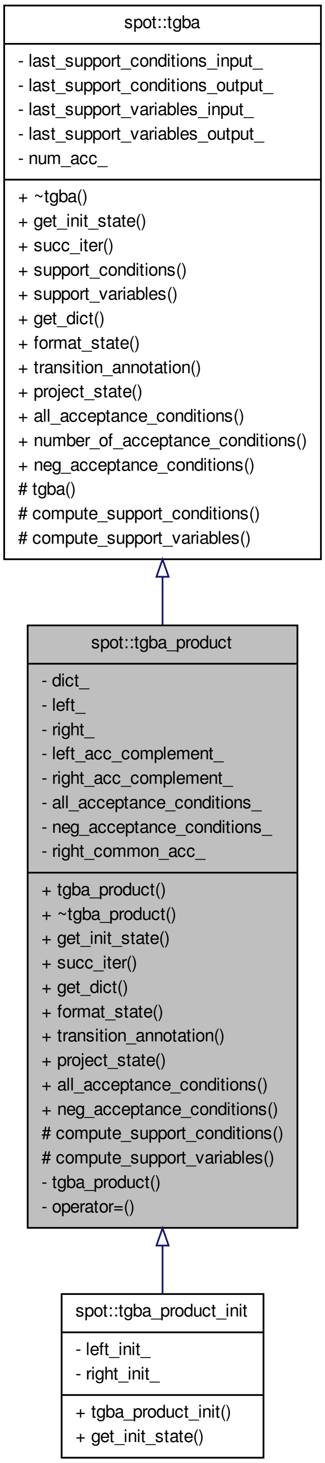
- tgba/tgbakvcomplement.hh

7.167 spot::tgba_product Class Reference

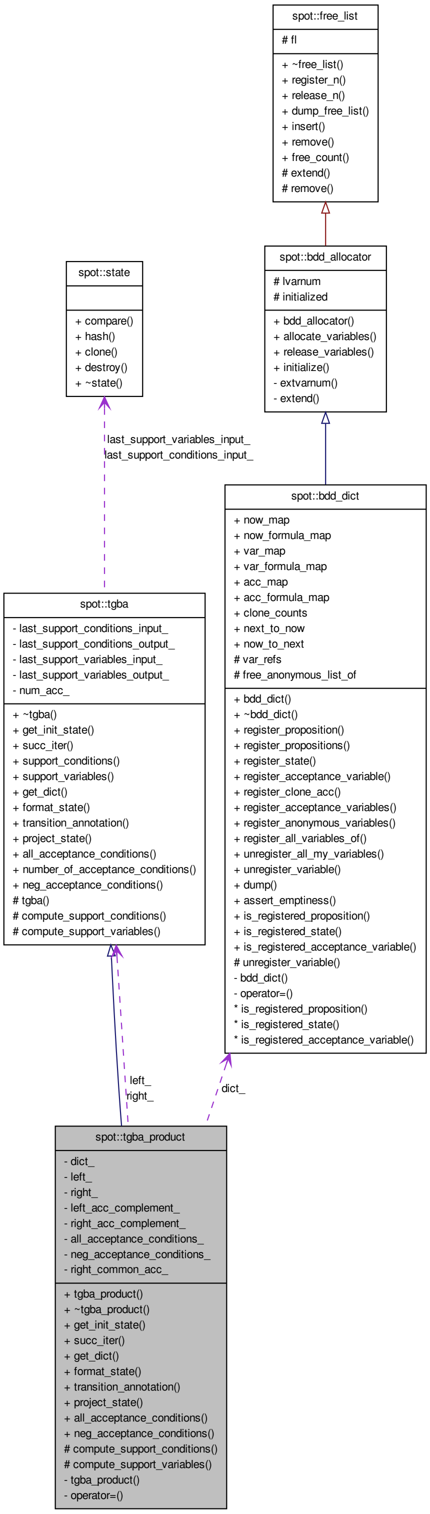
A lazy product. (States are computed on the fly.).

`#include <tgba/tgbaproduct.hh>`

Inheritance diagram for spot::tgba_product:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_product
- dict_
- left_
- right_
- left_acc_complement_
- right_acc_complement_
- all_acceptance_conditions_
- neg_acceptance_conditions_
- right_common_acc_
+ tgba_product()
+ ~tgba_product()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- tgba_product()
- operator=()
spot::tgba_product_init
- left_init_
- right_init_
+ tgba_product_init()
+ get_init_state()

Collaboration diagram for spot::tgba_product:



Public Member Functions

- tgba_product (const tgba ∗left, const tgba ∗right)

  Constructor.

- virtual ∼tgba_product ()
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator_product ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Private Member Functions

- tgba_product (const tgba_product &)
- tgba_product & operator= (const tgba_product &)

Private Attributes

- bdd_dict ∗ dict_
- const tgba ∗ left_
- const tgba ∗ right_
- bdd left_acc_complement_
- bdd right_acc_complement_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bddPair ∗ right_common_acc_

7.167.1 Detailed Description

A lazy product. (States are computed on the fly.).

7.167.2 Constructor & Destructor Documentation

7.167.2.1 spot::tgba_product::tgba_product (const tgba ∗ *left*, const tgba ∗ *right*)

Constructor.

Parameters

left The left automata in the product.

right The right automata in the product. Do not be fooled by these arguments: a product is commutative.

7.167.2.2 virtual spot::tgba_product::∼tgba_product ( ) `[virtual]`

7.167.2.3 spot::tgba_product::tgba_product (const tgba_product &) `[private]`

7.167.3 Member Function Documentation

7.167.3.1 virtual bdd spot::tgba_product::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.167.3.2 virtual bdd spot::tgba_product::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.167.3.3 virtual bdd spot::tgba_product::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.167.3.4 virtual std::string spot::tgba_product::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.167.3.5 virtual bdd_dict∗ spot::tgba_product::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.167.3.6 virtual state∗ spot::tgba_product::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

Reimplemented in spot::tgba_product_init.

7.167.3.7 virtual bdd spot::tgba_product::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.167.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.167.3.9 tgba_product& spot::tgba_product::operator= (const tgba_product &) `[private]`

7.167.3.10 virtual state∗ spot::tgba_product::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.167.3.11 virtual tgba_succ_iterator_product∗ spot::tgba_product::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.167.3.12 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.167.3.13 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.167.3.14 virtual std::string spot::tgba_product::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented from spot::tgba.

7.167.4 Member Data Documentation

7.167.4.1 bdd spot::tgba_product::all_acceptance_conditions_ `[private]`

7.167.4.2 bdd_dict∗ spot::tgba_product::dict_ `[private]`

7.167.4.3 const tgba∗ spot::tgba_product::left_ `[private]`

7.167.4.4 bdd spot::tgba_product::left_acc_complement_ `[private]`

7.167.4.5 bdd spot::tgba_product::neg_acceptance_conditions_ `[private]`

7.167.4.6 const tgba∗ spot::tgba_product::right_ `[private]`

7.167.4.7 bdd spot::tgba_product::right_acc_complement_ `[private]`

7.167.4.8 bddPair∗ spot::tgba_product::right_common_acc_ `[private]`

The documentation for this class was generated from the following file:

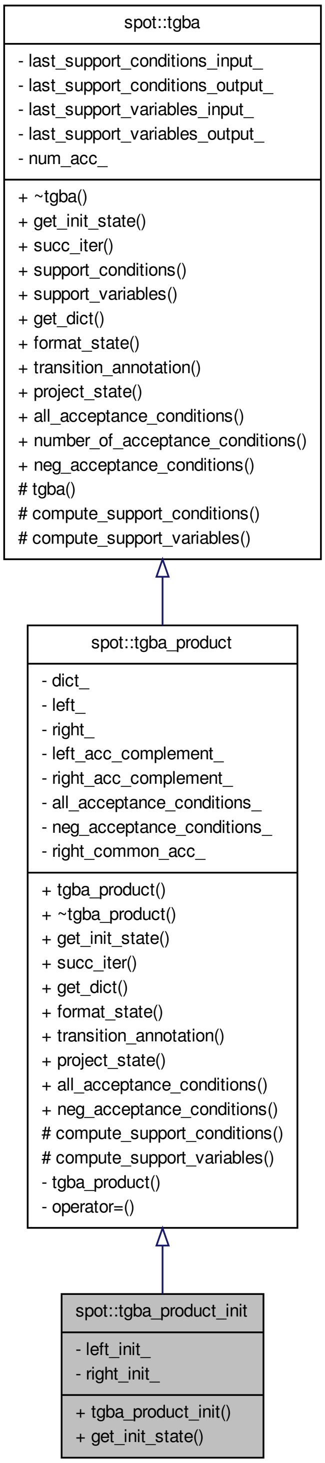
- tgba/tgbaproduct.hh

7.168 spot::tgba_product_init Class Reference

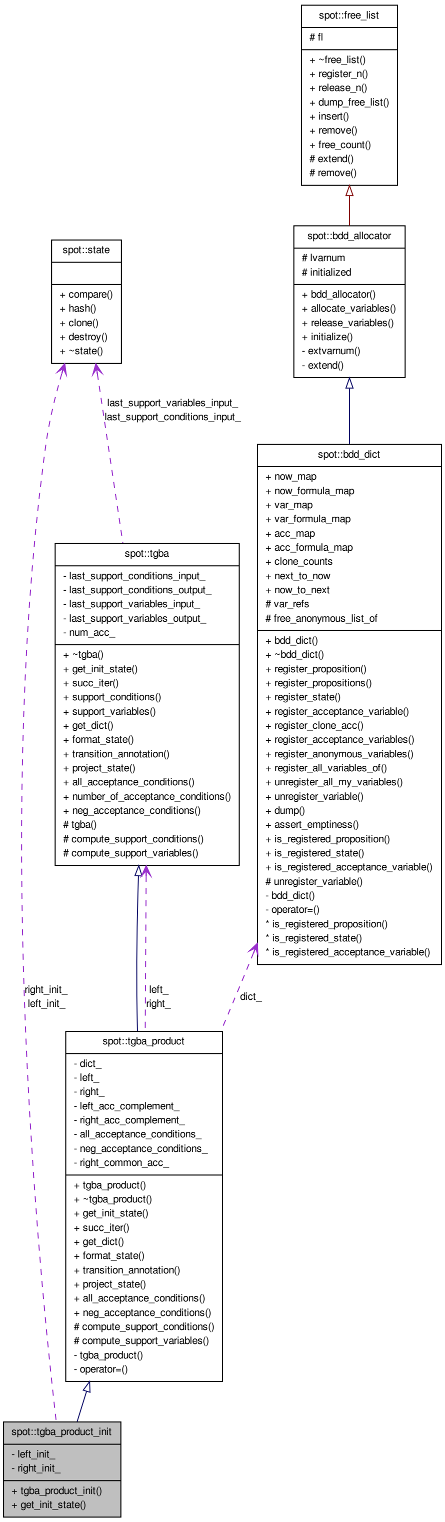
A lazy product with different initial states.

`#include <tgba/tgbaproduct.hh>`

Inheritance diagram for spot::tgba_product_init:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_product
- dict_
- left_
- right_
- left_acc_complement_
- right_acc_complement_
- all_acceptance_conditions_
- neg_acceptance_conditions_
- right_common_acc_
+ tgba_product()
+ ~tgba_product()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- tgba_product()
- operator=()
spot::tgba_product_init
- left_init_
- right_init_
+ tgba_product_init()
+ get_init_state()

Collaboration diagram for spot::tgba_product_init:



Public Member Functions

- tgba_product_init (const tgba ∗left, const tgba ∗right, const state ∗left_init, const state ∗right_init)
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator_product ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Private Attributes

- const state ∗ left_init_
- const state ∗ right_init_

7.168.1 Detailed Description

A lazy product with different initial states.

7.168.2 Constructor & Destructor Documentation

7.168.2.1 spot::tgba_product_init::tgba_product_init (const tgba ∗ *left*, const tgba ∗ *right*, const state ∗ *left_init*, const state ∗ *right_init*)

7.168.3 Member Function Documentation

7.168.3.1 virtual bdd spot::tgba_product::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.168.3.2 virtual bdd spot::tgba_product::compute_support_conditions (const state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.168.3.3 virtual bdd spot::tgba_product::compute_support_variables (const state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.168.3.4 virtual std::string spot::tgba_product::format_state (const state ∗ *state*) const `[virtual, inherited]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.168.3.5 virtual bdd_dict∗ spot::tgba_product::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.168.3.6 virtual state∗ spot::tgba_product_init::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Reimplemented from spot::tgba_product.

7.168.3.7 virtual bdd spot::tgba_product::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.168.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.168.3.9 virtual state∗ spot::tgba_product::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.168.3.10 virtual tgba_succ_iterator_product∗ spot::tgba_product::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.168.3.11 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.168.3.12 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.168.3.13 virtual std::string spot::tgba_product::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented from spot::tgba.

7.168.4 Member Data Documentation

7.168.4.1 const state∗ spot::tgba_product_init::left_init_ `[private]`

7.168.4.2 const state∗ spot::tgba_product_init::right_init_ `[private]`

The documentation for this class was generated from the following file:

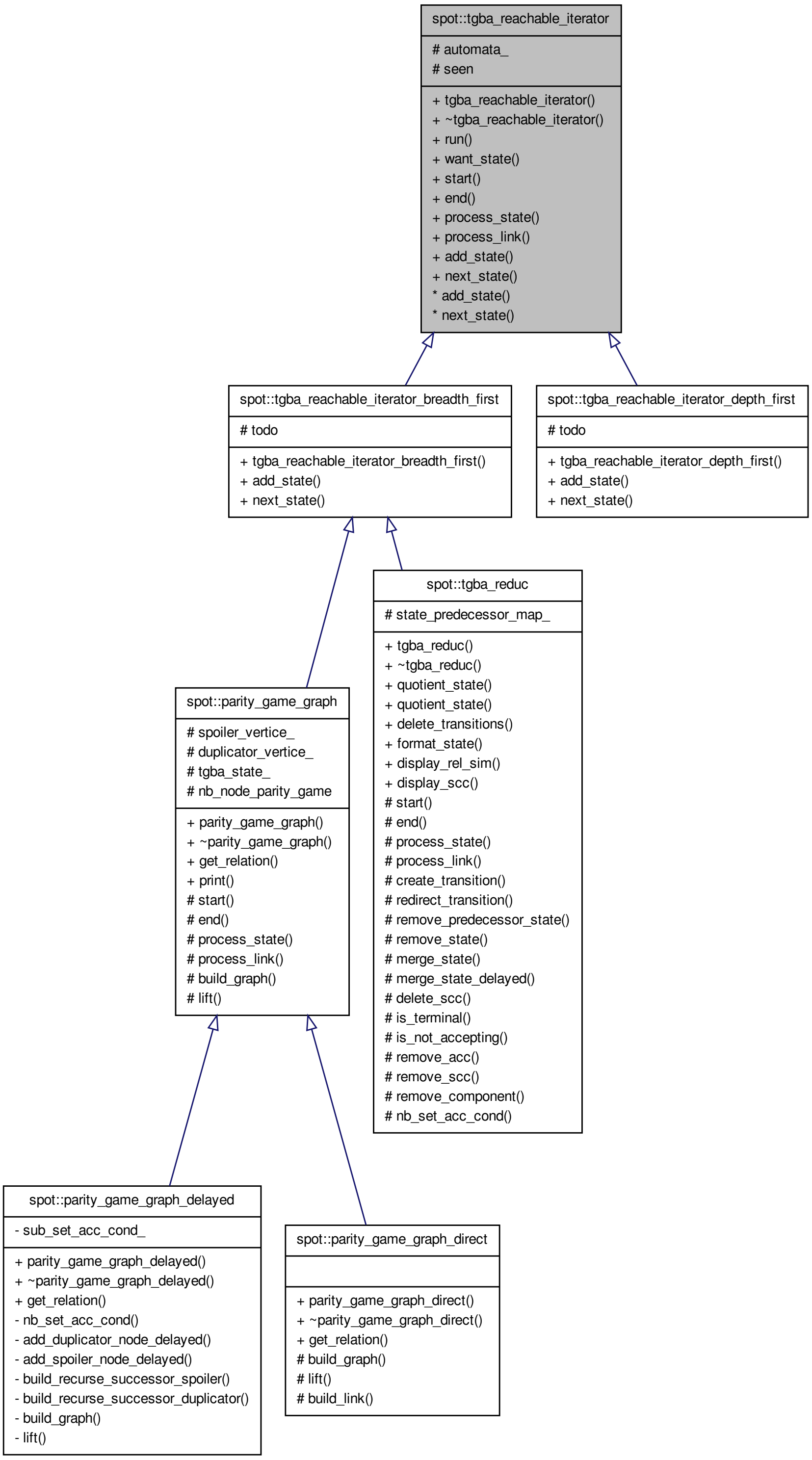
- tgba/tgbaproduct.hh

7.169 spot::tgba_reachable_iterator Class Reference

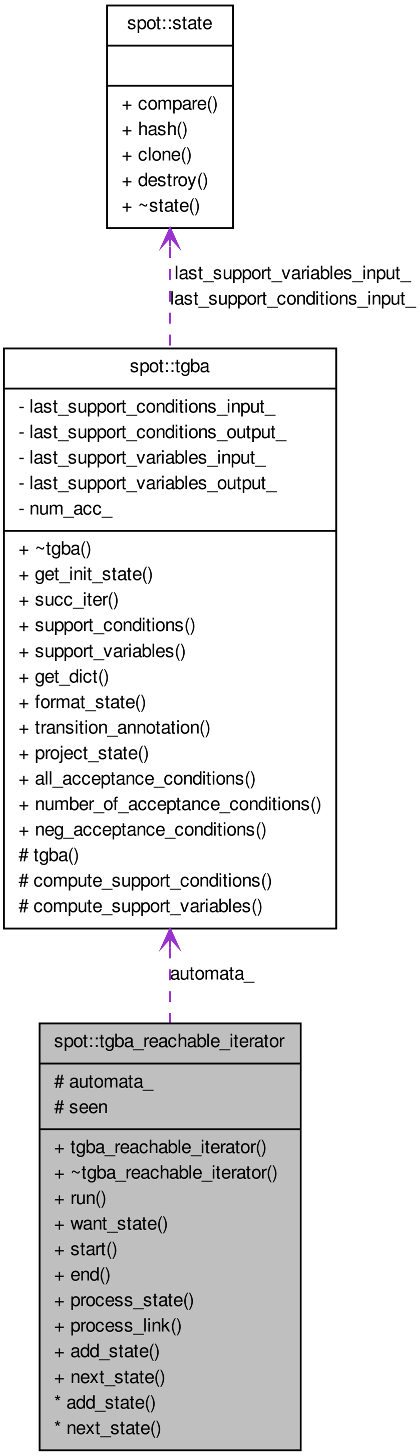
Iterate over all reachable states of a spot::tgba.

`#include <tgbaalgos/reachiter.hh>`

Inheritance diagram for spot::tgba_reachable_iterator:



Collaboration diagram for spot::tgba_reachable_iterator:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
automata_
spot::tgba_reachable_iterator
# automata_
# seen
+ tgba_reachable_iterator()
+ ~tgba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()

Public Member Functions

- tgba_reachable_iterator (const tgba ∗a)
- virtual ∼tgba_reachable_iterator ()
- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const
- virtual void start ()

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const state ∗s, int n, tgba_succ_iterator ∗si)
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)

Todo list management.

Called by run() to register newly discovered states.

spot::tgba_reachable_iterator_depth_first and spot::tgba_reachable_iterator_breadth_first offer two precanned implementations for these functions.

- virtual void add_state (const state ∗s)=0
- virtual const state ∗ next_state ()=0

  Called by run() to obtain the next state to process.

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Attributes

- const tgba ∗ automata_

  The spot::tgba to explore.

- seen_map seen

  States already seen.

7.169.1 Detailed Description

Iterate over all reachable states of a spot::tgba.

7.169.2 Member Typedef Documentation

7.169.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected]`

7.169.3 Constructor & Destructor Documentation

7.169.3.1 spot::tgba_reachable_iterator::tgba_reachable_iterator (const tgba ∗ *a*)

7.169.3.2 virtual spot::tgba_reachable_iterator::∼tgba_reachable_iterator ( ) `[virtual]`

7.169.4 Member Function Documentation

7.169.4.1 virtual void spot::tgba_reachable_iterator::add_state (const state ∗ *s*) `[pure virtual]`

Implemented in spot::tgba_reachable_iterator_depth_first, and spot::tgba_reachable_iterator_breadth_first.

7.169.4.2 virtual void spot::tgba_reachable_iterator::end ( ) `[virtual]`

Called by run() once all states have been explored.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.169.4.3 virtual const state∗ spot::tgba_reachable_iterator::next_state ( ) `[pure virtual]`

Called by run() to obtain the next state to process.

Implemented in spot::tgba_reachable_iterator_depth_first, and spot::tgba_reachable_iterator_breadth_first.

7.169.4.4 virtual void spot::tgba_reachable_iterator::process_link (const state ∗ *in_s,* int *in,* const state ∗ *out_s,* int *out,* const tgba_succ_iterator ∗ *si*) `[virtual]`

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

si The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.169.4.5 virtual void spot::tgba_reachable_iterator::process_state (const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[virtual]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.
- ***si*** The spot::tgba_succ_iterator for *s*.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.169.4.6 void spot::tgba_reachable_iterator::run ( )

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.169.4.7 virtual void spot::tgba_reachable_iterator::start ( ) `[virtual]`

Called by run() before starting its iteration.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.169.4.8 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.169.5 Member Data Documentation

7.169.5.1 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected]`

The spot::tgba to explore.

7.169.5.2 seen_map spot::tgba_reachable_iterator::seen `[protected]`

States already seen.

The documentation for this class was generated from the following file:

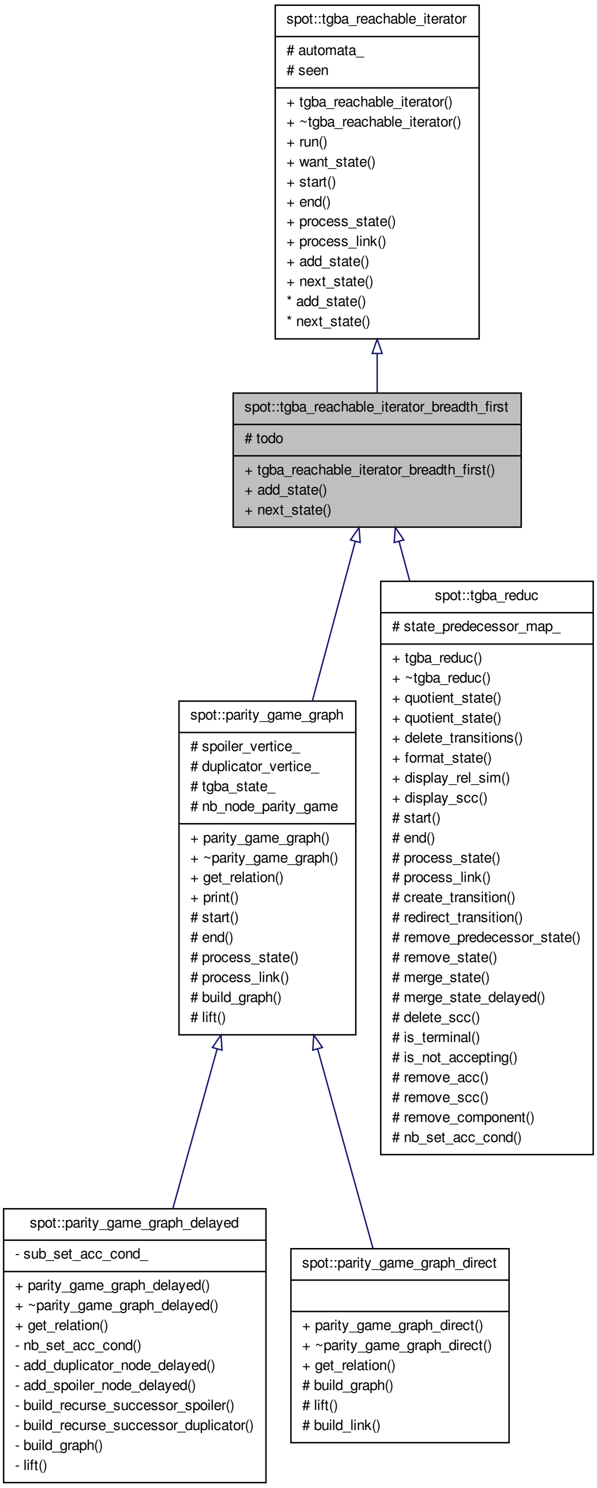
- tgbaalgos/reachiter.hh

7.170 spot::tgba_reachable_iterator_breadth_first Class Reference

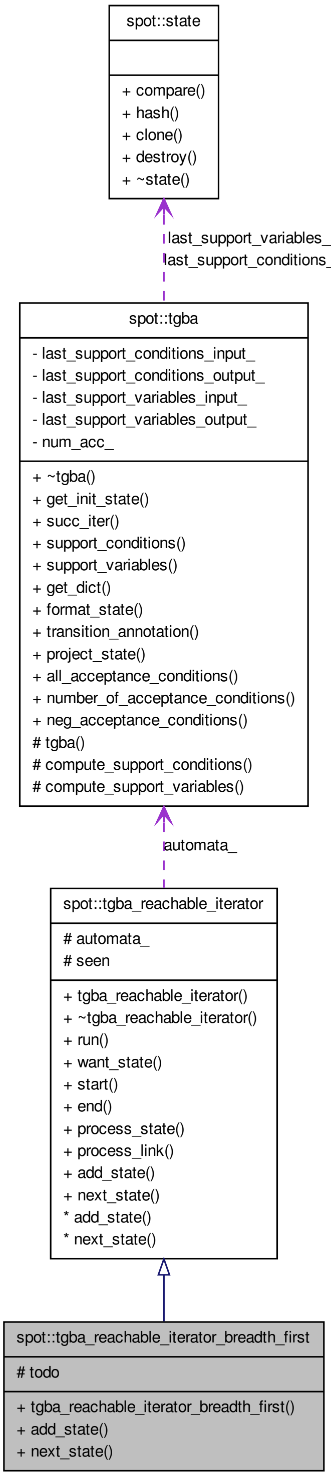
An implementation of spot::tgba_reachable_iterator that browses states breadth first.

`#include <tgbaalgos/reachiter.hh>`

Inheritance diagram for spot::tgba_reachable_iterator_breadth_first:



Collaboration diagram for spot::tgba_reachable_iterator_breadth_first:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
automata_
spot::tgba_reachable_iterator
# automata_
# seen
+ tgba_reachable_iterator()
+ ~tgba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::tgba_reachable_iterator_breadth_first
# todo
+ tgba_reachable_iterator_breadth_first()
+ add_state()
+ next_state()

Public Member Functions

- tgba_reachable_iterator_breadth_first (const tgba ∗a)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const
- virtual void start ()

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const state ∗s, int n, tgba_succ_iterator ∗si)
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Attributes

- std::deque< const state ∗ > todo

  A queue of states yet to explore.

- const tgba ∗ automata_

  The spot::tgba to explore.

- seen_map seen

  States already seen.

7.170.1 Detailed Description

An implementation of spot::tgba_reachable_iterator that browses states breadth first.

7.170.2 Member Typedef Documentation

7.170.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected, inherited]`

7.170.3 Constructor & Destructor Documentation

7.170.3.1 spot::tgba_reachable_iterator_breadth_first::tgba_reachable_iterator_breadth_first (const tgba ∗ *a*)

7.170.4 Member Function Documentation

7.170.4.1 virtual void spot::tgba_reachable_iterator_breadth_first::add_state (const state ∗ *s*) `[virtual]`

Implements spot::tgba_reachable_iterator.

7.170.4.2 virtual void spot::tgba_reachable_iterator::end ( ) `[virtual, inherited]`

Called by run() once all states have been explored.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.170.4.3 virtual const state∗ spot::tgba_reachable_iterator_breadth_first::next_state ( ) `[virtual]`

Called by run() to obtain the next state to process.

Implements spot::tgba_reachable_iterator.

7.170.4.4 virtual void spot::tgba_reachable_iterator::process_link (const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

si The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.170.4.5 virtual void spot::tgba_reachable_iterator::process_state (const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.
- ***si*** The spot::tgba_succ_iterator for *s*.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.170.4.6 void spot::tgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.170.4.7 virtual void spot::tgba_reachable_iterator::start ( ) `[virtual, inherited]`

Called by run() before starting its iteration.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.170.4.8 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.170.5 Member Data Documentation

7.170.5.1 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::tgba to explore.

7.170.5.2 seen_map spot::tgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.170.5.3 std::deque<const state∗> spot::tgba_reachable_iterator_breadth_first::todo `[protected]`

A queue of states yet to explore.

The documentation for this class was generated from the following file:

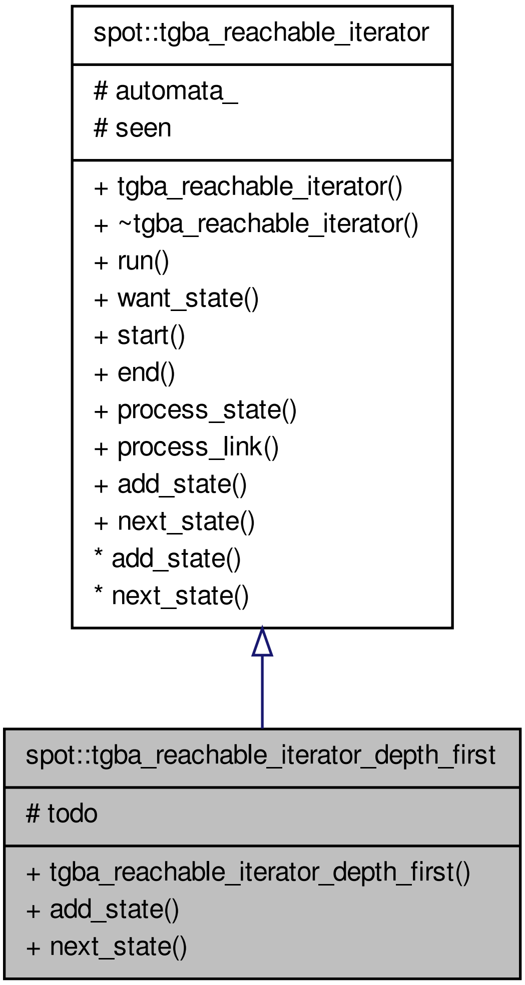
- tgbaalgos/reachiter.hh

7.171 spot::tgba_reachable_iterator_depth_first Class Reference

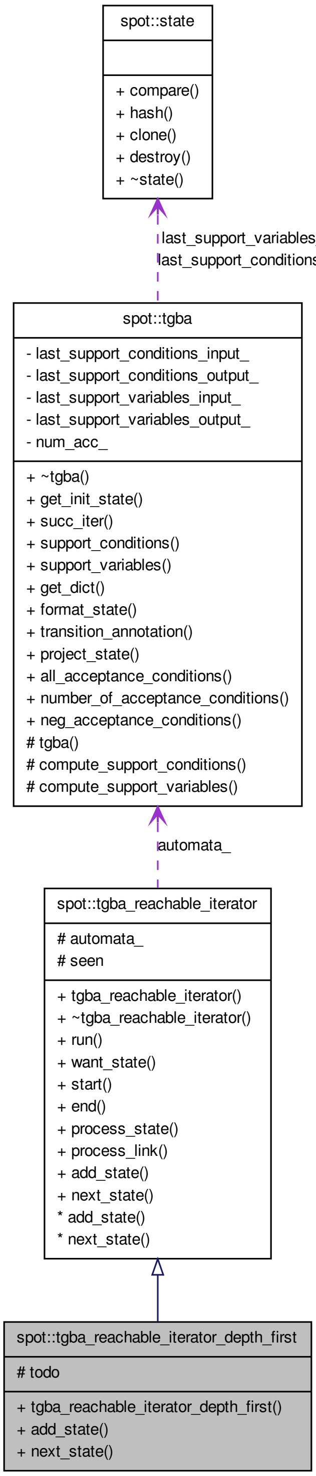
An implementation of spot::tgba_reachable_iterator that browses states depth first.

`#include <tgbaalgos/reachiter.hh>`

Inheritance diagram for spot::tgba_reachable_iterator_depth_first:



Collaboration diagram for spot::tgba_reachable_iterator_depth_first:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
automata_
spot::tgba_reachable_iterator
# automata_
# seen
+ tgba_reachable_iterator()
+ ~tgba_reachable_iterator()
+ run()
+ want_state()
+ start()
+ end()
+ process_state()
+ process_link()
+ add_state()
+ next_state()
* add_state()
* next_state()
spot::tgba_reachable_iterator_depth_first
# todo
+ tgba_reachable_iterator_depth_first()
+ add_state()
+ next_state()

Public Member Functions

- tgba_reachable_iterator_depth_first (const tgba ∗a)
- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const
- virtual void start ()

  Called by run() before starting its iteration.

- virtual void end ()

  Called by run() once all states have been explored.

- virtual void process_state (const state ∗s, int n, tgba_succ_iterator ∗si)
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Attributes

- std::stack< const state ∗ > todo

  A stack of states yet to explore.

- const tgba ∗ automata_

  The spot::tgba to explore.

- seen_map seen

  States already seen.

7.171.1 Detailed Description

An implementation of spot::tgba_reachable_iterator that browses states depth first.

7.171.2 Member Typedef Documentation

7.171.2.1 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected, inherited]`

7.171.3 Constructor & Destructor Documentation

7.171.3.1 spot::tgba_reachable_iterator_depth_first::tgba_reachable_iterator_depth_first (const tgba ∗ *a*)

7.171.4 Member Function Documentation

7.171.4.1 virtual void spot::tgba_reachable_iterator_depth_first::add_state (const state ∗ *s*) `[virtual]`

Implements spot::tgba_reachable_iterator.

7.171.4.2 virtual void spot::tgba_reachable_iterator::end ( ) `[virtual, inherited]`

Called by run() once all states have been explored.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.171.4.3 virtual const state∗ spot::tgba_reachable_iterator_depth_first::next_state ( ) `[virtual]`

Called by run() to obtain the next state to process.

Implements spot::tgba_reachable_iterator.

7.171.4.4 virtual void spot::tgba_reachable_iterator::process_link (const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

in_s The source state

in The source state number.

out_s The destination state

out The destination state number.

si The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.171.4.5 virtual void spot::tgba_reachable_iterator::process_state (const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.
- ***si*** The spot::tgba_succ_iterator for *s*.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.171.4.6 void spot::tgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.171.4.7 virtual void spot::tgba_reachable_iterator::start ( ) `[virtual, inherited]`

Called by run() before starting its iteration.

Reimplemented in spot::tgba_reduc, and spot::parity_game_graph.

7.171.4.8 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.171.5 Member Data Documentation

7.171.5.1 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::tgba to explore.

7.171.5.2 seen_map spot::tgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.171.5.3 std::stack<const state*> spot::tgba_reachable_iterator_depth_first::todo `[protected]`

A stack of states yet to explore.

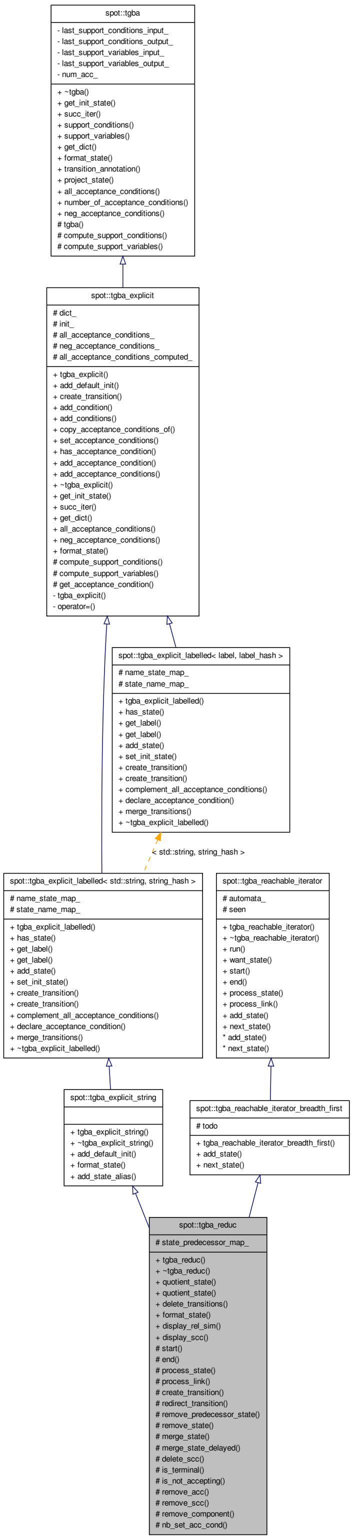
The documentation for this class was generated from the following file:

- tgbaalgos/reachiter.hh

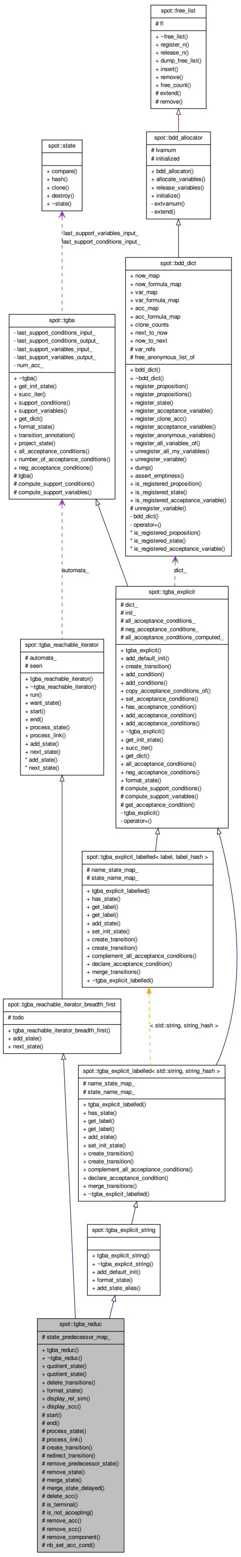
7.172 spot::tgba_reduc Class Reference

`#include <tgba/tgbareduc.hh>`

Inheritance diagram for spot::tgba_reduc:



Collaboration diagram for spot::tgba_reduc:



Public Types

- typedef std::list< transition ∗ > state

Public Member Functions

- tgba_reduc (const tgba ∗a)
- ∼tgba_reduc ()
- void quotient_state (direct_simulation_relation ∗rel)
- void quotient_state (delayed_simulation_relation ∗rel)
- void delete_transitions (simulation_relation ∗rel)

  Delete some transitions with help of a simulation relation.

- virtual std::string format_state (const spot::state ∗state) const

  Add the SCC index to the display of the state state.

- void display_rel_sim (simulation_relation ∗rel, std::ostream &os)
- void display_scc (std::ostream &os)
- virtual state ∗ add_default_init ()

  Add a default initial state.

- virtual std::string format_state (const spot::state ∗s) const

  Format the state as a string for printing.

- virtual void add_state_alias (const std::string &alias_name, const std::string &real_name)
- bool has_state (const std::string &name)
- const std::string & get_label (const tgba_explicit::state ∗s) const
- const std::string & get_label (const spot::state ∗s) const
- state ∗ add_state (const std::string &name)
- state ∗ set_init_state (const std::string &state)
- transition ∗ create_transition (state ∗source, const state ∗dest)
- transition ∗ create_transition (const std::string &source, const std::string &dest)
- void complement_all_acceptance_conditions ()
- void declare_acceptance_condition (const ltl::formula ∗f)
- void merge_transitions ()
- void add_condition (transition ∗t, const ltl::formula ∗f)
- void add_conditions (transition ∗t, bdd f)

  This assumes that all variables in f are known from dict.

- void copy_acceptance_conditions_of (const tgba ∗a)

  Copy the acceptance conditions of a tgba.

- void set_acceptance_conditions (bdd acc)

  The the acceptance conditions.

- bool has_acceptance_condition (const ltl::formula ∗f) const
- void add_acceptance_condition (transition ∗t, const ltl::formula ∗f)
- void add_acceptance_conditions (transition ∗t, bdd f)

  This assumes that all acceptance conditions in f are known from dict.

- virtual spot::state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const spot::state ∗local_state, const spot::state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

- virtual void add_state (const state ∗s)
- virtual const state ∗ next_state ()

  Called by run() to obtain the next state to process.

- void run ()

  Iterate over all reachable states of a spot::tgba.

- virtual bool want_state (const state ∗s) const
- virtual void process_link (const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si)

Protected Types

- typedef Sgi::hash_map< const tgba_explicit::state ∗, std::list< state ∗ > ∗, ptr_hash< tgba_explicit::state > > sp_map
- typedef std::string label_t
- typedef Sgi::hash_map< std::string, tgba_explicit::state ∗, string_hash > ns_map
- typedef Sgi::hash_map< const tgba_explicit::state ∗, std::string, ptr_hash< tgba_explicit::state > > sn_map
- typedef Sgi::hash_map< const state ∗, int, state_ptr_hash, state_ptr_equal > seen_map

Protected Member Functions

- void start ()

  Called by run() before starting its iteration.

- void end ()

  Called by run() once all states have been explored.

- void process_state (const spot::state ∗s, int n, tgba_succ_iterator ∗si)
- void process_link (int in, int out, const tgba_succ_iterator ∗si)
- transition ∗ create_transition (const spot::state ∗source, const spot::state ∗dest)

  Create a transition using two state of a TGBA.

- void redirect_transition (const spot::state ∗s, const spot::state ∗simul)
- void remove_predecessor_state (const state ∗s, const state ∗p)

  Remove p of the predecessor of s.

- void remove_state (const spot::state ∗s)
- void merge_state (const spot::state ∗s1, const spot::state ∗s2)
- void merge_state_delayed (const spot::state ∗s1, const spot::state ∗s2)
- void delete_scc ()
- bool is_terminal (const spot::state ∗s, int n=-1)
- bool is_not_accepting (const spot::state ∗s, int n=-1)
- void remove_acc (const spot::state ∗s)
- void remove_scc (spot::state ∗s)

  Remove all the state which belong to the same scc that s.

- void remove_component (const spot::state ∗from)

  Same as remove_scc but more efficient.

- int nb_set_acc_cond () const
- virtual bdd compute_support_conditions (const spot::state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const spot::state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd get_acceptance_condition (const ltl::formula ∗f)

Protected Attributes

- sp_map state_predecessor_map_
- ns_map name_state_map_
- sn_map state_name_map_
- bdd_dict ∗ dict_
- tgba_explicit::state ∗ init_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bool all_acceptance_conditions_computed_
- std::deque< const state ∗ > todo

A queue of states yet to explore.

- const tgba ∗ automata_

  The spot::tgba to explore.

- seen_map seen

  States already seen.

7.172.1 Detailed Description

Explicit automata used in reductions.

7.172.2 Member Typedef Documentation

7.172.2.1 typedef std::string spot::tgba_explicit_labelled< std::string , string_hash >::label_t `[protected, inherited]`

7.172.2.2 typedef Sgi::hash_map<std::string , tgba_explicit::state∗, string_hash > spot::tgba_explicit_labelled< std::string , string_hash >::ns_map `[protected, inherited]`

7.172.2.3 typedef Sgi::hash_map<const state∗, int, state_ptr_hash, state_ptr_equal> spot::tgba_reachable_iterator::seen_map `[protected, inherited]`

7.172.2.4 typedef Sgi::hash_map<const tgba_explicit::state∗, std::string , ptr_hash<tgba_explicit::state> > spot::tgba_explicit_labelled< std::string , string_hash >::sn_map `[protected, inherited]`

7.172.2.5 typedef Sgi::hash_map<const tgba_explicit::state∗, std::list<state∗>∗, ptr_hash<tgba_explicit::state> > spot::tgba_reduc::sp_map `[protected]`

7.172.2.6 typedef std::list<transition∗> spot::tgba_explicit::state `[inherited]`

7.172.3 Constructor & Destructor Documentation

7.172.3.1 spot::tgba_reduc::tgba_reduc (const tgba ∗ *a*)

7.172.3.2 spot::tgba_reduc::∼tgba_reduc ( )

7.172.4 Member Function Documentation

7.172.4.1 void spot::tgba_explicit::add_acceptance_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.172.4.2 void spot::tgba_explicit::add_acceptance_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all acceptance conditions in *f* are known from dict.

7.172.4.3 void spot::tgba_explicit::add_condition (transition ∗ *t*, const ltl::formula ∗ *f*) `[inherited]`

7.172.4.4 void spot::tgba_explicit::add_conditions (transition ∗ *t*, bdd *f*) `[inherited]`

This assumes that all variables in *f* are known from dict.

7.172.4.5 virtual state∗ spot::tgba_explicit_string::add_default_init ( ) `[virtual, inherited]`

Add a default initial state.

Implements spot::tgba_explicit.

7.172.4.6 state∗ spot::tgba_explicit_labelled< std::string , string_hash >::add_state (const std::string & *name*) `[inline, inherited]`

Return the tgba_explicit::state for *name*, creating the state if it does not exist.

References spot::tgba_explicit::init_, spot::tgba_explicit_labelled< label, label_hash >::name_state_map_, and spot::tgba_explicit_labelled< label, label_hash >::state_name_map_.

Referenced by spot::tgba_explicit_string::add_state_alias().

7.172.4.7 virtual void spot::tgba_reachable_iterator_breadth_first::add_state (const state ∗ *s*) `[virtual, inherited]`

Implements spot::tgba_reachable_iterator.

7.172.4.8 virtual void spot::tgba_explicit_string::add_state_alias (const std::string & *alias_name*, const std::string & *real_name*) `[inline, virtual, inherited]`

Create an alias for a state. Any reference to *alias_name* will act as a reference to *real_name*.

References spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::name_state_map_.

7.172.4.9 virtual bdd spot::tgba_explicit::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::complement_all_acceptance_conditions().

7.172.4.10 void spot::tgba_explicit_labelled< std::string , string_hash >::complement_all_acceptance_conditions ( ) `[inline, inherited]`

References spot::tgba_explicit::all_acceptance_conditions(), and spot::tgba_explicit_labelled< label, label_hash >::name_state_map_.

7.172.4.11 virtual bdd spot::tgba_explicit::compute_support_conditions (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.172.4.12 virtual bdd spot::tgba_explicit::compute_support_variables (const spot::state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.172.4.13 void spot::tgba_explicit::copy_acceptance_conditions_of (const tgba ∗ *a*) `[inherited]`

Copy the acceptance conditions of a tgba.

If used, this function should be called before creating any transition.

7.172.4.14 transition∗ spot::tgba_explicit_labelled< std::string , string_hash >::create_transition (const std::string & *source,* const std::string & *dest*) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::add_state(), and spot::tgba_explicit_labelled< label, label_hash >::create_transition().

7.172.4.15 transition∗ spot::tgba_explicit_labelled< std::string , string_hash >::create_transition (state ∗ *source,* const state ∗ *dest*) `[inline, inherited]`

Reimplemented from spot::tgba_explicit.

References spot::tgba_explicit_labelled< label, label_hash >::create_transition().

7.172.4.16 transition∗ spot::tgba_reduc::create_transition (const spot::state ∗ *source,* const spot::state ∗ *dest*) `[protected]`

Create a transition using two state of a TGBA.

7.172.4.17 void spot::tgba_explicit_labelled< std::string , string_hash >::declare_acceptance_condition (const ltl::formula ∗ *f*) `[inline, inherited]`

References spot::tgba_explicit::all_acceptance_conditions_computed_, spot::ltl::formula::destroy(), spot::tgba_explicit::dict_, spot::tgba_explicit_labelled< label, label_hash >::name_state_map_, spot::tgba_explicit::neg_acceptance_conditions_, and spot::bdd_dict::register_acceptance_variable().

7.172.4.18 void spot::tgba_reduc::delete_scc ( ) `[protected]`

Remove all the scc which are terminal and doesn't contains all the acceptance conditions.

7.172.4.19 void spot::tgba_reduc::delete_transitions (simulation_relation ∗ *rel*)

Delete some transitions with help of a simulation relation.

7.172.4.20 void spot::tgba_reduc::display_rel_sim (simulation_relation ∗ *rel*, std::ostream & *os*)

7.172.4.21 void spot::tgba_reduc::display_scc (std::ostream & *os*)

7.172.4.22 void spot::tgba_reduc::end ( ) `[protected, virtual]`

Called by run() once all states have been explored.

Reimplemented from spot::tgba_reachable_iterator.

7.172.4.23 virtual std::string spot::tgba_reduc::format_state (const spot::state ∗ *state*) const `[virtual]`

Add the SCC index to the display of the state *state*.

7.172.4.24 virtual std::string spot::tgba_explicit_string::format_state (const spot::state ∗ *state*) const `[virtual, inherited]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba_explicit.

7.172.4.25 bdd spot::tgba_explicit::get_acceptance_condition (const ltl::formula ∗ *f*) `[protected, inherited]`

7.172.4.26 virtual bdd_dict∗ spot::tgba_explicit::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.172.4.27 virtual spot::state∗ spot::tgba_explicit::get_init_state ( ) const `[virtual, inherited]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.172.4.28 const std::string & spot::tgba_explicit_labelled< std::string , string_hash >::get_label (const spot::state ∗ *s*) const `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::get_label(), and spot::state_explicit::get_state().

7.172.4.29 const std::string & spot::tgba_explicit_labelled< std::string , string_hash >::get_label (const tgba_explicit::state ∗ *s*) const `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::state_name_map_.

7.172.4.30 bool spot::tgba_explicit::has_acceptance_condition (const ltl::formula ∗ *f*) const `[inherited]`

7.172.4.31 bool spot::tgba_explicit_labelled< std::string , string_hash >::has_state (const std::string & *name*) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::name_state_map_.

7.172.4.32 bool spot::tgba_reduc::is_not_accepting (const spot::state ∗ *s*, int *n* = `-1`) `[protected]`

7.172.4.33 bool spot::tgba_reduc::is_terminal (const spot::state ∗ *s*, int *n* = `-1`) `[protected]`

Return true if the scc which contains *s* is an fixed-formula alpha-ball. this is explain in

```
/// @InProceedings{   etessami.00.concur,
/// author   = {Kousha Etessami and Gerard J. Holzmann},
/// title = {Optimizing {B\"u}chi Automata},
/// booktitle = {Proceedings of the 11th International Conference on
///    Concurrency Theory (Concur'2000)},
/// pages = {153--167},
/// year = {2000},
/// editor   = {C. Palamidessi},
/// volume   = {1877},
/// series   = {Lecture Notes in Computer Science},
///  publisher = {Springer-Verlag}
/// }
///
```

7.172.4.34 void spot::tgba_reduc::merge_state (const spot::state ∗ *s1*, const spot::state ∗ *s2*) `[protected]`

Redirect all transition leading to s1 to s2. Note that we can do the reverse because s1 and s2 belong to a co-simulate relation.

7.172.4.35 void spot::tgba_reduc::merge_state_delayed (const spot::state ∗ *s1*, const spot::state ∗ *s2*) `[protected]`

Redirect all transition leading to s1 to s2. Note that we can do the reverse because s1 and s2 belong to a co-simulate relation.

7.172.4.36 void spot::tgba_explicit_labelled< std::string , string_hash >::merge_transitions ( ) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::name_state_map_.

7.172.4.37 int spot::tgba_reduc::nb_set_acc_cond ( ) const `[protected]`

7.172.4.38 virtual bdd spot::tgba_explicit::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.172.4.39 virtual const state∗ spot::tgba_reachable_iterator_breadth_first::next_state ( ) `[virtual, inherited]`

Called by run() to obtain the next state to process.

Implements spot::tgba_reachable_iterator.

7.172.4.40 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.172.4.41 void spot::tgba_reduc::process_link (int *in*, int *out*, const tgba_succ_iterator ∗ *si*) `[protected]`

7.172.4.42 virtual void spot::tgba_reachable_iterator::process_link (const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*) `[virtual, inherited]`

Called by run() to process a transition.

Parameters

- ***in_s*** The source state
- ***in*** The source state number.
- ***out_s*** The destination state
- ***out*** The destination state number.
- ***si*** The spot::tgba_succ_iterator positionned on the current transition.

The in_s and out_s states are owned by the spot::tgba_reachable_iterator instance and destroyed when the instance is destroyed.

7.172.4.43 void spot::tgba_reduc::process_state (const spot::state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*) `[protected, virtual]`

Called by run() to process a state.

Parameters

- ***s*** The current state.
- ***n*** A unique number assigned to *s*.
- ***si*** The spot::tgba_succ_iterator for *s*.

Reimplemented from spot::tgba_reachable_iterator.

7.172.4.44 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.172.4.45 void spot::tgba_reduc::quotient_state (direct_simulation_relation ∗ *rel*)

Reduce the automata using a relation simulation Do not call this method with a delayed simulation relation.

7.172.4.46 void spot::tgba_reduc::quotient_state (delayed_simulation_relation ∗ *rel*)

Build the quotient automata. Call this method when use to a delayed simulation relation.

7.172.4.47 void spot::tgba_reduc::redirect_transition (const spot::state ∗ *s*, const spot::state ∗ *simul*) `[protected]`

Remove all the transition from the state q, predecessor of both *s* and *simul*, which can be removed.

7.172.4.48 void spot::tgba_reduc::remove_acc (const spot::state ∗ *s*) `[protected]`

If a scc maximal do not contains all the acceptance conditions we can remove all the acceptance conditions in this scc.

7.172.4.49 void spot::tgba_reduc::remove_component (const spot::state ∗ *from*) `[protected]`

Same as remove_scc but more efficient.

For compute_scc.

7.172.4.50 void spot::tgba_reduc::remove_predecessor_state (const state ∗ *s*, const state ∗ *p*) `[protected]`

Remove p of the predecessor of s.

7.172.4.51 void spot::tgba_reduc::remove_scc (spot::state ∗ *s*) `[protected]`

Remove all the state which belong to the same scc that s.

7.172.4.52 void spot::tgba_reduc::remove_state (const spot::state ∗ *s*) `[protected]`

Remove all the transition leading to s. s is then unreachable and can be consider as remove.

7.172.4.53 void spot::tgba_reachable_iterator::run ( ) `[inherited]`

Iterate over all reachable states of a spot::tgba.

This is a template method that will call add_state(), next_state(), start(), end(), process_state(), and process_link(), while it iterates over states.

7.172.4.54 void spot::tgba_explicit::set_acceptance_conditions (bdd *acc*) `[inherited]`

The the acceptance conditions.

7.172.4.55 state∗ spot::tgba_explicit_labelled< std::string , string_hash >::set_init_state (const std::string & *state*) `[inline, inherited]`

References spot::tgba_explicit_labelled< label, label_hash >::add_state(), and spot::tgba_explicit::init_.

7.172.4.56 void spot::tgba_reduc::start ( ) `[protected, virtual]`

Called by run() before starting its iteration.

Reimplemented from spot::tgba_reachable_iterator.

7.172.4.57 virtual tgba_succ_iterator∗ spot::tgba_explicit::succ_iter (const spot::state ∗ *local_state*, const spot::state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.172.4.58 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.172.4.59 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.172.4.60 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.172.4.61 virtual bool spot::tgba_reachable_iterator::want_state (const state ∗ *s*) const `[virtual, inherited]`

Called by add_state or next_states implementations to filter states. Default implementation always return true.

7.172.5 Member Data Documentation

7.172.5.1 bdd spot::tgba_explicit::all_acceptance_conditions_ `[mutable, protected, inherited]`

7.172.5.2 bool spot::tgba_explicit::all_acceptance_conditions_computed_ `[mutable, protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.172.5.3 const tgba∗ spot::tgba_reachable_iterator::automata_ `[protected, inherited]`

The spot::tgba to explore.

7.172.5.4 bdd_dict∗ spot::tgba_explicit::dict_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.172.5.5 tgba_explicit::state∗ spot::tgba_explicit::init_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::add_state(), and spot::tgba_explicit_labelled< std::string, string_hash >::set_init_state().

7.172.5.6 ns_map spot::tgba_explicit_labelled< std::string , string_hash >::name_state_map_ `[protected, inherited]`

Referenced by spot::tgba_explicit_string::add_state_alias().

7.172.5.7 bdd spot::tgba_explicit::neg_acceptance_conditions_ `[protected, inherited]`

Referenced by spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.172.5.8 seen_map spot::tgba_reachable_iterator::seen `[protected, inherited]`

States already seen.

7.172.5.9 sn_map spot::tgba_explicit_labelled< std::string , string_hash >::state_name_map_ `[protected, inherited]`

7.172.5.10 sp_map spot::tgba_reduc::state_predecessor_map_ `[protected]`

7.172.5.11 std::deque<const state*> spot::tgba_reachable_iterator_breadth_first::todo `[protected, inherited]`

A queue of states yet to explore.

The documentation for this class was generated from the following file:

- tgba/tgbareduc.hh

7.173 spot::tgba_run Struct Reference

An accepted run, for a tgba.

`#include <tgbaalgos/emptiness.hh>`

Classes

- struct step

Public Types

- typedef std::list< step > steps

Public Member Functions

- ~tgba_run ()
- tgba_run ()
- tgba_run (const tgba_run &run)
- tgba_run & operator= (const tgba_run &run)

Public Attributes

- steps prefix
- steps cycle

7.173.1 Detailed Description

An accepted run, for a tgba.

7.173.2 Member Typedef Documentation

7.173.2.1 typedef std::list<step> spot::tgba_run::steps

7.173.3 Constructor & Destructor Documentation

7.173.3.1 spot::tgba_run::∼tgba_run ( )

7.173.3.2 spot::tgba_run::tgba_run ( ) `[inline]`

7.173.3.3 spot::tgba_run::tgba_run (const tgba_run & *run*)

7.173.4 Member Function Documentation

7.173.4.1 tgba_run& spot::tgba_run::operator= (const tgba_run & *run*)

7.173.5 Member Data Documentation

7.173.5.1 steps spot::tgba_run::cycle

7.173.5.2 steps spot::tgba_run::prefix

The documentation for this struct was generated from the following file:

- tgbaalgos/emptiness.hh

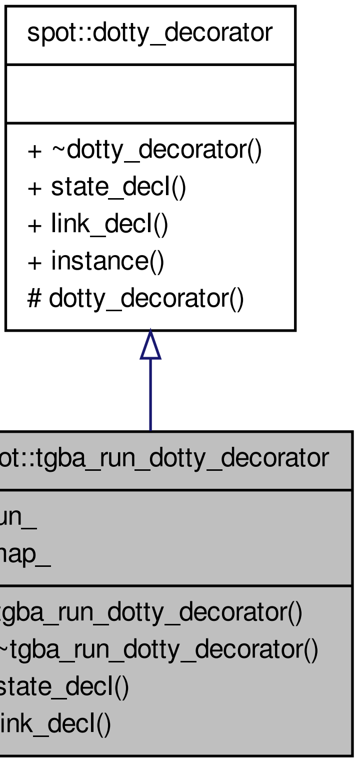
7.174 spot::tgba_run_dotty_decorator Class Reference

Highlight a spot::tgba_run on a spot::tgba.

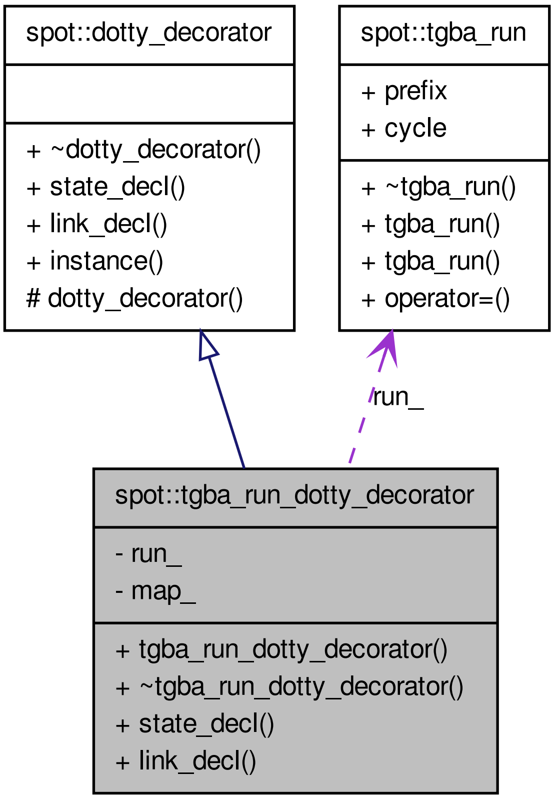
An instance of this class can be passed to spot::dotty_reachable.

`#include <tgbaalgos/rundotdec.hh>`

Inheritance diagram for spot::tgba_run_dotty_decorator:



Collaboration diagram for spot::tgba_run_dotty_decorator:



Public Member Functions

- tgba_run_dotty_decorator (const tgba_run ∗run)
- virtual ~tgba_run_dotty_decorator ()
- virtual std::string state_decl (const tgba ∗a, const state ∗s, int n, tgba_succ_iterator ∗si, const std::string &label)

  Compute the style of a state.

- virtual std::string link_decl (const tgba ∗a, const state ∗in_s, int in, const state ∗out_s, int out, const tgba_succ_iterator ∗si, const std::string &label)

  Compute the style of a link.

Static Public Member Functions

- static dotty_decorator ∗ instance ()

Get the unique instance of the default dotty_decorator.

Private Types

- typedef std::pair< tgba_run::steps::const_iterator, int > step_num
- typedef std::list< step_num > step_set
- typedef std::map< const state ∗, std::pair< step_set, step_set >, spot::state_ptr_less_than > step_map

Private Attributes

- const tgba_run ∗ run_
- step_map map_

7.174.1 Detailed Description

Highlight a spot::tgba_run on a spot::tgba.

An instance of this class can be passed to spot::dotty_reachable.

7.174.2 Member Typedef Documentation

7.174.2.1 typedef std::map<const state∗, std::pair<step_set, step_set>, spot::state_ptr_less_than> spot::tgba_run_dotty_decorator::step_map `[private]`

7.174.2.2 typedef std::pair<tgba_run::steps::const_iterator, int> spot::tgba_run_dotty_decorator::step_num `[private]`

7.174.2.3 typedef std::list<step_num> spot::tgba_run_dotty_decorator::step_set `[private]`

7.174.3 Constructor & Destructor Documentation

7.174.3.1 spot::tgba_run_dotty_decorator::tgba_run_dotty_decorator (const tgba_run ∗ *run*)

7.174.3.2 virtual spot::tgba_run_dotty_decorator::∼tgba_run_dotty_decorator ( ) `[virtual]`

7.174.4 Member Function Documentation

7.174.4.1 static dotty_decorator∗ spot::dotty_decorator::instance ( ) `[static, inherited]`

Get the unique instance of the default dotty_decorator.

7.174.4.2 virtual std::string spot::tgba_run_dotty_decorator::link_decl (const tgba ∗ *a*, const state ∗ *in_s*, int *in*, const state ∗ *out_s*, int *out*, const tgba_succ_iterator ∗ *si*, const std::string & *label*) `[virtual]`

Compute the style of a link.

This function should output a string of the form `[label="foo", style=bar, ...]`. The default implementation will simply output `[label="LABEL"]` with `LABEL` replaced by the value of *label*.

Parameters

a the automaton being drawn

in_s the source state of the transition being drawn (owned by the caller)

in the unique number associated to *in_s*

out_s the destination state of the transition being drawn (owned by the caller)

out the unique number associated to *out_s*

si an iterator over the successors of *in_s*, pointing to the current transition (owned by the caller and cannot be iterated)

label the computed name of this state

Reimplemented from spot::dotty_decorator.

7.174.4.3 virtual std::string spot::tgba_run_dotty_decorator::state_decl (const tgba ∗ *a*, const state ∗ *s*, int *n*, tgba_succ_iterator ∗ *si*, const std::string & *label*) `[virtual]`

Compute the style of a state.

This function should output a string of the form `[label="foo", style=bar, ...]`. The default implementation will simply output `[label="LABEL"]` with `LABEL` replaced by the value of *label*.

Parameters

a the automaton being drawn

s the state being drawn (owned by the caller)

n a unique number for this state

si an iterator over the successors of this state (owned by the caller, but can be freely iterated)

label the computed name of this state

Reimplemented from spot::dotty_decorator.

7.174.5 Member Data Documentation

7.174.5.1 step_map spot::tgba_run_dotty_decorator::map_ `[private]`

7.174.5.2 const tgba_run∗ spot::tgba_run_dotty_decorator::run_ `[private]`

The documentation for this class was generated from the following file:

- tgbaalgos/rundotdec.hh

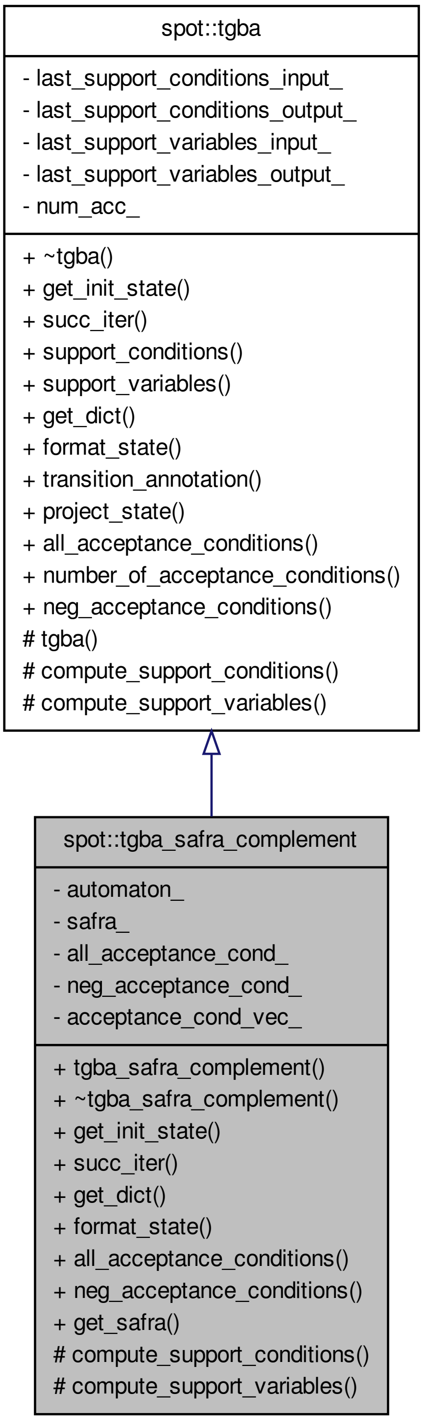
7.175 spot::tgba_safra_complement Class Reference

Build a complemented automaton.

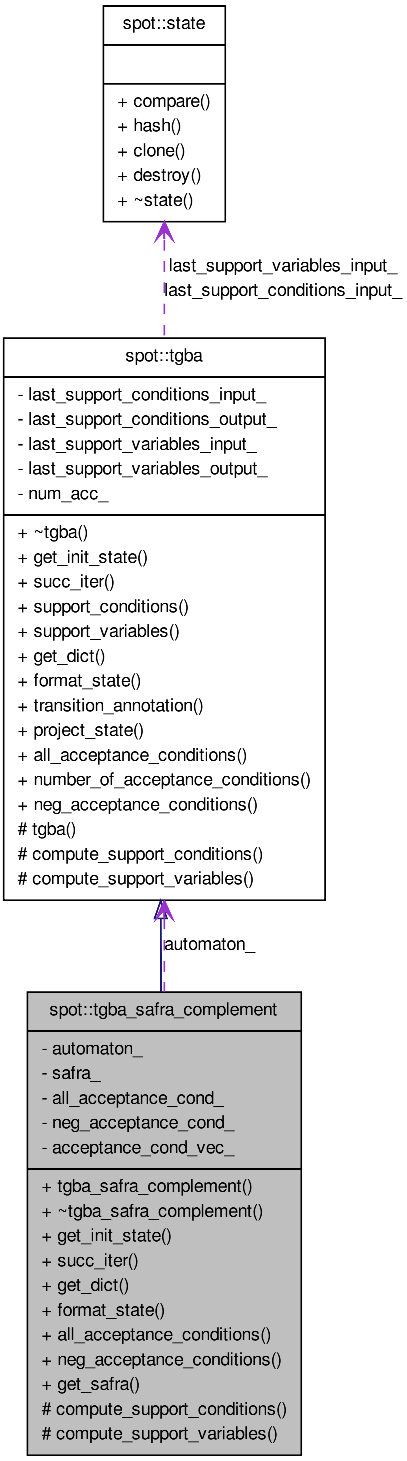
It creates an automaton that recognizes the negated language of *aut*.

`#include <tgba/tgbasafracomplement.hh>`

Inheritance diagram for spot::tgba_safra_complement:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_safra_complement
- automaton_
- safra_
- all_acceptance_cond_
- neg_acceptance_cond_
- acceptance_cond_vec_
+ tgba_safra_complement()
+ ~tgba_safra_complement()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ get_safra()
# compute_support_conditions()
# compute_support_variables()

Collaboration diagram for spot::tgba_safra_complement:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
automaton_
spot::tgba_safra_complement
- automaton_
- safra_
- all_acceptance_cond_
- neg_acceptance_cond_
- acceptance_cond_vec_
+ tgba_safra_complement()
+ ~tgba_safra_complement()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ get_safra()
# compute_support_conditions()
# compute_support_variables()

Public Member Functions

- tgba_safra_complement (const tgba ∗a)
- virtual ∼tgba_safra_complement ()
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- void ∗ get_safra () const
- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Private Attributes

- const tgba ∗ automaton_
- void ∗ safra_
- bdd all_acceptance_cond_
- bdd neg_acceptance_cond_
- std::vector< int > acceptance_cond_vec_

7.175.1 Detailed Description

Build a complemented automaton.

It creates an automaton that recognizes the negated language of *aut*. 1. First Safra construction algorithm produces a deterministic Rabin automaton. 2. Interpreting this deterministic Rabin automaton as a deterministic Streett will produce a complemented automaton. 3. Then we use a transformation from deterministic Streett automaton to nondeterministic Büchi automaton.

Safra construction is done in *tgba_complement*, the transformation is done on-the-fly when successors are called.

See also

safra_determinisation, tgba_safra_complement::succ_iter.

7.175.2 Constructor & Destructor Documentation

7.175.2.1 spot::tgba_safra_complement::tgba_safra_complement (const tgba ∗ *a*)

7.175.2.2 virtual spot::tgba_safra_complement::∼tgba_safra_complement ( ) `[virtual]`

7.175.3 Member Function Documentation

7.175.3.1 virtual bdd spot::tgba_safra_complement::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.175.3.2 virtual bdd spot::tgba_safra_complement::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.175.3.3 virtual bdd spot::tgba_safra_complement::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.175.3.4 virtual std::string spot::tgba_safra_complement::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.175.3.5 virtual bdd_dict∗ spot::tgba_safra_complement::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.175.3.6 virtual state∗ spot::tgba_safra_complement::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.175.3.7 void∗ spot::tgba_safra_complement::get_safra ( ) const `[inline]`

References safra_.

7.175.3.8 virtual bdd spot::tgba_safra_complement::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.175.3.9 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.175.3.10 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

> 0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.175.3.11 virtual tgba_succ_iterator∗ spot::tgba_safra_complement::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.175.3.12 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.175.3.13 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.175.3.14 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.175.4 Member Data Documentation

7.175.4.1 std::vector<int> spot::tgba_safra_complement::acceptance_cond_vec_ `[private]`

7.175.4.2 bdd spot::tgba_safra_complement::all_acceptance_cond_ `[private]`

7.175.4.3 const tgba∗ spot::tgba_safra_complement::automaton_ `[private]`

7.175.4.4 bdd spot::tgba_safra_complement::neg_acceptance_cond_ `[private]`

7.175.4.5 void∗ spot::tgba_safra_complement::safra_ `[private]`

Referenced by get_safra().

The documentation for this class was generated from the following file:

- tgba/tgbasafracomplement.hh

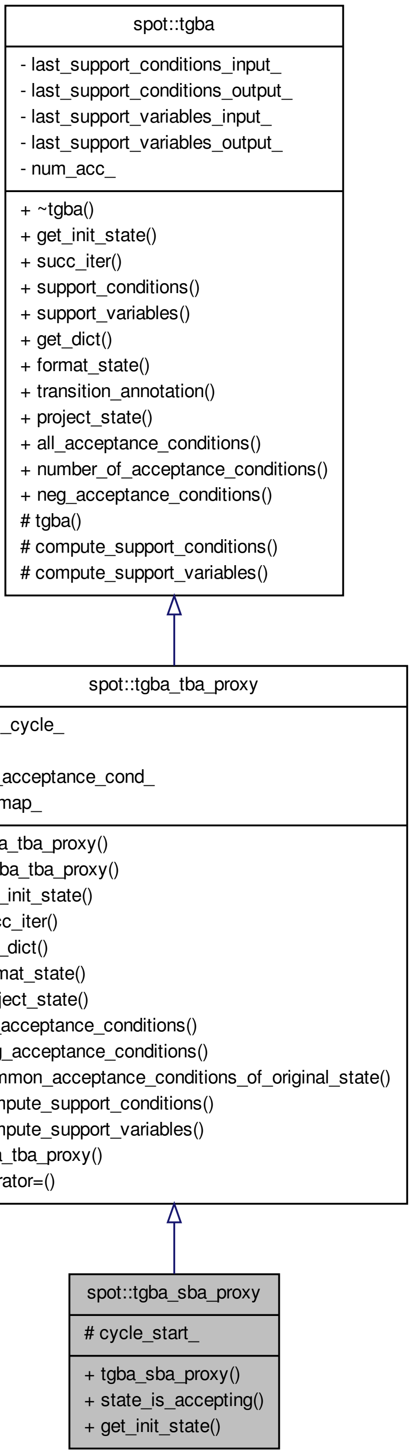
7.176 spot::tgba_sba_proxy Class Reference

Degeneralize a spot::tgba on the fly, producing an SBA.

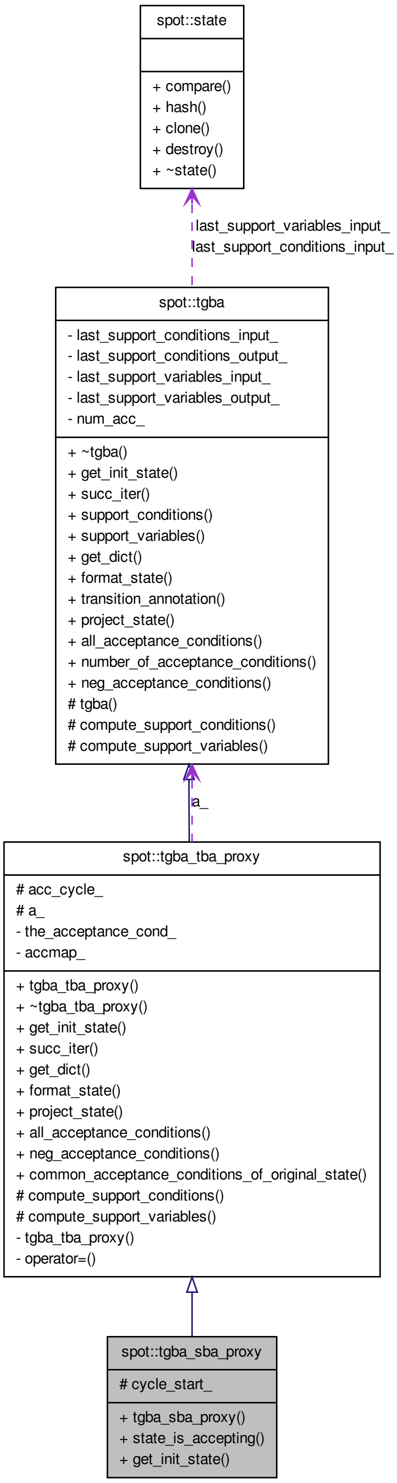
This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly.

`#include <tgba/tgbatba.hh>`

Inheritance diagram for spot::tgba_sba_proxy:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_tba_proxy
# acc_cycle_
# a_
- the_acceptance_cond_
- accmap_
+ tgba_tba_proxy()
+ ~tgba_tba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ common_acceptance_conditions_of_original_state()
# compute_support_conditions()
# compute_support_variables()
- tgba_tba_proxy()
- operator=()
spot::tgba_sba_proxy
# cycle_start_
+ tgba_sba_proxy()
+ state_is_accepting()
+ get_init_state()

Collaboration diagram for spot::tgba_sba_proxy:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
a_
spot::tgba_tba_proxy
# acc_cycle_
# a_
- the_acceptance_cond_
- accmap_
+ tgba_tba_proxy()
+ ~tgba_tba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ common_acceptance_conditions_of_original_state()
# compute_support_conditions()
# compute_support_variables()
- tgba_tba_proxy()
- operator=()
spot::tgba_sba_proxy
# cycle_start_
+ tgba_sba_proxy()
+ state_is_accepting()
+ get_init_state()

Public Types

- typedef std::list< bdd > cycle_list

Public Member Functions

- tgba_sba_proxy (const tgba ∗a)
- bool state_is_accepting (const state ∗state) const

  Whether the state is accepting.

- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd common_acceptance_conditions_of_original_state (const state ∗ostate) const

  Return the acceptance conditions common to all outgoing transitions of state ostate in the original automaton.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

    Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

    Do the actual computation of tgba::support_variables().

Protected Attributes

- cycle_list::iterator cycle_start_
- cycle_list acc_cycle_
- const tgba ∗ a_

7.176.1 Detailed Description

Degeneralize a spot::tgba on the fly, producing an SBA.

This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly. This is similar to tgba_tba_proxy, except that automata produced with this algorithms can also been see as State-based Büchi Automata (SBA). See tgba_sba_proxy::state_is_accepting(). (An SBA is a TBA, and a TBA is a TGBA.)

This extra property has a small cost in size: if the input automaton uses N acceptance conditions, the output automaton can have at most max(N,1)+1 times more states and transitions. (This is only max(N,1) for tgba_tba_proxy.)

7.176.2 Member Typedef Documentation

7.176.2.1 typedef std::list<bdd> spot::tgba_tba_proxy::cycle_list `[inherited]`

7.176.3 Constructor & Destructor Documentation

7.176.3.1 spot::tgba_sba_proxy::tgba_sba_proxy (const tgba ∗ *a*)

7.176.4 Member Function Documentation

7.176.4.1 virtual bdd spot::tgba_tba_proxy::all_acceptance_conditions ( ) const `[virtual, inherited]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.176.4.2 bdd spot::tgba_tba_proxy::common_acceptance_conditions_of_original_state (const state ∗ *ostate*) const `[inherited]`

Return the acceptance conditions common to all outgoing transitions of state *ostate* in the original automaton.

This internal function is only meant to be used to implement the iterator returned by succ_iter.

The result of this function is computed the first time, and then cached.

7.176.4.3 virtual bdd spot::tgba_tba_proxy::compute_support_conditions (const state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.176.4.4 virtual bdd spot::tgba_tba_proxy::compute_support_variables (const state ∗ *state*) const `[protected, virtual, inherited]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.176.4.5 virtual std::string spot::tgba_tba_proxy::format_state (const state ∗ *state*) const `[virtual, inherited]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.176.4.6 virtual bdd_dict∗ spot::tgba_tba_proxy::get_dict ( ) const `[virtual, inherited]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.176.4.7 virtual state∗ spot::tgba_sba_proxy::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Reimplemented from spot::tgba_tba_proxy.

7.176.4.8 virtual bdd spot::tgba_tba_proxy::neg_acceptance_conditions ( ) const `[virtual, inherited]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.176.4.9 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.176.4.10 virtual state∗ spot::tgba_tba_proxy::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.176.4.11 bool spot::tgba_sba_proxy::state_is_accepting (const state ∗ *state*) const

Whether the state is accepting.

A particularity of a spot::tgba_sba_proxy automaton is that when a state has an outgoing accepting arc, all its outgoing arcs are accepting. The state itself can therefore be considered accepting. This is useful in algorithms working on degeneralized automata with state acceptance conditions.

7.176.4.12 virtual tgba_succ_iterator∗ spot::tgba_tba_proxy::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual, inherited]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

- ***local_state*** The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).
- ***global_state*** In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.
- ***global_automaton*** In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.176.4.13 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.176.4.14 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.176.4.15 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.176.5 Member Data Documentation

7.176.5.1 const tgba∗ spot::tgba_tba_proxy::a_ `[protected, inherited]`

7.176.5.2 cycle_list spot::tgba_tba_proxy::acc_cycle_ `[protected, inherited]`

7.176.5.3 cycle_list::iterator spot::tgba_sba_proxy::cycle_start_ `[protected]`

The documentation for this class was generated from the following file:

- tgba/tgbatba.hh

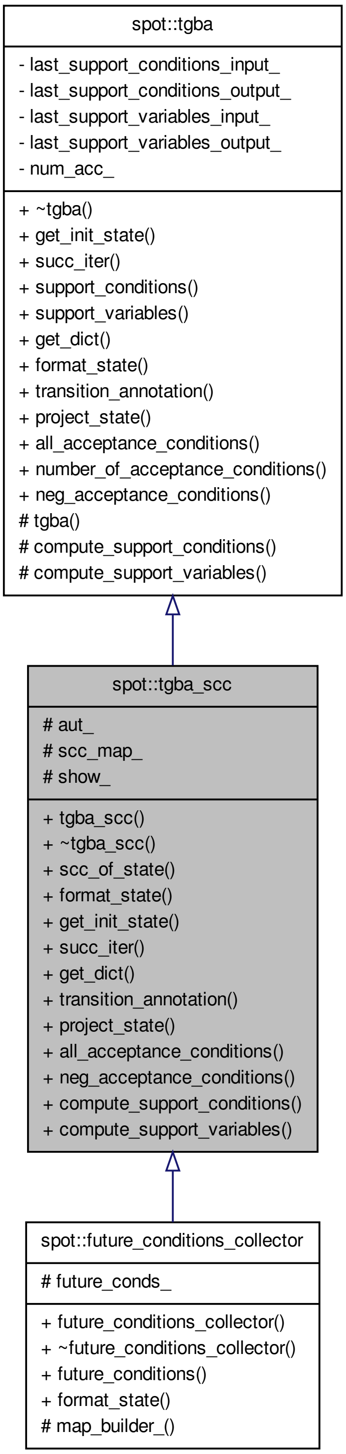
7.177 spot::tgba_scc Class Reference

Wrap a tgba to offer information about strongly connected components.

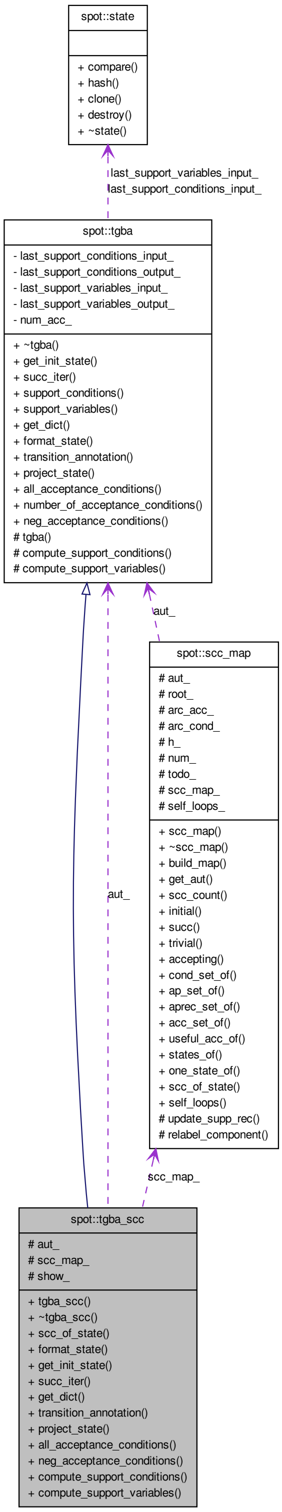
This class is a spot::tgba wrapper that simply add a new method scc_of_state() to retrieve the number of a SCC a state belongs to.

`#include <tgba/tgbascc.hh>`

Inheritance diagram for spot::tgba_scc:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_scc
# aut_
# scc_map_
# show_
+ tgba_scc()
+ ~tgba_scc()
+ scc_of_state()
+ format_state()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ compute_support_conditions()
+ compute_support_variables()
spot::future_conditions_collector
# future_conds_
+ future_conditions_collector()
+ ~future_conditions_collector()
+ future_conditions()
+ format_state()
# map_builder_()

Collaboration diagram for spot::tgba_scc:



Public Member Functions

- tgba_scc (const tgba ∗aut, bool show=false)

  Create a tgba_scc wrapper for aut.

- virtual ∼tgba_scc ()
- unsigned scc_of_state (const spot::state ∗s) const

  Returns the number of the SCC s belongs to.

- virtual std::string format_state (const state ∗state) const

  Format a state for output.

- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Attributes

- const tgba ∗ aut_
- scc_map scc_map_
- bool show_

7.177.1 Detailed Description

Wrap a tgba to offer information about strongly connected components.

This class is a spot::tgba wrapper that simply add a new method scc_of_state() to retrieve the number of a SCC a state belongs to.

7.177.2 Constructor & Destructor Documentation

7.177.2.1 spot::tgba_scc::tgba_scc (const tgba ∗ *aut*, bool *show* = `false`)

Create a tgba_scc wrapper for *aut*.

If *show* is set to true, then the format_state() method will include the SCC number computed for the given state in its output string.

7.177.2.2 virtual spot::tgba_scc::∼tgba_scc ( ) `[virtual]`

7.177.3 Member Function Documentation

7.177.3.1 virtual bdd spot::tgba_scc::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.177.3.2 virtual bdd spot::tgba_scc::compute_support_conditions (const state ∗ *state*) const `[virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.177.3.3 virtual bdd spot::tgba_scc::compute_support_variables (const state ∗ *state*) const `[virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.177.3.4 virtual std::string spot::tgba_scc::format_state (const state ∗ *state*) const `[virtual]`

Format a state for output.

If the constructor was called with *show* set to true, then this method will include the SCC number computed for *state* in the output string.

Implements spot::tgba.

Reimplemented in spot::future_conditions_collector.

7.177.3.5 virtual bdd_dict∗ spot::tgba_scc::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.177.3.6 virtual state∗ spot::tgba_scc::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.177.3.7 virtual bdd spot::tgba_scc::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.177.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.177.3.9 virtual state∗ spot::tgba_scc::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state*` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.177.3.10 unsigned spot::tgba_scc::scc_of_state (const spot::state ∗ *s*) const

Returns the number of the SCC *s* belongs to.

7.177.3.11 virtual tgba_succ_iterator∗ spot::tgba_scc::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.177.3.12 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.177.3.13 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.177.3.14 virtual std::string spot::tgba_scc::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented from spot::tgba.

7.177.4 Member Data Documentation

7.177.4.1 const tgba∗ spot::tgba_scc::aut_ `[protected]`

7.177.4.2 scc_map spot::tgba_scc::scc_map_ `[protected]`

7.177.4.3 bool spot::tgba_scc::show_ `[protected]`

The documentation for this class was generated from the following file:

- tgba/tgbascc.hh

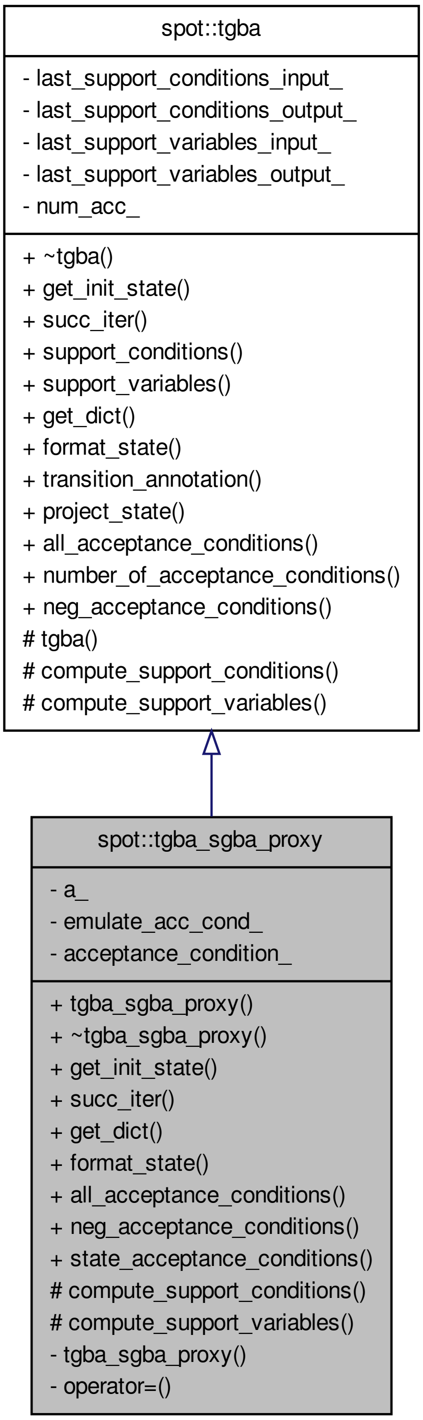
7.178 spot::tgba_sgba_proxy Class Reference

Change the labeling-mode of spot::tgba on the fly, producing a state-based generalized Büchi automaton.

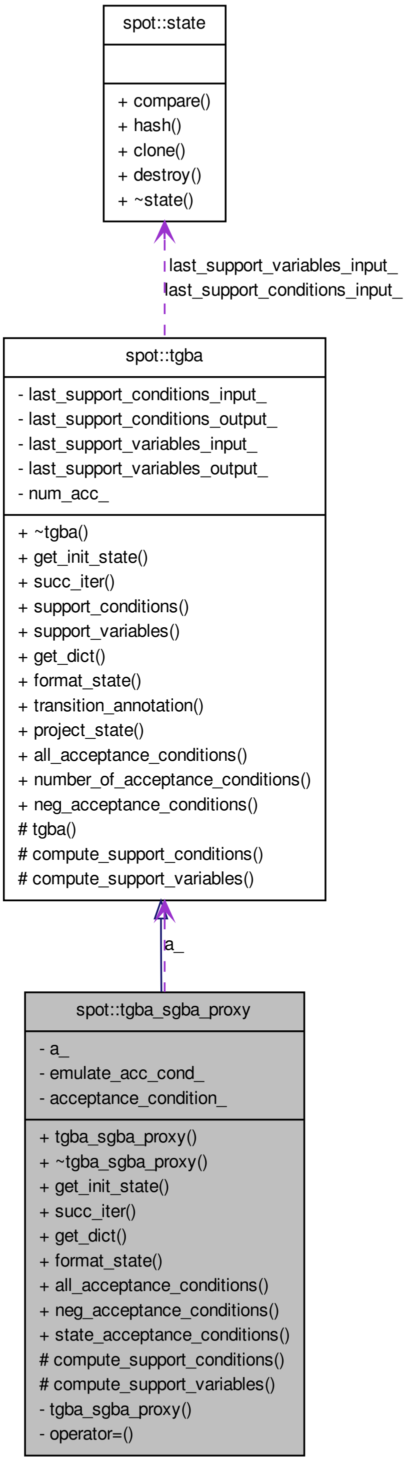
This class acts as a proxy in front of a spot::tgba, that should label on states on-the-fly. The result is still a spot::tgba, but acceptances conditions are also on states.

`#include <tgba/tgbasgba.hh>`

Inheritance diagram for spot::tgba_sgba_proxy:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_sgba_proxy
- a_
- emulate_acc_cond_
- acceptance_condition_
+ tgba_sgba_proxy()
+ ~tgba_sgba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- tgba_sgba_proxy()
- operator=()

Collaboration diagram for spot::tgba_sgba_proxy:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
a_
spot::tgba_sgba_proxy
- a_
- emulate_acc_cond_
- acceptance_condition_
+ tgba_sgba_proxy()
+ ~tgba_sgba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ state_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- tgba_sgba_proxy()
- operator=()

Public Member Functions

- tgba_sgba_proxy (const tgba ∗a, bool no_zero_acc=true)
- virtual ∼tgba_sgba_proxy ()
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.
- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.
- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.
- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.
- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.
- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.
- bdd state_acceptance_conditions (const state ∗state) const

  Retrieve the acceptance condition of a state.
- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.
- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.
- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.
- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.
- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().
- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Private Member Functions

- tgba_sgba_proxy (const tgba_sgba_proxy &)
- tgba_sgba_proxy & operator= (const tgba_sgba_proxy &)

Private Attributes

- const tgba ∗ a_
- bool emulate_acc_cond_
- bdd acceptance_condition_

7.178.1 Detailed Description

Change the labeling-mode of spot::tgba on the fly, producing a state-based generalized Büchi automaton.

This class acts as a proxy in front of a spot::tgba, that should label on states on-the-fly. The result is still a spot::tgba, but acceptances conditions are also on states.

7.178.2 Constructor & Destructor Documentation

7.178.2.1 spot::tgba_sgba_proxy::tgba_sgba_proxy (const tgba ∗ *a*, bool *no_zero_acc* = `true`)

7.178.2.2 virtual spot::tgba_sgba_proxy::∼tgba_sgba_proxy ( ) `[virtual]`

7.178.2.3 spot::tgba_sgba_proxy::tgba_sgba_proxy (const tgba_sgba_proxy &) `[private]`

7.178.3 Member Function Documentation

7.178.3.1 virtual bdd spot::tgba_sgba_proxy::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.178.3.2 virtual bdd spot::tgba_sgba_proxy::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.178.3.3 virtual bdd spot::tgba_sgba_proxy::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.178.3.4 virtual std::string spot::tgba_sgba_proxy::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.178.3.5 virtual bdd_dict∗ spot::tgba_sgba_proxy::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.178.3.6 virtual state∗ spot::tgba_sgba_proxy::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.178.3.7 virtual bdd spot::tgba_sgba_proxy::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.178.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.178.3.9 tgba_sgba_proxy& spot::tgba_sgba_proxy::operator= (const tgba_sgba_proxy &) `[private]`

7.178.3.10 virtual state∗ spot::tgba::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual, inherited]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented in spot::tgba_product, spot::tgba_scc, spot::tgba_tba_proxy, and spot::tgba_union.

7.178.3.11 bdd spot::tgba_sgba_proxy::state_acceptance_conditions (const state ∗ *state*) const

Retrieve the acceptance condition of a state.

7.178.3.12 virtual tgba_succ_iterator∗ spot::tgba_sgba_proxy::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = 0, const tgba ∗ *global_automaton* = 0) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.178.3.13 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.178.3.14 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.178.3.15 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.178.4 Member Data Documentation

7.178.4.1 const tgba∗ spot::tgba_sgba_proxy::a_ `[private]`

7.178.4.2 bdd spot::tgba_sgba_proxy::acceptance_condition_ `[private]`

7.178.4.3 bool spot::tgba_sgba_proxy::emulate_acc_cond_ `[private]`

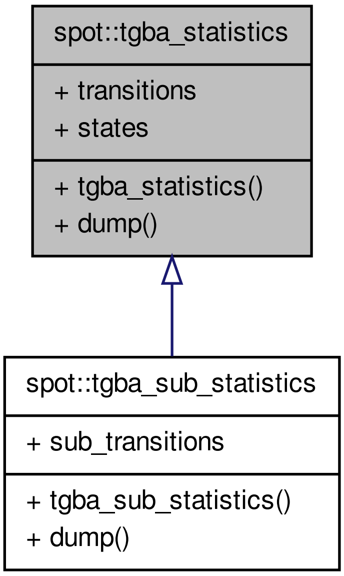
The documentation for this class was generated from the following file:

- tgba/tgbasgba.hh

7.179 spot::tgba_statistics Struct Reference

`#include <tgbaalgos/stats.hh>`

Inheritance diagram for spot::tgba_statistics:



Public Member Functions

- tgba_statistics ()
- std::ostream & dump (std::ostream &out) const

Public Attributes

- unsigned transitions
- unsigned states

7.179.1 Constructor & Destructor Documentation

7.179.1.1 spot::tgba_statistics::tgba_statistics ( ) `[inline]`

References states, and transitions.

7.179.2 Member Function Documentation

7.179.2.1 std::ostream& spot::tgba_statistics::dump (std::ostream & *out*) const

Reimplemented in spot::tgba_sub_statistics.

7.179.3 Member Data Documentation

7.179.3.1 unsigned spot::tgba_statistics::states

Referenced by tgba_statistics().

7.179.3.2 unsigned spot::tgba_statistics::transitions

Referenced by tgba_statistics().

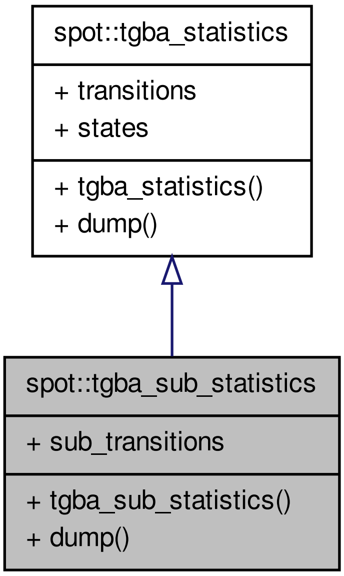
The documentation for this struct was generated from the following file:

- tgbaalgos/stats.hh

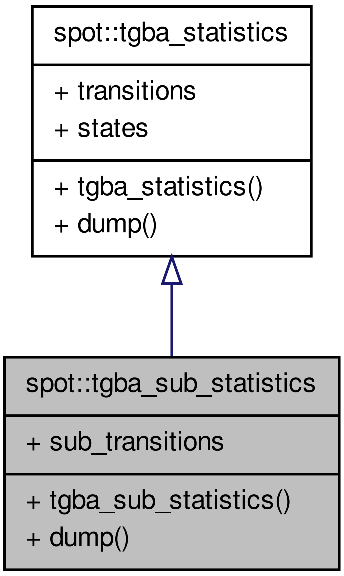
7.180 spot::tgba_sub_statistics Struct Reference

`#include <tgbaalgos/stats.hh>`

Inheritance diagram for spot::tgba_sub_statistics:



Collaboration diagram for spot::tgba_sub_statistics:



Public Member Functions

- tgba_sub_statistics ()
- std::ostream & dump (std::ostream &out) const

Public Attributes

- unsigned sub_transitions
- unsigned transitions
- unsigned states

7.180.1 Constructor & Destructor Documentation

7.180.1.1 spot::tgba_sub_statistics::tgba_sub_statistics ( ) `[inline]`

References sub_transitions.

7.180.2 Member Function Documentation

7.180.2.1 std::ostream& spot::tgba_sub_statistics::dump (std::ostream & *out*) const

Reimplemented from spot::tgba_statistics.

7.180.3 Member Data Documentation

7.180.3.1 unsigned spot::tgba_statistics::states `[inherited]`

Referenced by spot::tgba_statistics::tgba_statistics().

7.180.3.2 unsigned spot::tgba_sub_statistics::sub_transitions

Referenced by tgba_sub_statistics().

7.180.3.3 unsigned spot::tgba_statistics::transitions `[inherited]`

Referenced by spot::tgba_statistics::tgba_statistics().

The documentation for this struct was generated from the following file:

- tgbaalgos/stats.hh

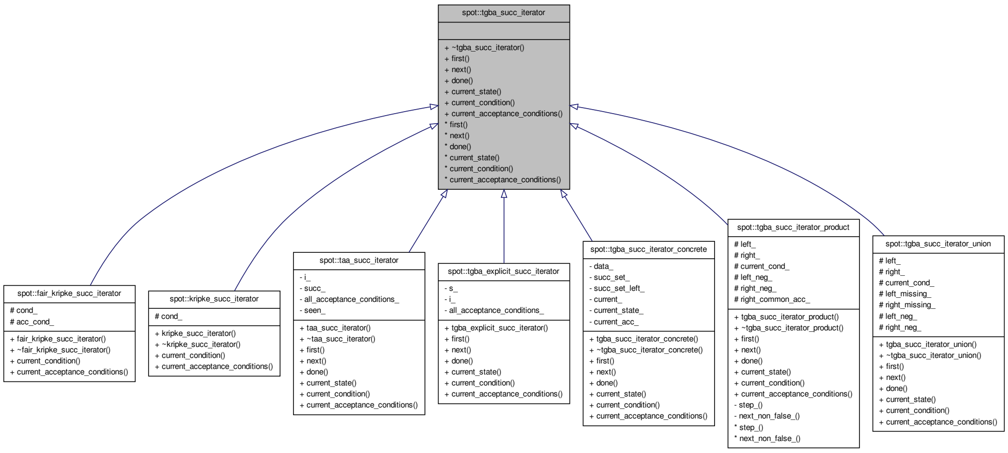
7.181 spot::tgba_succ_iterator Class Reference

Iterate over the successors of a state.

This class provides the basic functionalities required to iterate over the successors of a state, as well as querying transition labels. Because transitions are never explicitely encoded, labels (conditions and acceptance conditions) can only be queried while iterating over the successors.

`#include <tgba/succiter.hh>`

Inheritance diagram for spot::tgba_succ_iterator:



Public Member Functions

- virtual ~tgba_succ_iterator ()

Iteration

- virtual void first ()=0
  Position the iterator on the first successor (if any).
- virtual void next ()=0
  Jump to the next successor (if any).
- virtual bool done () const =0
  Check whether the iteration is finished.

Inspection

- virtual state ∗ current_state () const =0
  Get the state of the current successor.
- virtual bdd current_condition () const =0
  Get the condition on the transition leading to this successor.
- virtual bdd current_acceptance_conditions () const =0
  Get the acceptance conditions on the transition leading to this successor.

7.181.1 Detailed Description

Iterate over the successors of a state.

This class provides the basic functionalities required to iterate over the successors of a state, as well as querying transition labels. Because transitions are never explicitely encoded, labels (conditions and acceptance conditions) can only be queried while iterating over the successors.

7.181.2 Constructor & Destructor Documentation

7.181.2.1 virtual spot::tgba_succ_iterator::∼tgba_succ_iterator ( ) `[inline, virtual]`

7.181.3 Member Function Documentation

7.181.3.1 virtual bdd spot::tgba_succ_iterator::current_acceptance_conditions ( ) const `[pure virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implemented in spot::fair_kripke_succ_iterator, spot::kripke_succ_iterator, spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.181.3.2 virtual bdd spot::tgba_succ_iterator::current_condition ( ) const `[pure virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implemented in spot::fair_kripke_succ_iterator, spot::kripke_succ_iterator, spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.181.3.3 virtual state∗ spot::tgba_succ_iterator::current_state ( ) const `[pure virtual]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.181.3.4 virtual bool spot::tgba_succ_iterator::done ( ) const `[pure virtual]`

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.181.3.5 virtual void spot::tgba_succ_iterator::first ( ) `[pure virtual]`

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

7.181.3.6 virtual void spot::tgba_succ_iterator::next ( ) `[pure virtual]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implemented in spot::tgba_succ_iterator_concrete, spot::taa_succ_iterator, spot::tgba_explicit_succ_iterator, spot::tgba_succ_iterator_product, and spot::tgba_succ_iterator_union.

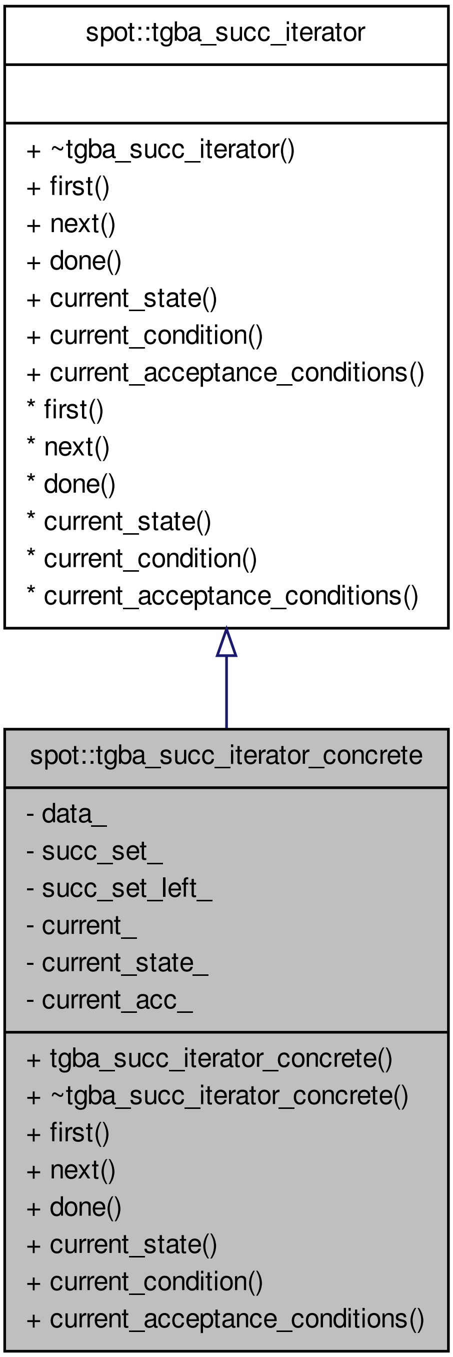
The documentation for this class was generated from the following file:

- tgba/succiter.hh

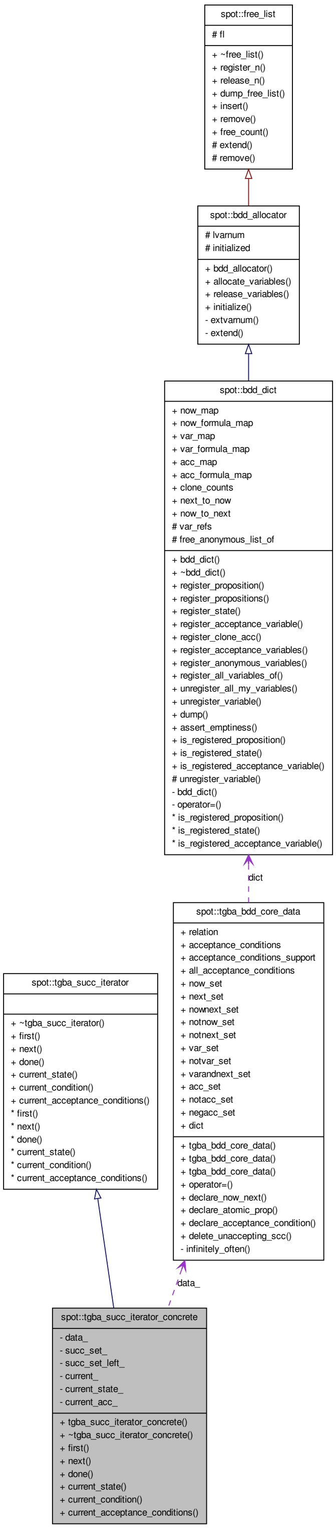
7.182 spot::tgba_succ_iterator_concrete Class Reference

`#include <tgba/succiterconcrete.hh>`

Inheritance diagram for spot::tgba_succ_iterator_concrete:



Collaboration diagram for spot::tgba_succ_iterator_concrete:



Public Member Functions

- tgba_succ_iterator_concrete (const tgba_bdd_core_data &d, bdd successors)

  Build a spot::tgba_succ_iterator_concrete.

- virtual ~tgba_succ_iterator_concrete ()
- void first ()

  Position the iterator on the first successor (if any).

- void next ()

  Jump to the next successor (if any).

- bool done () const

  Check whether the iteration is finished.

- state_bdd ∗ current_state () const

  Get the state of the current successor.

- bdd current_condition () const

  Get the condition on the transition leading to this successor.

- bdd current_acceptance_conditions () const

  Get the acceptance conditions on the transition leading to this successor.

Private Attributes

- const tgba_bdd_core_data & data_

  Core data of the automaton.

- bdd succ_set_

  The set of successors.

- bdd succ_set_left_

  Unexplored successors (including current_).

- bdd current_

  Current successor, as a conjunction of atomic proposition and Next variables.

- bdd current_state_

  Current successor, as a conjunction of Now variables.

- bdd current_acc_

  Acceptance conditions for the current transition.

7.182.1 Detailed Description

A concrete iterator over successors of a TGBA state.

7.182.2 Constructor & Destructor Documentation

7.182.2.1 spot::tgba_succ_iterator_concrete::tgba_succ_iterator_concrete (const tgba_bdd_core_data & *d*, bdd *successors*)

Build a spot::tgba_succ_iterator_concrete.

Parameters

successors The set of successors with ingoing conditions and acceptance conditions, represented as a BDD. The job of this iterator will be to enumerate the satisfactions of that BDD and split them into destination states and conditions, and compute acceptance conditions.

d The core data of the automata. These contains sets of variables useful to split a BDD, and compute acceptance conditions.

7.182.2.2 virtual spot::tgba_succ_iterator_concrete::∼tgba_succ_iterator_concrete ( ) `[virtual]`

7.182.3 Member Function Documentation

7.182.3.1 bdd spot::tgba_succ_iterator_concrete::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.182.3.2 bdd spot::tgba_succ_iterator_concrete::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.182.3.3 state_bdd∗ spot::tgba_succ_iterator_concrete::current_state ( ) const `[virtual]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implements spot::tgba_succ_iterator.

7.182.3.4 bool spot::tgba_succ_iterator_concrete::done ( ) const [virtual]

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.
The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implements spot::tgba_succ_iterator.

7.182.3.5 void spot::tgba_succ_iterator_concrete::first ( ) [virtual]

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implements spot::tgba_succ_iterator.

7.182.3.6 void spot::tgba_succ_iterator_concrete::next ( ) [virtual]

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implements spot::tgba_succ_iterator.

7.182.4 Member Data Documentation

7.182.4.1 bdd spot::tgba_succ_iterator_concrete::current_ [private]

Current successor, as a conjunction of atomic proposition and Next variables.

7.182.4.2 bdd spot::tgba_succ_iterator_concrete::current_acc_ [private]

Acceptance conditions for the current transition.

7.182.4.3 bdd spot::tgba_succ_iterator_concrete::current_state_ `[private]`

Current successor, as a conjunction of Now variables.

7.182.4.4 const tgba_bdd_core_data& spot::tgba_succ_iterator_concrete::data_ `[private]`

Core data of the automaton.

7.182.4.5 bdd spot::tgba_succ_iterator_concrete::succ_set_ `[private]`

The set of successors.

7.182.4.6 bdd spot::tgba_succ_iterator_concrete::succ_set_left_ `[private]`

Unexplored successors (including current_).

The documentation for this class was generated from the following file:

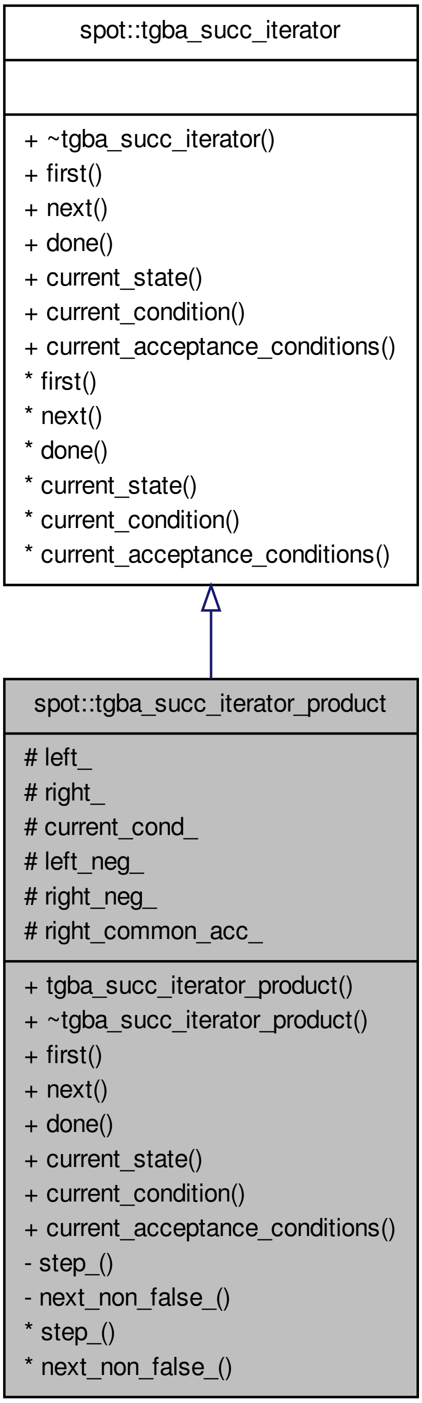
- tgba/succiterconcrete.hh

7.183 spot::tgba_succ_iterator_product Class Reference

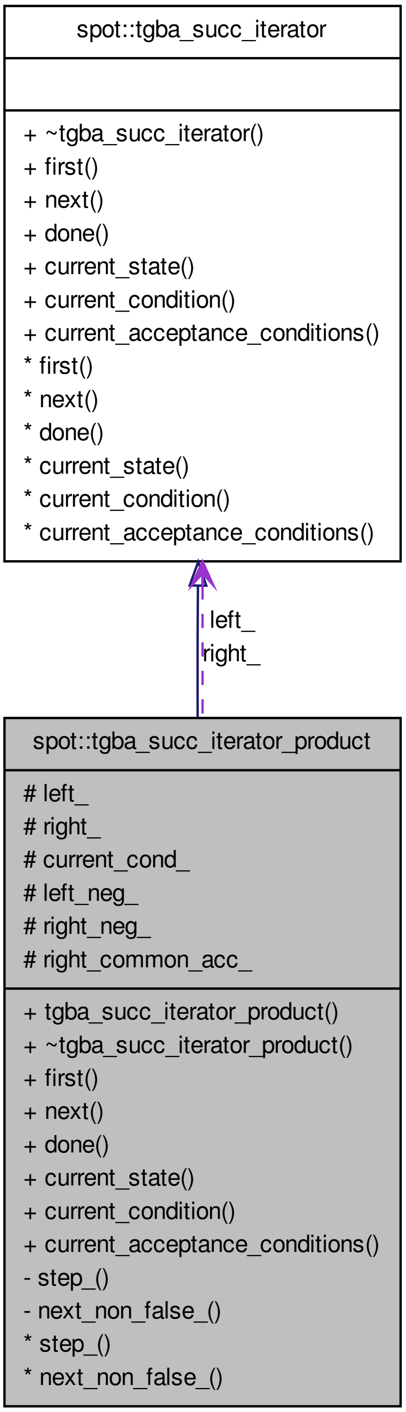
Iterate over the successors of a product computed on the fly.

`#include <tgba/tgbaproduct.hh>`

Inheritance diagram for spot::tgba_succ_iterator_product:



Collaboration diagram for spot::tgba_succ_iterator_product:



Public Member Functions

- tgba_succ_iterator_product (tgba_succ_iterator ∗left, tgba_succ_iterator ∗right, bdd left_neg, bdd right_neg, bddPair ∗right_common_acc)
- virtual ∼tgba_succ_iterator_product ()
- void first ()

  Position the iterator on the first successor (if any).

- void next ()

  Jump to the next successor (if any).

- bool done () const

  Check whether the iteration is finished.

- state_product ∗ current_state () const

  Get the state of the current successor.

- bdd current_condition () const

  Get the condition on the transition leading to this successor.

- bdd current_acceptance_conditions () const

  Get the acceptance conditions on the transition leading to this successor.

Protected Attributes

- tgba_succ_iterator ∗ left_
- tgba_succ_iterator ∗ right_
- bdd current_cond_
- bdd left_neg_
- bdd right_neg_
- bddPair ∗ right_common_acc_

Private Member Functions

- void step_ ()

  Internal routines to advance to the next successor.

- void next_non_false_ ()

Friends

- class tgba_product

7.183.1 Detailed Description

Iterate over the successors of a product computed on the fly.

7.183.2 Constructor & Destructor Documentation

7.183.2.1 spot::tgba_succ_iterator_product::tgba_succ_iterator_product (tgba_succ_iterator ∗ *left*, tgba_succ_iterator ∗ *right*, bdd *left_neg*, bdd *right_neg*, bddPair ∗ *right_common_acc*)

7.183.2.2 virtual spot::tgba_succ_iterator_product::∼tgba_succ_iterator_product ( ) `[virtual]`

7.183.3 Member Function Documentation

7.183.3.1 bdd spot::tgba_succ_iterator_product::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.183.3.2 bdd spot::tgba_succ_iterator_product::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.183.3.3 state_product∗ spot::tgba_succ_iterator_product::current_state ( ) const `[virtual]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implements spot::tgba_succ_iterator.

7.183.3.4 bool spot::tgba_succ_iterator_product::done ( ) const `[virtual]`

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implements spot::tgba_succ_iterator.

7.183.3.5 void spot::tgba_succ_iterator_product::first ( ) `[virtual]`

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implements spot::tgba_succ_iterator.

7.183.3.6 void spot::tgba_succ_iterator_product::next ( ) `[virtual]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implements spot::tgba_succ_iterator.

7.183.3.7 void spot::tgba_succ_iterator_product::next_non_false_ ( ) `[private]`

7.183.3.8 void spot::tgba_succ_iterator_product::step_ ( ) `[private]`

Internal routines to advance to the next successor.

7.183.4 Friends And Related Function Documentation

7.183.4.1 friend class tgba_product `[friend]`

7.183.5 Member Data Documentation

7.183.5.1 bdd spot::tgba_succ_iterator_product::current_cond_ `[protected]`

7.183.5.2 tgba_succ_iterator∗ spot::tgba_succ_iterator_product::left_ `[protected]`

7.183.5.3 bdd spot::tgba_succ_iterator_product::left_neg_ `[protected]`

7.183.5.4 tgba_succ_iterator∗ spot::tgba_succ_iterator_product::right_ `[protected]`

7.183.5.5 bddPair∗ spot::tgba_succ_iterator_product::right_common_acc_ `[protected]`

7.183.5.6 bdd spot::tgba_succ_iterator_product::right_neg_ `[protected]`

The documentation for this class was generated from the following file:

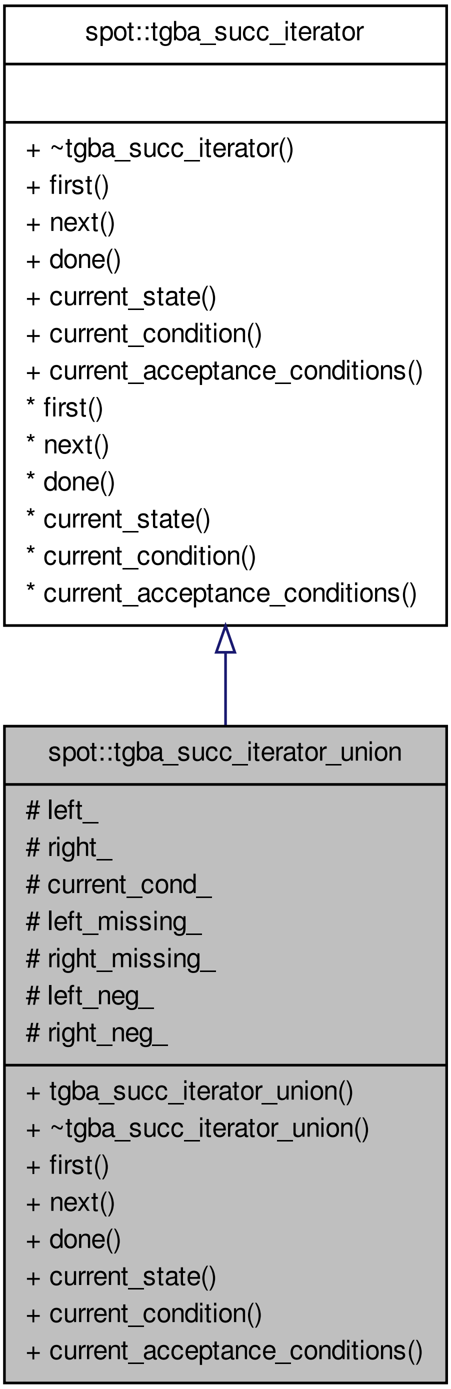
- tgba/tgbaproduct.hh

7.184 spot::tgba_succ_iterator_union Class Reference

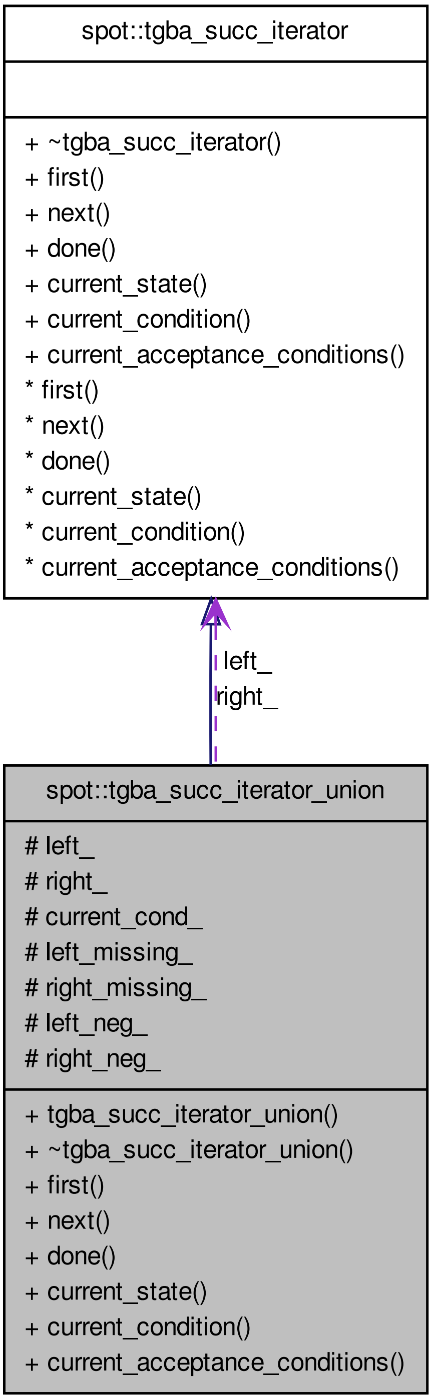
Iterate over the successors of an union computed on the fly.

`#include <tgba/tgbaunion.hh>`

Inheritance diagram for spot::tgba_succ_iterator_union:



Collaboration diagram for spot::tgba_succ_iterator_union:



Public Member Functions

- tgba_succ_iterator_union (tgba_succ_iterator ∗left, tgba_succ_iterator ∗right, bdd left_missing, bdd right_missing, bdd left_var, bdd right_var)
- virtual ∼tgba_succ_iterator_union ()
- void first ()

  Position the iterator on the first successor (if any).
- void next ()

  Jump to the next successor (if any).
- bool done () const

  Check whether the iteration is finished.
- state_union ∗ current_state () const

  Get the state of the current successor.
- bdd current_condition () const

  Get the condition on the transition leading to this successor.
- bdd current_acceptance_conditions () const

  Get the acceptance conditions on the transition leading to this successor.

Protected Attributes

- tgba_succ_iterator ∗ left_
- tgba_succ_iterator ∗ right_
- bdd current_cond_
- bdd left_missing_
- bdd right_missing_
- bdd left_neg_
- bdd right_neg_

Friends

- class tgba_union

7.184.1 Detailed Description

Iterate over the successors of an union computed on the fly.

7.184.2 Constructor & Destructor Documentation

7.184.2.1 spot::tgba_succ_iterator_union::tgba_succ_iterator_union (tgba_succ_iterator ∗ *left,* tgba_succ_iterator ∗ *right,* bdd *left_missing,* bdd *right_missing,* bdd *left_var,* bdd *right_var*)

7.184.2.2 virtual spot::tgba_succ_iterator_union::∼tgba_succ_iterator_union ( ) `[virtual]`

7.184.3 Member Function Documentation

7.184.3.1 bdd spot::tgba_succ_iterator_union::current_acceptance_conditions ( ) const `[virtual]`

Get the acceptance conditions on the transition leading to this successor.

Implements spot::tgba_succ_iterator.

7.184.3.2 bdd spot::tgba_succ_iterator_union::current_condition ( ) const `[virtual]`

Get the condition on the transition leading to this successor.

This is a boolean function of atomic propositions.

Implements spot::tgba_succ_iterator.

7.184.3.3 state_union∗ spot::tgba_succ_iterator_union::current_state ( ) const `[virtual]`

Get the state of the current successor.

Note that the same state may occur at different points in the iteration. These actually correspond to the same destination. It just means there were several transitions, with different conditions, leading to the same state.

The returned state should be destroyed (see state::destroy) by the caller after it is no longer used.

Implements spot::tgba_succ_iterator.

7.184.3.4 bool spot::tgba_succ_iterator_union::done ( ) const `[virtual]`

Check whether the iteration is finished.

This function should be called after any call to `first()` or `next()` and before any enquiry about the current state.

The usual way to do this is with a `for` loop.

```
for (s->first(); !s->done(); s->next())
  ...
```

Implements spot::tgba_succ_iterator.

7.184.3.5 void spot::tgba_succ_iterator_union::first ( ) `[virtual]`

Position the iterator on the first successor (if any).

This method can be called several times to make multiple passes over successors.

Warning

> One should always call `done()` to ensure there is a successor, even after `first()`. A common trap is to assume that there is at least one successor: this is wrong.

Implements spot::tgba_succ_iterator.

7.184.3.6 void spot::tgba_succ_iterator_union::next ( ) `[virtual]`

Jump to the next successor (if any).

Warning

> Again, one should always call `done()` to ensure there is a successor.

Implements spot::tgba_succ_iterator.

7.184.4 Friends And Related Function Documentation

7.184.4.1 friend class tgba_union `[friend]`

7.184.5 Member Data Documentation

7.184.5.1 bdd spot::tgba_succ_iterator_union::current_cond_ `[protected]`

7.184.5.2 tgba_succ_iterator∗ spot::tgba_succ_iterator_union::left_ `[protected]`

7.184.5.3 bdd spot::tgba_succ_iterator_union::left_missing_ `[protected]`

7.184.5.4 bdd spot::tgba_succ_iterator_union::left_neg_ `[protected]`

7.184.5.5 tgba_succ_iterator∗ spot::tgba_succ_iterator_union::right_ `[protected]`

7.184.5.6 bdd spot::tgba_succ_iterator_union::right_missing_ `[protected]`

7.184.5.7 bdd spot::tgba_succ_iterator_union::right_neg_ `[protected]`

The documentation for this class was generated from the following file:

- tgba/tgbaunion.hh

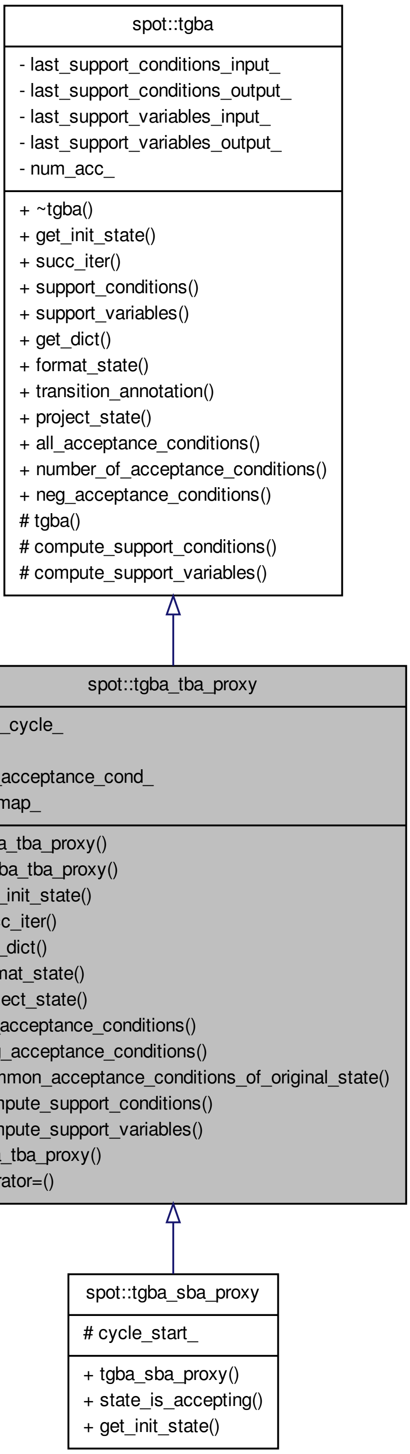
7.185 spot::tgba_tba_proxy Class Reference

Degeneralize a spot::tgba on the fly, producing a TBA.

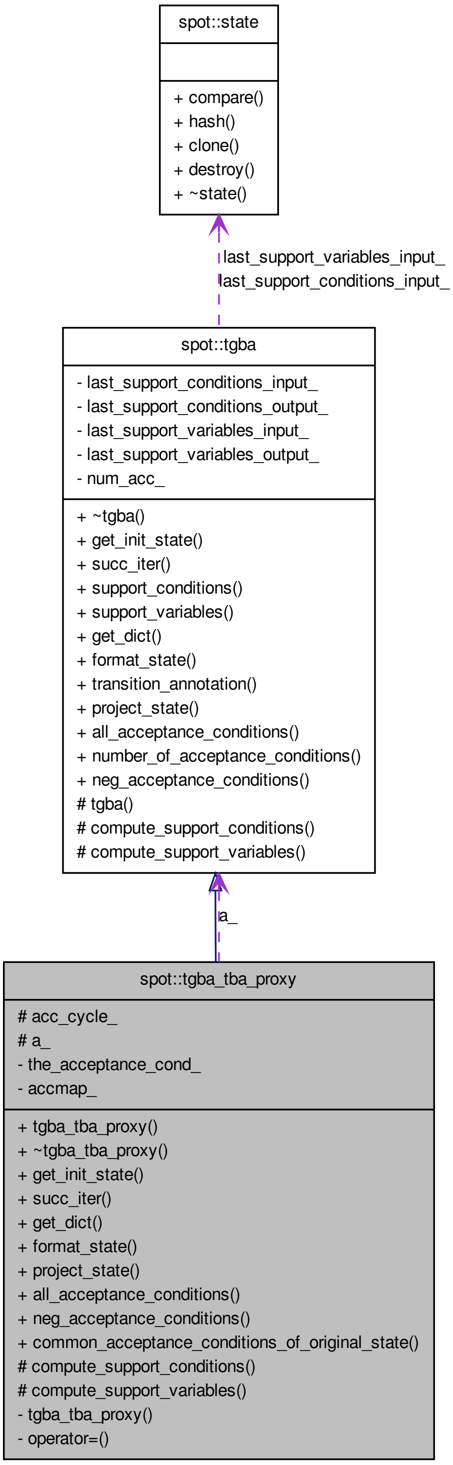
This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly. The result is still a spot::tgba, but it will always have exactly one acceptance condition so it could be called TBA (without the G).

`#include <tgba/tgbatba.hh>`

Inheritance diagram for spot::tgba_tba_proxy:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_tba_proxy
# acc_cycle_
# a_
- the_acceptance_cond_
- accmap_
+ tgba_tba_proxy()
+ ~tgba_tba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ common_acceptance_conditions_of_original_state()
# compute_support_conditions()
# compute_support_variables()
- tgba_tba_proxy()
- operator=()
spot::tgba_sba_proxy
# cycle_start_
+ tgba_sba_proxy()
+ state_is_accepting()
+ get_init_state()

Collaboration diagram for spot::tgba_tba_proxy:


spot::state
+ compare()
+ hash()
+ clone()
+ destroy()
+ ~state()
last_support_variables_input_
last_support_conditions_input_
spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
a_
spot::tgba_tba_proxy
# acc_cycle_
# a_
- the_acceptance_cond_
- accmap_
+ tgba_tba_proxy()
+ ~tgba_tba_proxy()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
+ common_acceptance_conditions_of_original_state()
# compute_support_conditions()
# compute_support_variables()
- tgba_tba_proxy()
- operator=()

Public Types

- typedef std::list< bdd > cycle_list

Public Member Functions

- tgba_tba_proxy (const tgba ∗a)
- virtual ∼tgba_tba_proxy ()
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd common_acceptance_conditions_of_original_state (const state ∗ostate) const

  Return the acceptance conditions common to all outgoing transitions of state ostate in the original automaton.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Protected Attributes

- cycle_list acc_cycle_
- const tgba ∗ a_

Private Types

- typedef Sgi::hash_map< const state ∗, bdd, state_ptr_hash, state_ptr_equal > accmap_t

Private Member Functions

- tgba_tba_proxy (const tgba_tba_proxy &)
- tgba_tba_proxy & operator= (const tgba_tba_proxy &)

Private Attributes

- bdd the_acceptance_cond_
- accmap_t accmap_

7.185.1 Detailed Description

Degeneralize a spot::tgba on the fly, producing a TBA.

This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly. The result is still a spot::tgba, but it will always have exactly one acceptance condition so it could be called TBA (without the G). The degeneralization is done by synchronizing the input automaton with a "counter" automaton such as the one shown in "On-the-fly Verification of Linear Temporal Logic" (Jean-Michel Couveur, FME99).

If the input automaton uses N acceptance conditions, the output automaton can have at most max(N,1) times more states and transitions.

See also

tgba_sba_proxy

7.185.2 Member Typedef Documentation

7.185.2.1 typedef Sgi::hash_map<const state∗, bdd, state_ptr_hash, state_ptr_equal> spot::tgba_tba_proxy::accmap_t `[private]`

7.185.2.2 typedef std::list<bdd> spot::tgba_tba_proxy::cycle_list

7.185.3 Constructor & Destructor Documentation

7.185.3.1 spot::tgba_tba_proxy::tgba_tba_proxy (const tgba ∗ *a*)

7.185.3.2 virtual spot::tgba_tba_proxy::∼tgba_tba_proxy ( ) `[virtual]`

7.185.3.3 spot::tgba_tba_proxy::tgba_tba_proxy (const tgba_tba_proxy &) `[private]`

7.185.4 Member Function Documentation

7.185.4.1 virtual bdd spot::tgba_tba_proxy::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.185.4.2 bdd spot::tgba_tba_proxy::common_acceptance_conditions_of_original_state (const state ∗ *ostate*) const

Return the acceptance conditions common to all outgoing transitions of state *ostate* in the original automaton.

This internal function is only meant to be used to implement the iterator returned by succ_iter.

The result of this function is computed the first time, and then cached.

7.185.4.3 virtual bdd spot::tgba_tba_proxy::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.185.4.4 virtual bdd spot::tgba_tba_proxy::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.185.4.5 virtual std::string spot::tgba_tba_proxy::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.185.4.6 virtual bdd_dict∗ spot::tgba_tba_proxy::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.185.4.7 virtual state∗ spot::tgba_tba_proxy::get_init_state ( ) const `[virtual]`

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

Reimplemented in spot::tgba_sba_proxy.

7.185.4.8 virtual bdd spot::tgba_tba_proxy::neg_acceptance_conditions ( ) const `[virtual]`

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.185.4.9 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const `[virtual, inherited]`

The number of acceptance conditions.

7.185.4.10 tgba_tba_proxy& spot::tgba_tba_proxy::operator= (const tgba_tba_proxy &) `[private]`

7.185.4.11 virtual state∗ spot::tgba_tba_proxy::project_state (const state ∗ *s*, const tgba ∗ *t*) const `[virtual]`

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.185.4.12 virtual tgba_succ_iterator∗ spot::tgba_tba_proxy::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = *0*, const tgba ∗ *global_automaton* = *0*) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.185.4.13 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.185.4.14 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.185.4.15 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.185.5 Member Data Documentation

7.185.5.1 const tgba∗ spot::tgba_tba_proxy::a_ `[protected]`

7.185.5.2 cycle_list spot::tgba_tba_proxy::acc_cycle_ `[protected]`

7.185.5.3 accmap_t spot::tgba_tba_proxy::accmap_ `[mutable, private]`

7.185.5.4 bdd spot::tgba_tba_proxy::the_acceptance_cond_ `[private]`

The documentation for this class was generated from the following file:

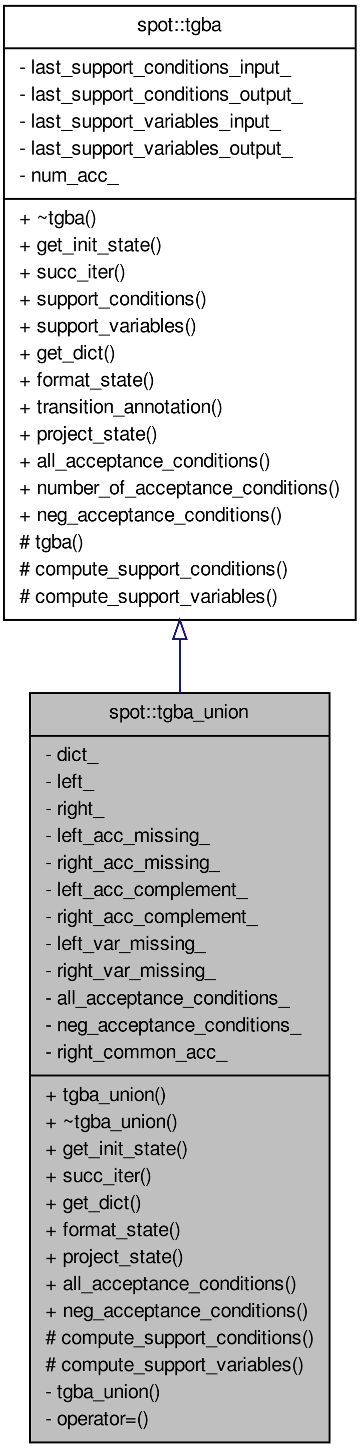
- tgba/tgbatba.hh

7.186 spot::tgba_union Class Reference

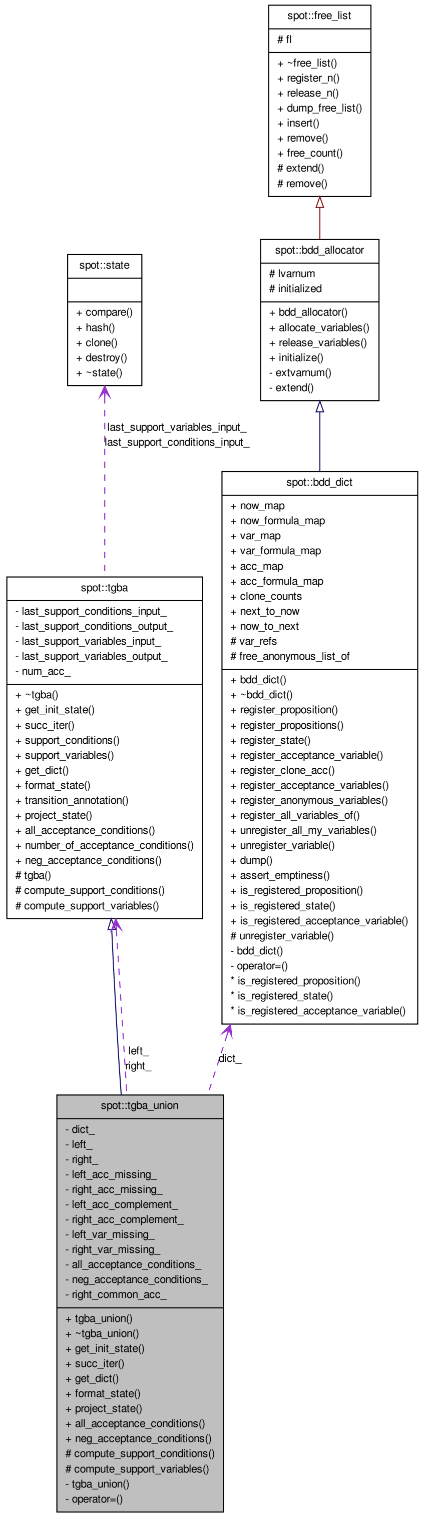
A lazy union. (States are computed on the fly.).

`#include <tgba/tgbaunion.hh>`

Inheritance diagram for spot::tgba_union:


spot::tgba
- last_support_conditions_input_
- last_support_conditions_output_
- last_support_variables_input_
- last_support_variables_output_
- num_acc_
+ ~tgba()
+ get_init_state()
+ succ_iter()
+ support_conditions()
+ support_variables()
+ get_dict()
+ format_state()
+ transition_annotation()
+ project_state()
+ all_acceptance_conditions()
+ number_of_acceptance_conditions()
+ neg_acceptance_conditions()
# tgba()
# compute_support_conditions()
# compute_support_variables()
spot::tgba_union
- dict_
- left_
- right_
- left_acc_missing_
- right_acc_missing_
- left_acc_complement_
- right_acc_complement_
- left_var_missing_
- right_var_missing_
- all_acceptance_conditions_
- neg_acceptance_conditions_
- right_common_acc_
+ tgba_union()
+ ~tgba_union()
+ get_init_state()
+ succ_iter()
+ get_dict()
+ format_state()
+ project_state()
+ all_acceptance_conditions()
+ neg_acceptance_conditions()
# compute_support_conditions()
# compute_support_variables()
- tgba_union()
- operator=()

Collaboration diagram for spot::tgba_union:



Public Member Functions

- tgba_union (const tgba ∗left, const tgba ∗right)

  Constructor.

- virtual ∼tgba_union ()
- virtual state ∗ get_init_state () const

  Get the initial state of the automaton.

- virtual tgba_succ_iterator_union ∗ succ_iter (const state ∗local_state, const state ∗global_state=0, const tgba ∗global_automaton=0) const

  Get an iterator over the successors of local_state.

- virtual bdd_dict ∗ get_dict () const

  Get the dictionary associated to the automaton.

- virtual std::string format_state (const state ∗state) const

  Format the state as a string for printing.

- virtual state ∗ project_state (const state ∗s, const tgba ∗t) const

  Project a state on an automaton.

- virtual bdd all_acceptance_conditions () const

  Return the set of all acceptance conditions used by this automaton.

- virtual bdd neg_acceptance_conditions () const

  Return the conjuction of all negated acceptance variables.

- bdd support_conditions (const state ∗state) const

  Get a formula that must hold whatever successor is taken.

- bdd support_variables (const state ∗state) const

  Get the conjunctions of variables tested by the outgoing transitions of state.

- virtual std::string transition_annotation (const tgba_succ_iterator ∗t) const

  Return a possible annotation for the transition pointed to by the iterator.

- virtual unsigned int number_of_acceptance_conditions () const

  The number of acceptance conditions.

Protected Member Functions

- virtual bdd compute_support_conditions (const state ∗state) const

  Do the actual computation of tgba::support_conditions().

- virtual bdd compute_support_variables (const state ∗state) const

  Do the actual computation of tgba::support_variables().

Private Member Functions

- tgba_union (const tgba_union &)
- tgba_union & operator= (const tgba_union &)

Private Attributes

- bdd_dict ∗ dict_
- const tgba ∗ left_
- const tgba ∗ right_
- bdd left_acc_missing_
- bdd right_acc_missing_
- bdd left_acc_complement_
- bdd right_acc_complement_
- bdd left_var_missing_
- bdd right_var_missing_
- bdd all_acceptance_conditions_
- bdd neg_acceptance_conditions_
- bddPair ∗ right_common_acc_

7.186.1 Detailed Description

A lazy union. (States are computed on the fly.).

7.186.2 Constructor & Destructor Documentation

7.186.2.1 spot::tgba_union::tgba_union (const tgba ∗ *left*, const tgba ∗ *right*)

Constructor.

Parameters

left The left automata in the union.

right The right automata in the union.

7.186.2.2 virtual spot::tgba_union::∼tgba_union ( ) `[virtual]`

7.186.2.3 spot::tgba_union::tgba_union (const tgba_union &) `[private]`

7.186.3 Member Function Documentation

7.186.3.1 virtual bdd spot::tgba_union::all_acceptance_conditions ( ) const `[virtual]`

Return the set of all acceptance conditions used by this automaton.

The goal of the emptiness check is to ensure that a strongly connected component walks through each of these acceptiong conditions. I.e., the union of the acceptiong conditions of all transition in the SCC should be equal to the result of this function.

Implements spot::tgba.

7.186.3.2 virtual bdd spot::tgba_union::compute_support_conditions (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_conditions().

Implements spot::tgba.

7.186.3.3 virtual bdd spot::tgba_union::compute_support_variables (const state ∗ *state*) const `[protected, virtual]`

Do the actual computation of tgba::support_variables().

Implements spot::tgba.

7.186.3.4 virtual std::string spot::tgba_union::format_state (const state ∗ *state*) const `[virtual]`

Format the state as a string for printing.

This formating is the responsability of the automata that owns the state.

Implements spot::tgba.

7.186.3.5 virtual bdd_dict∗ spot::tgba_union::get_dict ( ) const `[virtual]`

Get the dictionary associated to the automaton.

State are represented as BDDs. The dictionary allows to map BDD variables back to formulae, and vice versa. This is useful when dealing with several automata (which may use the same BDD variable for different formula), or simply when printing.

Implements spot::tgba.

7.186.3.6 virtual state∗ spot::tgba_union::get_init_state ( ) const [virtual]

Get the initial state of the automaton.

The state has been allocated with `new`. It is the responsability of the caller to `destroy` it when no longer needed.

Implements spot::tgba.

7.186.3.7 virtual bdd spot::tgba_union::neg_acceptance_conditions ( ) const [virtual]

Return the conjuction of all negated acceptance variables.

For instance if the automaton uses variables `Acc[a]`, `Acc[b]` and `Acc[c]` to describe acceptance sets, this function should return `!Acc[a]&!Acc[b]&!Acc[c]`.

This is useful when making products: each operand's condition set should be augmented with the neg_acceptance_conditions() of the other operand.

Implements spot::tgba.

7.186.3.8 virtual unsigned int spot::tgba::number_of_acceptance_conditions ( ) const [virtual, inherited]

The number of acceptance conditions.

7.186.3.9 tgba_union& spot::tgba_union::operator= (const tgba_union &) [private]

7.186.3.10 virtual state∗ spot::tgba_union::project_state (const state ∗ *s*, const tgba ∗ *t*) const [virtual]

Project a state on an automaton.

This converts *s*, into that corresponding spot::state for *t*. This is useful when you have the state of a product, and want restrict this state to a specific automata occuring in the product.

It goes without saying that *s* and *t* should be compatible (i.e., *s* is a state of *t*).

Returns

0 if the projection fails (*s* is unrelated to *t*), or a new `state∗` (the projected state) that must be destroyed by the caller.

Reimplemented from spot::tgba.

7.186.3.11 virtual tgba_succ_iterator_union∗ spot::tgba_union::succ_iter (const state ∗ *local_state*, const state ∗ *global_state* = `0`, const tgba ∗ *global_automaton* = `0`) const `[virtual]`

Get an iterator over the successors of *local_state*.

The iterator has been allocated with `new`. It is the responsability of the caller to `delete` it when no longer needed.

During synchornized products, additional informations are passed about the entire product and its state. Recall that products can be nested, forming a tree of spot::tgba where most values are computed on demand. *global_automaton* designate the root spot::tgba, and *global_state* its state. This two objects can be used by succ_iter() to restrict the set of successors to compute.

Parameters

local_state The state whose successors are to be explored. This pointer is not adopted in any way by `succ_iter`, and it is still the caller's responsability to destroy it when appropriate (this can be done during the lifetime of the iterator).

global_state In a product, the state of the global product automaton. Otherwise, 0. Like *locale_state*, *global_state* is not adopted by `succ_iter`.

global_automaton In a product, the global product automaton. Otherwise, 0.

Implements spot::tgba.

7.186.3.12 bdd spot::tgba::support_conditions (const state ∗ *state*) const `[inherited]`

Get a formula that must hold whatever successor is taken.

Returns

A formula which must be verified for all successors of *state*.

This can be as simple as `bddtrue`, or more completely the disjunction of the condition of all successors. This is used as an hint by `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_conditions(), this function is just a wrapper that will cache the last return value for efficiency.

7.186.3.13 bdd spot::tgba::support_variables (const state ∗ *state*) const `[inherited]`

Get the conjunctions of variables tested by the outgoing transitions of *state*.

All variables tested by outgoing transitions must be returned. This is mandatory.

This is used as an hint by some `succ_iter()` to reduce the number of successor to compute in a product.

Sub classes should implement compute_support_variables(), this function is just a wrapper that will cache the last return value for efficiency.

7.186.3.14 virtual std::string spot::tgba::transition_annotation (const tgba_succ_iterator ∗ *t*) const `[virtual, inherited]`

Return a possible annotation for the transition pointed to by the iterator.

Implementing this function is optional; the default annotation it the empty string.

Parameters

t a non-done tgba_succ_iterator for this automata

Reimplemented in spot::tgba_product, and spot::tgba_scc.

7.186.4 Member Data Documentation

7.186.4.1 bdd spot::tgba_union::all_acceptance_conditions_ `[private]`

7.186.4.2 bdd_dict∗ spot::tgba_union::dict_ `[private]`

7.186.4.3 const tgba∗ spot::tgba_union::left_ `[private]`

7.186.4.4 bdd spot::tgba_union::left_acc_complement_ `[private]`

7.186.4.5 bdd spot::tgba_union::left_acc_missing_ `[private]`

7.186.4.6 bdd spot::tgba_union::left_var_missing_ `[private]`

7.186.4.7 bdd spot::tgba_union::neg_acceptance_conditions_ `[private]`

7.186.4.8 const tgba∗ spot::tgba_union::right_ `[private]`

7.186.4.9 bdd spot::tgba_union::right_acc_complement_ `[private]`

7.186.4.10 bdd spot::tgba_union::right_acc_missing_ `[private]`

7.186.4.11 bddPair∗ spot::tgba_union::right_common_acc_ `[private]`

7.186.4.12 bdd spot::tgba_union::right_var_missing_ `[private]`

The documentation for this class was generated from the following file:

- tgba/tgbaunion.hh

7.187 spot::time_info Struct Reference

A structure to record elapsed time in clock ticks.

`#include <misc/timer.hh>`

Public Member Functions

- time_info ()

Public Attributes

- clock_t utime
- clock_t stime

7.187.1 Detailed Description

A structure to record elapsed time in clock ticks.

7.187.2 Constructor & Destructor Documentation

7.187.2.1 spot::time_info::time_info ( ) `[inline]`

7.187.3 Member Data Documentation

7.187.3.1 clock_t spot::time_info::stime

Referenced by spot::timer::start(), spot::timer::stime(), and spot::timer::stop().

7.187.3.2 clock_t spot::time_info::utime

Referenced by spot::timer::start(), spot::timer::stop(), and spot::timer::utime().

The documentation for this struct was generated from the following file:

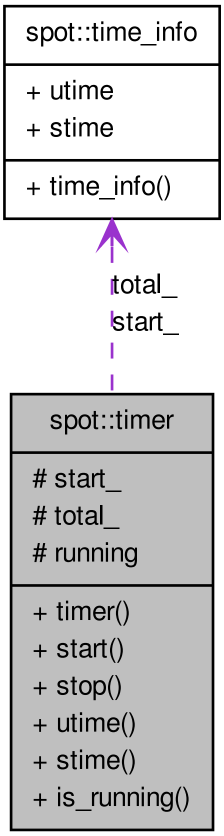
- misc/timer.hh

7.188 spot::timer Class Reference

A timekeeper that accumulate interval of time.

`#include <misc/timer.hh>`

Collaboration diagram for spot::timer:



Public Member Functions

- timer ()
- void start ()

  Start a time interval.

- void stop ()

  Stop a time interval and update the sum of all intervals.

- clock_t utime () const

  Return the user time of all accumulated interval.

- clock_t stime () const

  Return the system time of all accumulated interval.

- bool is_running () const

  Whether the timer is running.

Protected Attributes

- time_info start_
- time_info total_
- bool running

7.188.1 Detailed Description

A timekeeper that accumulate interval of time.

7.188.2 Constructor & Destructor Documentation

7.188.2.1 spot::timer::timer ( ) `[inline]`

7.188.3 Member Function Documentation

7.188.3.1 bool spot::timer::is_running ( ) const `[inline]`

Whether the timer is running.

References running.

7.188.3.2 void spot::timer::start ( ) `[inline]`

Start a time interval.

References running, start_, spot::time_info::stime, and spot::time_info::utime.

7.188.3.3 clock_t spot::timer::stime ( ) const `[inline]`

Return the system time of all accumulated interval.

Any time interval that has been start()ed but not stop()ed will not be accounted for.

References spot::time_info::stime, and total_.

7.188.3.4 void spot::timer::stop ( ) `[inline]`

Stop a time interval and update the sum of all intervals.

References running, start_, spot::time_info::stime, total_, and spot::time_info::utime.

7.188.3.5 clock_t spot::timer::utime ( ) const `[inline]`

Return the user time of all accumulated interval.

Any time interval that has been start()ed but not stop()ed will not be accounted for.

References total_, and spot::time_info::utime.

7.188.4 Member Data Documentation

7.188.4.1 bool spot::timer::running `[protected]`

Referenced by is_running(), start(), and stop().

7.188.4.2 time_info spot::timer::start_ `[protected]`

Referenced by start(), and stop().

7.188.4.3 time_info spot::timer::total_ `[protected]`

Referenced by stime(), stop(), and utime().

The documentation for this class was generated from the following file:

- misc/timer.hh

7.189 spot::timer_map Class Reference

A map of timer, where each timer has a name.

`#include <misc/timer.hh>`

Public Member Functions

- void start (const std::string &name)

  Start a timer with name name.

- void stop (const std::string &name)

  Stop timer name.

- void cancel (const std::string &name)

  Cancel timer name.

- const spot::timer & timer (const std::string &name) const

  Return the timer name.

- spot::timer & timer (const std::string &name)

  Return the timer name.

- bool empty () const

  Whether there is no timer in the map.

- std::ostream & print (std::ostream &os) const

  Format information about all timers in a table.

Protected Types

- typedef std::pair< spot::timer, int > item_type
- typedef std::map< std::string, item_type > tm_type

Protected Attributes

- tm_type tm

7.189.1 Detailed Description

A map of timer, where each timer has a name. Timer_map also keeps track of the number of measures each timer has performed.

7.189.2 Member Typedef Documentation

7.189.2.1 typedef std::pair<spot::timer, int> spot::timer_map::item_type `[protected]`

7.189.2.2 typedef std::map<std::string, item_type> spot::timer_map::tm_type `[protected]`

7.189.3 Member Function Documentation

7.189.3.1 void spot::timer_map::cancel (const std::string & *name*) `[inline]`

Cancel timer *name*.

The timer must have been previously started with start().

This cancel only the current measure. (Previous measures recorded by the timer are preserved.) When a timer that has not done any measure is canceled, it is removed from the map.

References tm.

7.189.3.2 bool spot::timer_map::empty ( ) const `[inline]`

Whether there is no timer in the map.

If empty() return true, then either no timer where ever started, or all started timers were canceled without completing any measure.

References tm.

7.189.3.3 std::ostream& spot::timer_map::print (std::ostream & *os*) const

Format information about all timers in a table.

7.189.3.4 void spot::timer_map::start (const std::string & *name*) `[inline]`

Start a timer with name *name*.

The timer is created if it did not exist already. Once started, a timer should be either stop()ed or cancel()ed.

References tm.

7.189.3.5 void spot::timer_map::stop (const std::string & *name*) `[inline]`

Stop timer *name*.

The timer must have been previously started with start().

References tm.

7.189.3.6 spot::timer& spot::timer_map::timer (const std::string & *name*) `[inline]`

Return the timer *name*.

References tm.

7.189.3.7 const spot::timer& spot::timer_map::timer (const std::string & *name*) const `[inline]`

Return the timer *name*.

References tm.

7.189.4 Member Data Documentation

7.189.4.1 tm_type spot::timer_map::tm `[protected]`

Referenced by cancel(), empty(), start(), stop(), and timer().

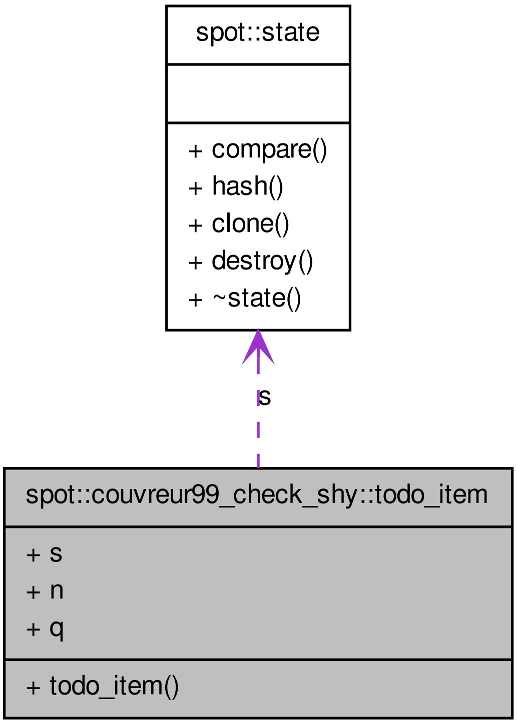
The documentation for this class was generated from the following file:

- misc/timer.hh

7.190 spot::couvreur99_check_shy::todo_item Struct Reference

`#include <tgbaalgos/gtec/gtec.hh>`

Collaboration diagram for spot::couvreur99_check_shy::todo_item:



Public Member Functions

- todo_item (const state ∗s, int n, couvreur99_check_shy ∗shy)

Public Attributes

- const state ∗ s
- int n
- succ_queue q

7.190.1 Constructor & Destructor Documentation

7.190.1.1 spot::couvreur99_check_shy::todo_item::todo_item (const state ∗ *s*, int *n*, couvreur99_check_shy ∗ *shy*)

7.190.2 Member Data Documentation

7.190.2.1 int spot::couvreur99_check_shy::todo_item::n

7.190.2.2 succ_queue spot::couvreur99_check_shy::todo_item::q

7.190.2.3 const state∗ spot::couvreur99_check_shy::todo_item::s

The documentation for this struct was generated from the following file:

- tgbaalgos/gtec/gtec.hh

7.191 spot::ltl::nfa::transition Struct Reference

Explicit transitions.

`#include <ltlast/nfa.hh>`

Public Attributes

- label lbl
- const state ∗ dst

7.191.1 Detailed Description

Explicit transitions.

7.191.2 Member Data Documentation

7.191.2.1 const state∗ spot::ltl::nfa::transition::dst

7.191.2.2 label spot::ltl::nfa::transition::lbl

The documentation for this struct was generated from the following file:

- ltlast/nfa.hh

7.192 spot::taa_tgba::transition Struct Reference

Explicit transitions.

`#include <tgba/taatgba.hh>`

Public Attributes

- bdd condition
- bdd acceptance_conditions
- const state_set ∗ dst

7.192.1 Detailed Description

Explicit transitions.

7.192.2 Member Data Documentation

7.192.2.1 bdd spot::taa_tgba::transition::acceptance_conditions

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::taa_tgba_labelled< std::string, string_hash >::create_transition().

7.192.2.2 bdd spot::taa_tgba::transition::condition

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::create_transition().

7.192.2.3 const state_set∗ spot::taa_tgba::transition::dst

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::create_transition().

The documentation for this struct was generated from the following file:

- tgba/taatgba.hh

7.193 spot::tgba_explicit::transition Struct Reference

Explicit transitions (used by spot::tgba_explicit).

`#include <tgba/tgbaexplicit.hh>`

Public Attributes

- bdd condition
- bdd acceptance_conditions
- const state ∗ dest

7.193.1 Detailed Description

Explicit transitions (used by spot::tgba_explicit).

7.193.2 Member Data Documentation

7.193.2.1 bdd spot::tgba_explicit::transition::acceptance_conditions

7.193.2.2 bdd spot::tgba_explicit::transition::condition

7.193.2.3 const state∗ spot::tgba_explicit::transition::dest

The documentation for this struct was generated from the following file:

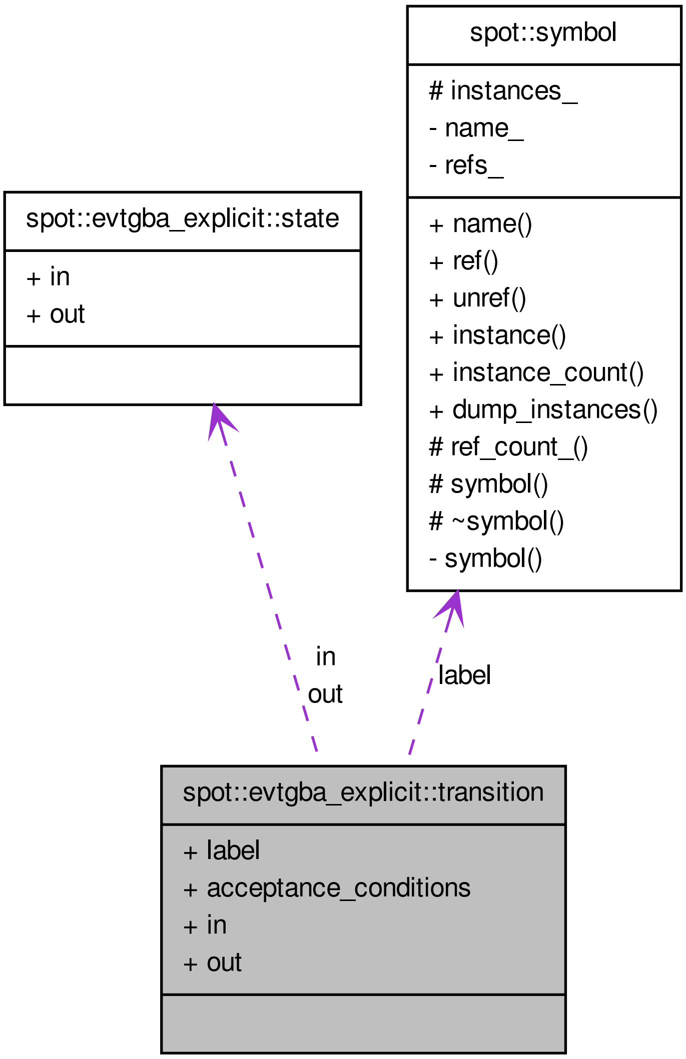
- tgba/tgbaexplicit.hh

7.194 spot::evtgba_explicit::transition Struct Reference

Explicit transitions (used by spot::evtgba_explicit).

`#include <evtgba/explicit.hh>`

Collaboration diagram for spot::evtgba_explicit::transition:



Public Attributes

- const symbol ∗ label
- symbol_set acceptance_conditions
- state ∗ in
- state ∗ out

7.194.1 Detailed Description

Explicit transitions (used by spot::evtgba_explicit).

7.194.2 Member Data Documentation

7.194.2.1 symbol_set spot::evtgba_explicit::transition::acceptance_conditions

7.194.2.2 state∗ spot::evtgba_explicit::transition::in

7.194.2.3 const symbol∗ spot::evtgba_explicit::transition::label

7.194.2.4 state∗ spot::evtgba_explicit::transition::out

The documentation for this struct was generated from the following file:

- evtgba/explicit.hh

7.195 spot::ltl::automatop::tripletcmp Struct Reference

Comparison functor used internally by ltl::automatop.

`#include <ltlast/automatop.hh>`

Public Member Functions

- bool operator() (const triplet &p1, const triplet &p2) const

7.195.1 Detailed Description

Comparison functor used internally by ltl::automatop.

7.195.2 Member Function Documentation

7.195.2.1 bool spot::ltl::automatop::tripletcmp::operator() (const triplet & *p1*, const triplet & *p2*) const `[inline]`

The documentation for this struct was generated from the following file:

- ltlast/automatop.hh

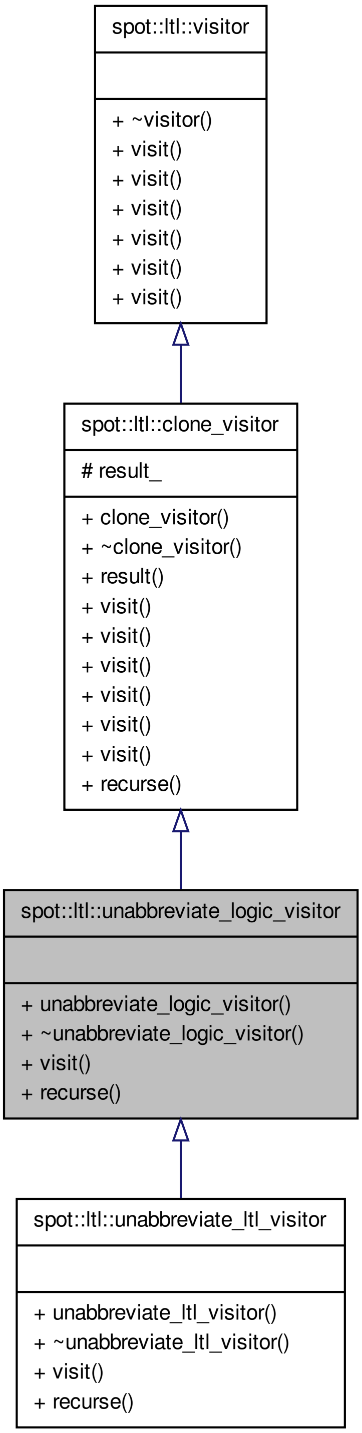
7.196 spot::ltl::unabbreviate_logic_visitor Class Reference

Clone and rewrite a formula to remove most of the abbreviated logical operators.

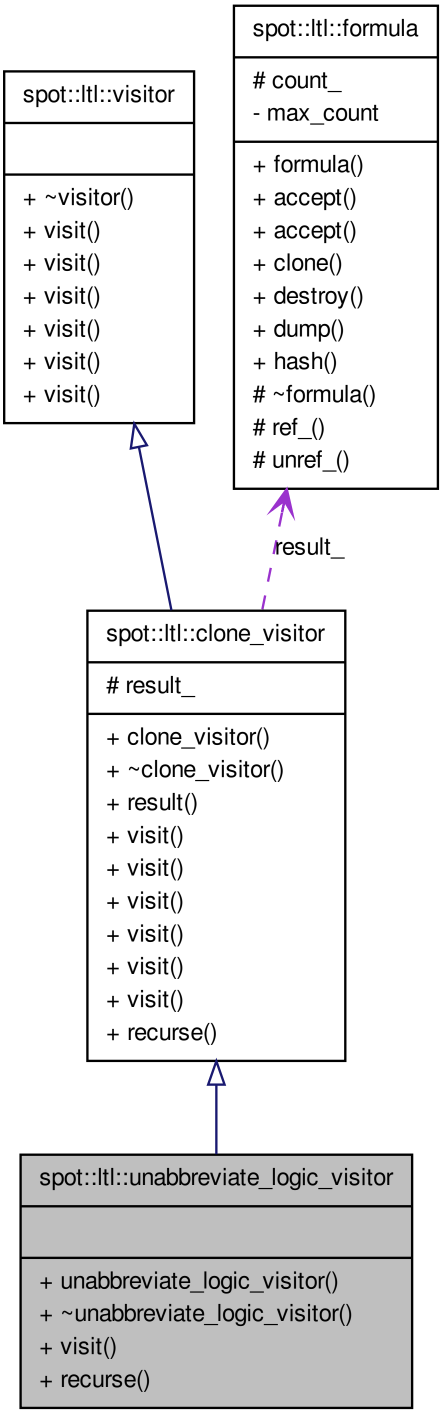
This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

`#include <ltlvisit/lunabbrev.hh>`

Inheritance diagram for spot::ltl::unabbreviate_logic_visitor:



Collaboration diagram for spot::ltl::unabbreviate_logic_visitor:



Public Member Functions

- unabbreviate_logic_visitor ()
- virtual ∼unabbreviate_logic_visitor ()
- void visit (binop ∗bo)
- virtual formula ∗ recurse (formula ∗f)
- formula ∗ result () const
- void visit (atomic_prop ∗ap)
- void visit (unop ∗uo)
- void visit (automatop ∗mo)
- void visit (multop ∗mo)
- void visit (constant ∗c)

Protected Attributes

- formula ∗ result_

Private Types

- typedef clone_visitor super

7.196.1 Detailed Description

Clone and rewrite a formula to remove most of the abbreviated logical operators.

This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And. This visitor is public, because it's convenient to derive from it and override some of its methods. But if you just want the functionality, consider using spot::ltl::unabbreviate_logic instead.

7.196.2 Member Typedef Documentation

7.196.2.1 typedef clone_visitor spot::ltl::unabbreviate_logic_visitor::super `[private]`

Reimplemented in spot::ltl::unabbreviate_ltl_visitor.

7.196.3 Constructor & Destructor Documentation

7.196.3.1 spot::ltl::unabbreviate_logic_visitor::unabbreviate_logic_visitor ( )

7.196.3.2 virtual spot::ltl::unabbreviate_logic_visitor::∼unabbreviate_logic_visitor ( ) `[virtual]`

7.196.4 Member Function Documentation

7.196.4.1 virtual formula∗ spot::ltl::unabbreviate_logic_visitor::recurse (formula ∗ *f*) `[virtual]`

Reimplemented from spot::ltl::clone_visitor.

Reimplemented in spot::ltl::unabbreviate_ltl_visitor.

7.196.4.2 formula∗ spot::ltl::clone_visitor::result ( ) const `[inherited]`

7.196.4.3 void spot::ltl::clone_visitor::visit (multop ∗ *mo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.196.4.4 void spot::ltl::clone_visitor::visit (automatop ∗ *mo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.196.4.5 void spot::ltl::clone_visitor::visit (unop ∗ *uo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

Reimplemented in spot::ltl::unabbreviate_ltl_visitor.

7.196.4.6 void spot::ltl::clone_visitor::visit (atomic_prop ∗ *ap*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.196.4.7 void spot::ltl::clone_visitor::visit (constant ∗ *c*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.196.4.8 void spot::ltl::unabbreviate_logic_visitor::visit (binop ∗ *bo*) `[virtual]`

Reimplemented from spot::ltl::clone_visitor.

7.196.5 Member Data Documentation

7.196.5.1 formula∗ spot::ltl::clone_visitor::result_ `[protected, inherited]`

The documentation for this class was generated from the following file:

- ltlvisit/lunabbrev.hh

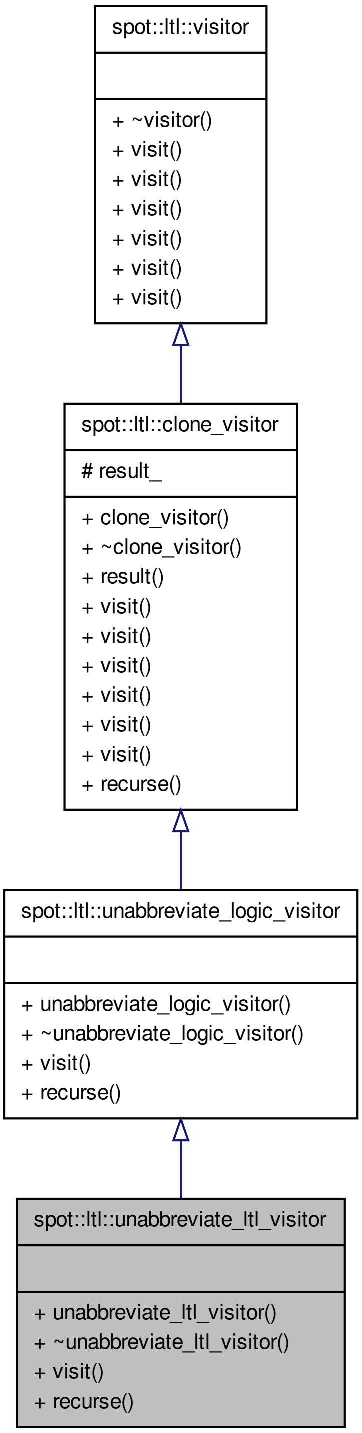
7.197 spot::ltl::unabbreviate_ltl_visitor Class Reference

Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.

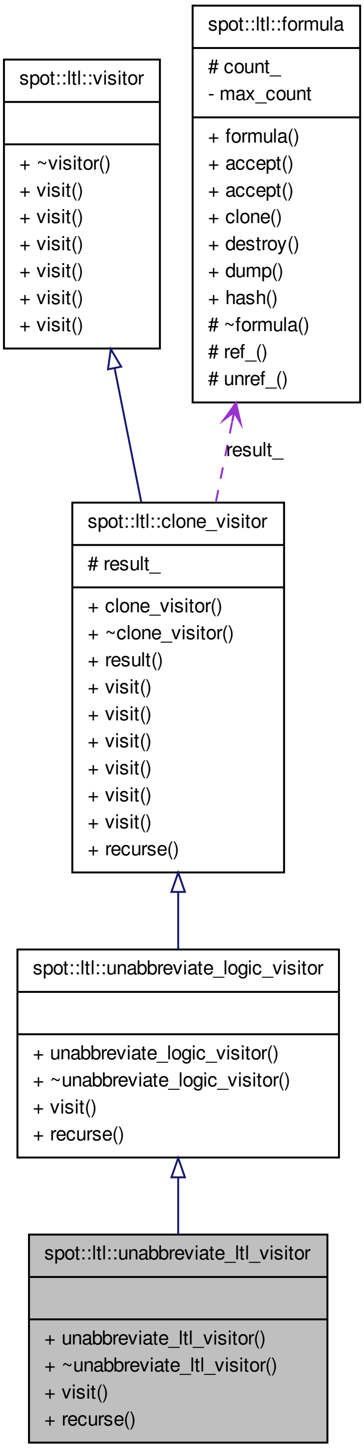
The rewriting performed on logical operator is the same as the one done by spot::ltl::unabbreviate_logic_visitor.

`#include <ltlvisit/tunabbrev.hh>`

Inheritance diagram for spot::ltl::unabbreviate_ltl_visitor:



Collaboration diagram for spot::ltl::unabbreviate_ltl_visitor:



Public Member Functions

- unabbreviate_ltl_visitor ()
- virtual ∼unabbreviate_ltl_visitor ()
- void visit (unop ∗uo)
- formula ∗ recurse (formula ∗f)
- void visit (binop ∗bo)
- void visit (atomic_prop ∗ap)
- void visit (automatop ∗mo)
- void visit (multop ∗mo)
- void visit (constant ∗c)
- formula ∗ result () const

Protected Attributes

- formula ∗ result_

Private Types

- typedef unabbreviate_logic_visitor super

7.197.1 Detailed Description

Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.

The rewriting performed on logical operator is the same as the one done by spot::ltl::unabbreviate_logic_visitor. This will also rewrite unary operators such as unop::F, and unop::G, using only binop::U, and binop::R.

This visitor is public, because it's convenient to derive from it and override some of its methods. But if you just want the functionality, consider using spot::ltl::unabbreviate_ltl instead.

7.197.2 Member Typedef Documentation

7.197.2.1 typedef unabbreviate_logic_visitor spot::ltl::unabbreviate_ltl_visitor::super `[private]`

Reimplemented from spot::ltl::unabbreviate_logic_visitor.

7.197.3 Constructor & Destructor Documentation

7.197.3.1 spot::ltl::unabbreviate_ltl_visitor::unabbreviate_ltl_visitor ( )

7.197.3.2 virtual spot::ltl::unabbreviate_ltl_visitor::∼unabbreviate_ltl_visitor ( ) `[virtual]`

7.197.4 Member Function Documentation

7.197.4.1 formula∗ spot::ltl::unabbreviate_ltl_visitor::recurse (formula ∗ *f*) `[virtual]`

Reimplemented from spot::ltl::unabbreviate_logic_visitor.

7.197.4.2 formula∗ spot::ltl::clone_visitor::result ( ) const `[inherited]`

7.197.4.3 void spot::ltl::clone_visitor::visit (constant ∗ *c*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.197.4.4 void spot::ltl::clone_visitor::visit (multop ∗ *mo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.197.4.5 void spot::ltl::clone_visitor::visit (automatop ∗ *mo*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.197.4.6 void spot::ltl::unabbreviate_ltl_visitor::visit (unop ∗ *uo*) `[virtual]`

Reimplemented from spot::ltl::clone_visitor.

7.197.4.7 void spot::ltl::unabbreviate_logic_visitor::visit (binop ∗ *bo*) `[virtual, inherited]`

Reimplemented from spot::ltl::clone_visitor.

7.197.4.8 void spot::ltl::clone_visitor::visit (atomic_prop ∗ *ap*) `[virtual, inherited]`

Implements spot::ltl::visitor.

7.197.5 Member Data Documentation

7.197.5.1 formula∗ spot::ltl::clone_visitor::result_ `[protected, inherited]`

The documentation for this class was generated from the following file:

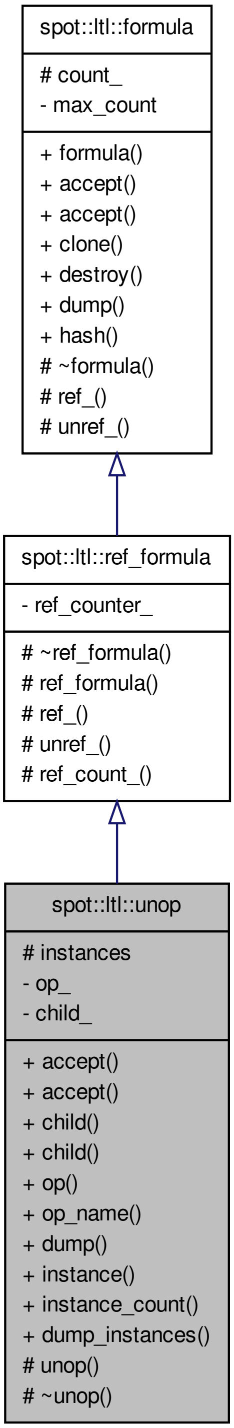
- ltlvisit/tunabbrev.hh

7.198 spot::ltl::unop Class Reference

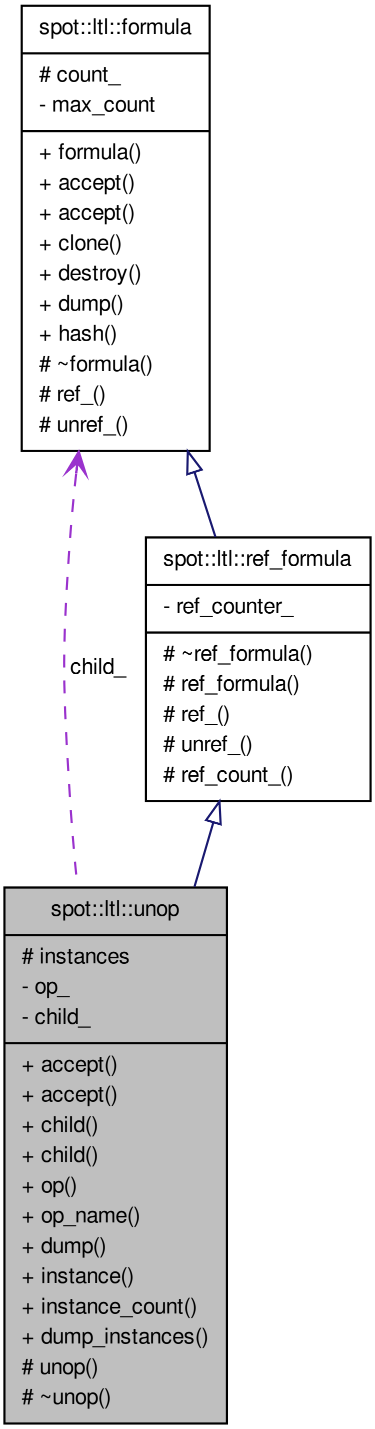
Unary operators.

`#include <ltlast/unop.hh>`

Inheritance diagram for spot::ltl::unop:



Collaboration diagram for spot::ltl::unop:



Public Types

- enum type {
  Not, X, F, G,
  Finish }

Public Member Functions

- virtual void accept (visitor &v)

  Entry point for vspot::ltl::visitor instances.
- virtual void accept (const_visitor &v) const

  Entry point for vspot::ltl::const_visitor instances.
- const formula ∗ child () const

  Get the sole operand of this operator.
- formula ∗ child ()

  Get the sole operand of this operator.
- type op () const

  Get the type of this operator.
- const char ∗ op_name () const

  Get the type of this operator, as a string.
- virtual std::string dump () const

  Return a canonic representation of the atomic proposition.
- formula ∗ clone () const

  clone this node
- void destroy () const

  release this node
- size_t hash () const

  Return a hash key for the formula.

Static Public Member Functions

- static unop ∗ instance (type op, formula ∗child)
- static unsigned instance_count ()

  Number of instantiated unary operators. For debugging.
- static std::ostream & dump_instances (std::ostream &os)

  Dump all instances. For debugging.

Protected Types

- typedef std::pair< type, formula ∗ > pair
- typedef std::map< pair, unop ∗ > map

Protected Member Functions

- unop (type op, formula ∗child)
- virtual ∼unop ()
- void ref_ ()

  increment reference counter if any

- bool unref_ ()

  decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

- unsigned ref_count_ ()

  Number of references to this formula.

Protected Attributes

- size_t count_

  The hash key of this formula.

Static Protected Attributes

- static map instances

Private Attributes

- type op_
- formula ∗ child_

7.198.1 Detailed Description

Unary operators.

7.198.2 Member Typedef Documentation

7.198.2.1 typedef std::map<pair, unop∗> spot::ltl::unop::map `[protected]`

7.198.2.2 typedef std::pair<type, formula∗> spot::ltl::unop::pair `[protected]`

7.198.3 Member Enumeration Documentation

7.198.3.1 enum spot::ltl::unop::type

Enumerator:

- ***Not***
- ***X***
- ***F***
- ***G***
- ***Finish***

7.198.4 Constructor & Destructor Documentation

7.198.4.1 spot::ltl::unop::unop (type *op*, formula ∗ *child*) `[protected]`

7.198.4.2 virtual spot::ltl::unop::∼unop ( ) `[protected, virtual]`

7.198.5 Member Function Documentation

7.198.5.1 virtual void spot::ltl::unop::accept (visitor & *v*) `[virtual]`

Entry point for vspot::ltl::visitor instances.

Implements spot::ltl::formula.

7.198.5.2 virtual void spot::ltl::unop::accept (const_visitor & *v*) const `[virtual]`

Entry point for vspot::ltl::const_visitor instances.

Implements spot::ltl::formula.

7.198.5.3 const formula∗ spot::ltl::unop::child ( ) const

Get the sole operand of this operator.

7.198.5.4 formula∗ spot::ltl::unop::child ( )

Get the sole operand of this operator.

7.198.5.5 formula∗ spot::ltl::formula::clone ( ) const `[inherited]`

clone this node

This increments the reference counter of this node (if one is used).

7.198.5.6 void spot::ltl::formula::destroy ( ) const `[inherited]`

release this node

This decrements the reference counter of this node (if one is used) and can free the object.

Referenced by spot::taa_tgba_labelled< std::string, string_hash >::add_acceptance_condition(), and spot::tgba_explicit_labelled< std::string, string_hash >::declare_acceptance_condition().

7.198.5.7 virtual std::string spot::ltl::unop::dump ( ) const `[virtual]`

Return a canonic representation of the atomic proposition.

Implements spot::ltl::formula.

7.198.5.8 static std::ostream& spot::ltl::unop::dump_instances (std::ostream & *os*) `[static]`

Dump all instances. For debugging.

7.198.5.9 size_t spot::ltl::formula::hash ( ) const `[inline, inherited]`

Return a hash key for the formula.

References spot::ltl::formula::count_.

Referenced by spot::ltl::formula_ptr_hash::operator()(), and spot::ltl::formula_ptr_less_than::operator()().

7.198.5.10 static unop∗ spot::ltl::unop::instance (type *op*, formula ∗ *child*) `[static]`

Build an unary operator with operation *op* and child *child*.

7.198.5.11 static unsigned spot::ltl::unop::instance_count ( ) `[static]`

Number of instantiated unary operators. For debugging.

7.198.5.12 type spot::ltl::unop::op ( ) const

Get the type of this operator.

7.198.5.13 const char∗ spot::ltl::unop::op_name ( ) const

Get the type of this operator, as a string.

7.198.5.14 void spot::ltl::ref_formula::ref_ ( ) `[protected, virtual, inherited]`

increment reference counter if any

Reimplemented from spot::ltl::formula.

7.198.5.15 unsigned spot::ltl::ref_formula::ref_count_ ( ) `[protected, inherited]`

Number of references to this formula.

7.198.5.16 bool spot::ltl::ref_formula::unref_ ( ) `[protected, virtual, inherited]`

decrement reference counter if any, return true when the instance must be deleted (usually when the counter hits 0).

Reimplemented from spot::ltl::formula.

7.198.6 Member Data Documentation

7.198.6.1 formula∗ spot::ltl::unop::child_ `[private]`

7.198.6.2 size_t spot::ltl::formula::count_ `[protected, inherited]`

The hash key of this formula.

Referenced by spot::ltl::formula::hash().

7.198.6.3 map spot::ltl::unop::instances `[static, protected]`

7.198.6.4 type spot::ltl::unop::op_ `[private]`

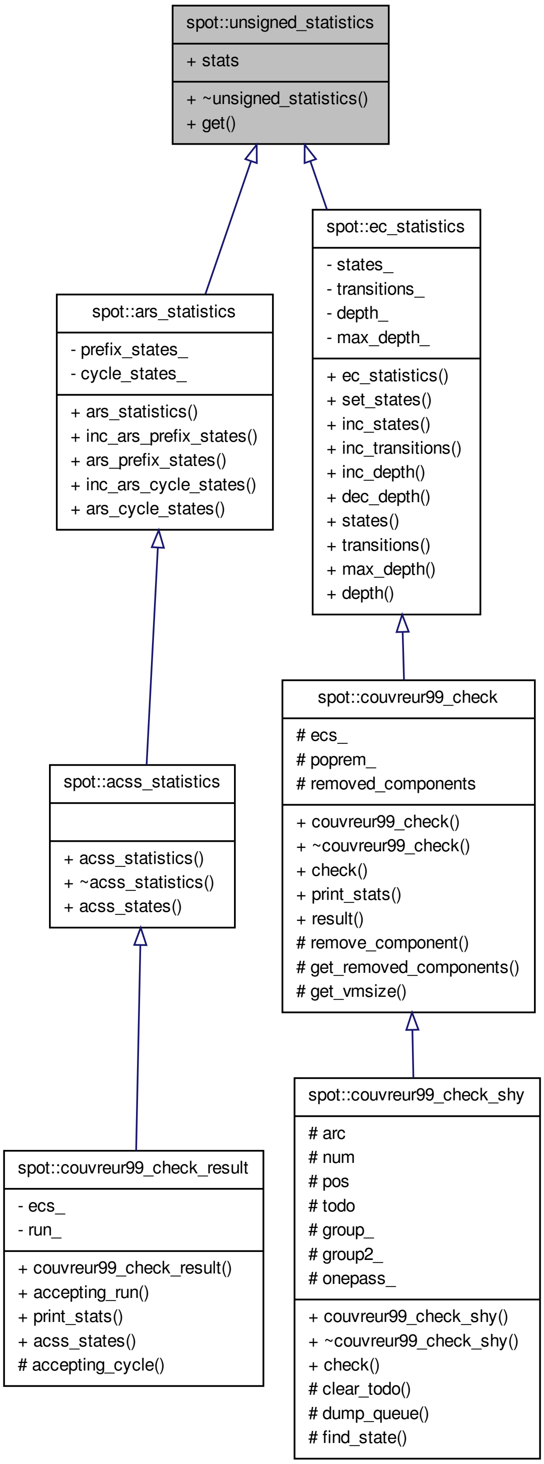
The documentation for this class was generated from the following file:

- ltlast/unop.hh

7.199 spot::unsigned_statistics Struct Reference

`#include <tgbaalgos/emptiness_stats.hh>`

Inheritance diagram for spot::unsigned_statistics:



Public Types

- typedef unsigned(unsigned_statistics::∗ unsigned_fun)() const
- typedef std::map< const char ∗, unsigned_fun, char_ptr_less_than > stats_map

Public Member Functions

- virtual ∼unsigned_statistics ()
- unsigned get (const char ∗str) const

Public Attributes

- stats_map stats

7.199.1 Member Typedef Documentation

7.199.1.1 typedef std::map<const char∗, unsigned_fun, char_ptr_less_than> spot::unsigned_statistics::stats_map

7.199.1.2 typedef unsigned(unsigned_statistics::∗ spot::unsigned_statistics::unsigned_fun)() const

7.199.2 Constructor & Destructor Documentation

7.199.2.1 virtual spot::unsigned_statistics::∼unsigned_statistics ( ) `[inline, virtual]`

7.199.3 Member Function Documentation

7.199.3.1 unsigned spot::unsigned_statistics::get (const char ∗ *str*) const `[inline]`

References stats.

7.199.4 Member Data Documentation

7.199.4.1 stats_map spot::unsigned_statistics::stats

Referenced by spot::acss_statistics::acss_statistics(), spot::ars_statistics::ars_statistics(), spot::ec_statistics::ec_statistics(), get(), and spot::unsigned_statistics_copy::seteq().

The documentation for this struct was generated from the following file:

- tgbaalgos/emptiness_stats.hh

7.200 spot::unsigned_statistics_copy Class Reference

comparable statistics

`#include <tgbaalgos/emptiness_stats.hh>`

Public Types

- typedef std::map< const char ∗, unsigned, char_ptr_less_than > stats_map

Public Member Functions

- unsigned_statistics_copy ()
- unsigned_statistics_copy (const unsigned_statistics &o)
- bool seteq (const unsigned_statistics &o)
- bool operator== (const unsigned_statistics_copy &o) const
- bool operator!= (const unsigned_statistics_copy &o) const

Public Attributes

- stats_map stats
- bool set

7.200.1 Detailed Description

comparable statistics This must be built from a spot::unsigned_statistics. But unlike spot::unsigned_statistics, it supports equality and inequality tests. (It's the only operations it supports, BTW.)

7.200.2 Member Typedef Documentation

7.200.2.1 typedef std::map<const char∗, unsigned, char_ptr_less_than> spot::unsigned_statistics_copy::stats_map

7.200.3 Constructor & Destructor Documentation

7.200.3.1 spot::unsigned_statistics_copy::unsigned_statistics_copy ( ) `[inline]`

7.200.3.2 spot::unsigned_statistics_copy::unsigned_statistics_copy (const unsigned_statistics & *o*) `[inline]`

References seteq().

7.200.4 Member Function Documentation

7.200.4.1 bool spot::unsigned_statistics_copy::operator!= (const unsigned_statistics_copy & *o*) const [inline]

7.200.4.2 bool spot::unsigned_statistics_copy::operator== (const unsigned_statistics_copy & *o*) const [inline]

References stats.

7.200.4.3 bool spot::unsigned_statistics_copy::seteq (const unsigned_statistics & *o*) [inline]

References stats, and spot::unsigned_statistics::stats.

Referenced by unsigned_statistics_copy().

7.200.5 Member Data Documentation

7.200.5.1 bool spot::unsigned_statistics_copy::set

7.200.5.2 stats_map spot::unsigned_statistics_copy::stats

Referenced by operator==(), and seteq().

The documentation for this class was generated from the following file:

- tgbaalgos/emptiness_stats.hh

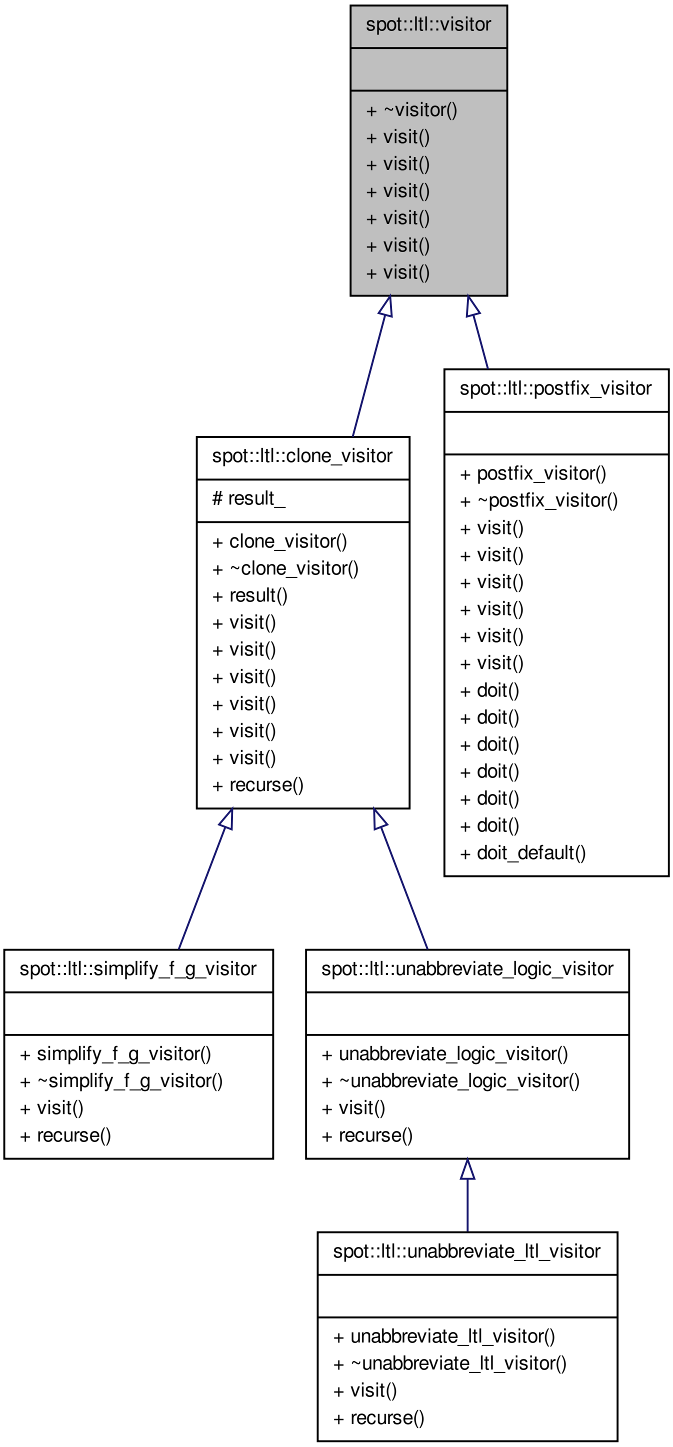
7.201 spot::ltl::visitor Struct Reference

Formula visitor that can modify the formula.

Writing visitors is the prefered way to traverse a formula, since it doesn't involve any cast.

`#include <ltlast/visitor.hh>`

Inheritance diagram for spot::ltl::visitor:



Public Member Functions

- virtual ∼visitor ()
- virtual void visit (atomic_prop ∗node)=0
- virtual void visit (constant ∗node)=0
- virtual void visit (binop ∗node)=0
- virtual void visit (unop ∗node)=0
- virtual void visit (multop ∗node)=0
- virtual void visit (automatop ∗node)=0

7.201.1 Detailed Description

Formula visitor that can modify the formula.

Writing visitors is the prefered way to traverse a formula, since it doesn't involve any cast. If you do not need to modify the visited formula, inherit from spot::ltl:const_visitor instead.

7.201.2 Constructor & Destructor Documentation

7.201.2.1 virtual spot::ltl::visitor::∼visitor ( ) `[inline, virtual]`

7.201.3 Member Function Documentation

7.201.3.1 virtual void spot::ltl::visitor::visit (atomic_prop ∗ *node*) `[pure virtual]`

Implemented in spot::ltl::clone_visitor, and spot::ltl::postfix_visitor.

7.201.3.2 virtual void spot::ltl::visitor::visit (automatop ∗ *node*) `[pure virtual]`

Implemented in spot::ltl::clone_visitor, and spot::ltl::postfix_visitor.

7.201.3.3 virtual void spot::ltl::visitor::visit (multop ∗ *node*) `[pure virtual]`

Implemented in spot::ltl::clone_visitor, and spot::ltl::postfix_visitor.

7.201.3.4 virtual void spot::ltl::visitor::visit (unop ∗ *node*) `[pure virtual]`

Implemented in spot::ltl::clone_visitor, spot::ltl::postfix_visitor, and spot::ltl::unabbreviate_ltl_visitor.

7.201.3.5 virtual void spot::ltl::visitor::visit (binop ∗ *node*) `[pure virtual]`

Implemented in spot::ltl::clone_visitor, spot::ltl::unabbreviate_logic_visitor, spot::ltl::postfix_visitor, and spot::ltl::simplify_f_g_visitor.

7.201.3.6 virtual void spot::ltl::visitor::visit (constant ∗ *node*) `[pure virtual]`

Implemented in spot::ltl::clone_visitor, and spot::ltl::postfix_visitor.

The documentation for this struct was generated from the following file:

- ltlast/visitor.hh

7.202 spot::weight Class Reference

Manage for a given automaton a vector of counter indexed by its acceptance condition.

`#include <tgbaalgos/weight.hh>`

Public Member Functions

- weight (const bdd &neg_all_cond)
- weight & operator+= (const bdd &acc)

  Increment by one the counters of each acceptance condition in acc.

- weight & operator-= (const bdd &acc)

  Decrement by one the counters of each acceptance condition in acc.

- bdd operator- (const weight &w) const

Private Types

- typedef std::map< int, int > weight_vector

Static Private Member Functions

- static void inc_weight_handler (char ∗varset, int size)
- static void dec_weight_handler (char ∗varset, int size)

Private Attributes

- weight_vector m
- bdd neg_all_acc

Static Private Attributes

- static weight_vector ∗ pm

Friends

- std::ostream & operator<< (std::ostream &os, const weight &w)

7.202.1 Detailed Description

Manage for a given automaton a vector of counter indexed by its acceptance condition.

7.202.2 Member Typedef Documentation

7.202.2.1 typedef std::map<int, int> spot::weight::weight_vector `[private]`

7.202.3 Constructor & Destructor Documentation

7.202.3.1 spot::weight::weight (const bdd & *neg_all_cond*)

Construct a empty vector (all counters set to zero).

Parameters

neg_all_cond : negation of all the acceptance conditions of the automaton (the bdd returned by tgba::neg_acceptance_conditions()).

7.202.4 Member Function Documentation

7.202.4.1 static void spot::weight::dec_weight_handler (char ∗ *varset,* int *size*) `[static, private]`

7.202.4.2 static void spot::weight::inc_weight_handler (char ∗ *varset,* int *size*) `[static, private]`

7.202.4.3 weight& spot::weight::operator+= (const bdd & *acc*)

Increment by one the counters of each acceptance condition in *acc*.

7.202.4.4 bdd spot::weight::operator- (const weight & *w*) const

Return the set of each acceptance condition such that its counter is strictly greatest than the corresponding counter in w.

Precondition

For each acceptance condition, its counter is greatest or equal to the corresponding counter in w.

7.202.4.5 weight& spot::weight::operator-= (const bdd & *acc*)

Decrement by one the counters of each acceptance condition in *acc*.

7.202.5 Friends And Related Function Documentation

7.202.5.1 std::ostream& operator<< (std::ostream & *os*, const weight & *w*) `[friend]`

7.202.6 Member Data Documentation

7.202.6.1 weight_vector spot::weight::m `[private]`

7.202.6.2 bdd spot::weight::neg_all_acc `[private]`

7.202.6.3 weight_vector∗ spot::weight::pm `[static, private]`

The documentation for this class was generated from the following file:

- tgbaalgos/weight.hh

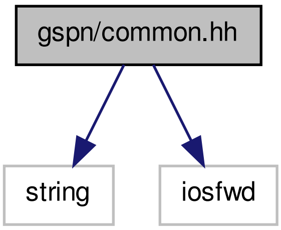
8 File Documentation

8.1 mainpage.dox File Reference

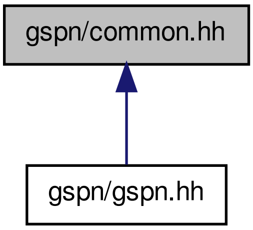
8.2 gspn/common.hh File Reference

```
#include <string>
#include <iosfwd>
```

Include dependency graph for common.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::gspn_exception

  An exception used to forward GSPN errors.

Namespaces

- namespace spot

Functions

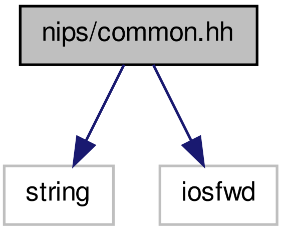
- std::ostream & spot::operator<< (std::ostream &os, const gspn_exception &e)

8.3 nips/common.hh File Reference

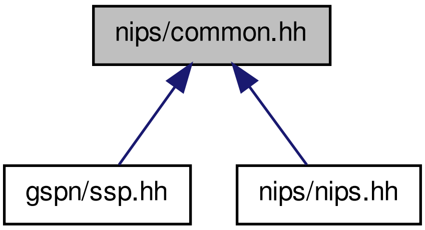
`#include <string>`

`#include <iosfwd>`

Include dependency graph for common.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::nips_exception

  An exception used to forward NIPS errors.

Namespaces

- namespace spot

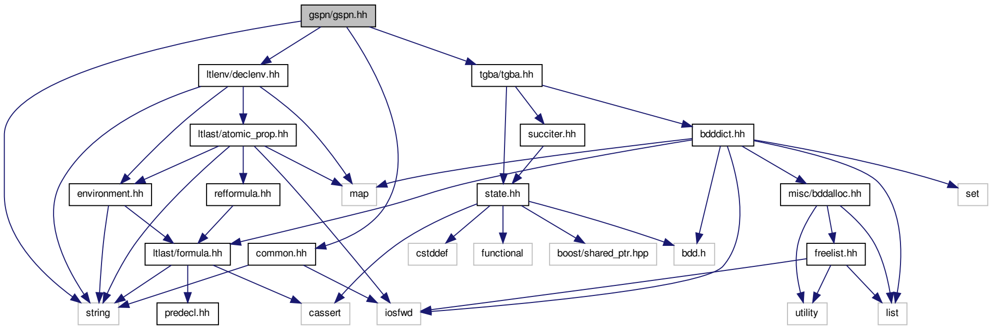
Functions

- std::ostream & spot::operator<< (std::ostream &os, const nips_exception &e)

8.4 gspn/gspn.hh File Reference

```
#include <string>
#include "tgba/tgba.hh"
#include "common.hh"
#include "ltlenv/declenv.hh"
```

Include dependency graph for gspn.hh:



Classes

- class spot::gspn_interface

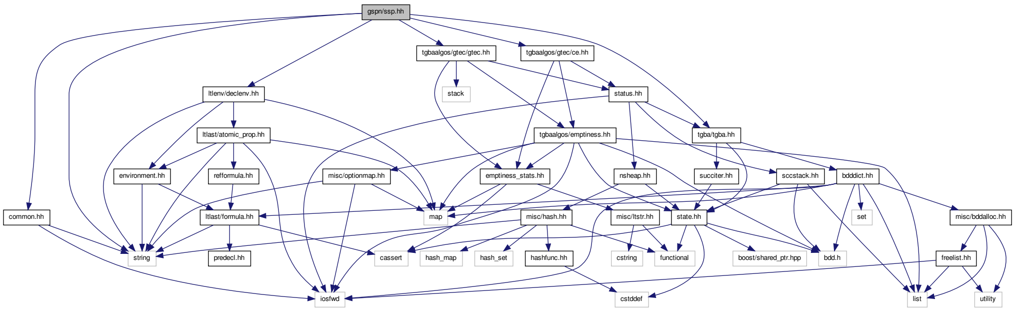
Namespaces

- namespace spot

8.5 gspn/ssp.hh File Reference

```
#include <string>
#include "tgba/tgba.hh"
#include "common.hh"
#include "tgbaalgos/gtec/gtec.hh"
#include "tgbaalgos/gtec/ce.hh"
#include "ltlenv/declenv.hh"
```

Include dependency graph for ssp.hh:



Classes

- class spot::gspn_ssp_interface

Namespaces

- namespace spot

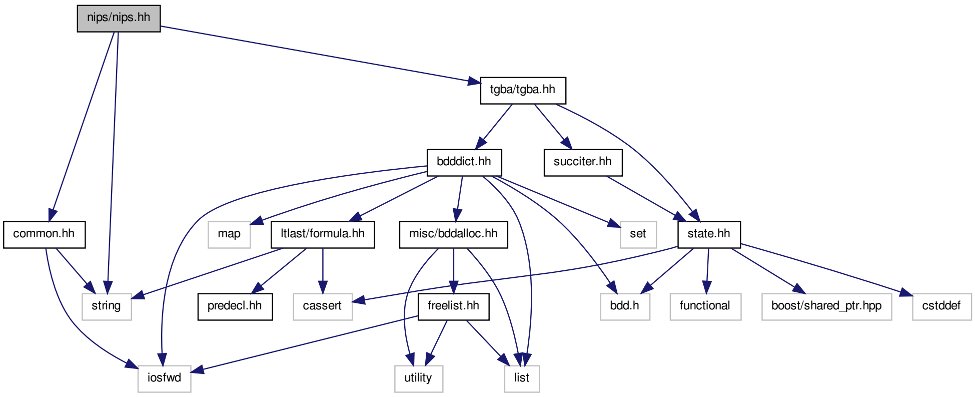
Functions

- couvreur99_check ∗ spot::couvreur99_check_ssp_semi (const tgba ∗ssp_automata)
- couvreur99_check ∗ spot::couvreur99_check_ssp_shy_semi (const tgba ∗ssp_automata)
- couvreur99_check ∗ spot::couvreur99_check_ssp_shy (const tgba ∗ssp_automata, bool stack_inclusion=true, bool double_inclusion=false, bool reversed_double_inclusion=false, bool no_decomp=false)

8.6 nips/nips.hh File Reference

```
#include <string>
#include "tgba/tgba.hh"
#include "common.hh"
```

Include dependency graph for nips.hh:



Classes

- class spot::nips_interface

  An interface to provide a PROMELA front-end.

Namespaces

- namespace spot

Typedefs

- typedef struct nipsvm_t nipsvm_t
- typedef struct t_bytecode nipsvm_bytecode_t

8.6.1 Typedef Documentation

8.6.1.1 typedef struct t_bytecode nipsvm_bytecode_t

8.6.1.2 typedef struct nipsvm_t nipsvm_t

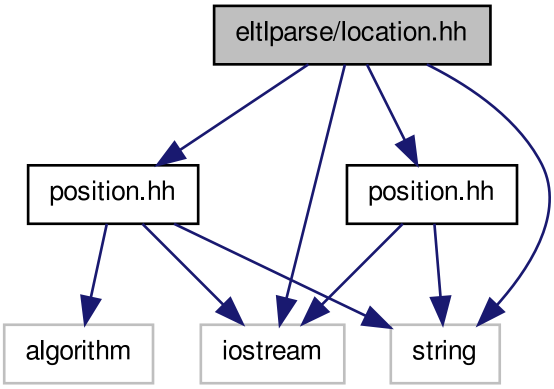
8.7 eltlparse/location.hh File Reference

```
#include <iostream>
#include <string>
```

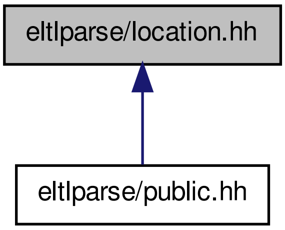
`#include "position.hh"`

`#include "position.hh"`

Include dependency graph for location.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class eltlyy::location

  Abstract a location.

Namespaces

- namespace eltlyy

Functions

- const location eltlyy::operator+ (const location &begin, const location &end)

    Join two location objects to create a location.

- const location eltlyy::operator+ (const location &begin, unsigned int width)

    Add two location objects.

- location & eltlyy::operator+= (location &res, unsigned int width)

    Add and assign a location.

- bool eltlyy::operator== (const location &loc1, const location &loc2)

    Compare two location objects.

- bool eltlyy::operator!= (const location &loc1, const location &loc2)

    Compare two location objects.

- std::ostream & eltlyy::operator<< (std::ostream &ostr, const location &loc)

    Intercept output stream redirection.

8.8 ltlparse/location.hh File Reference

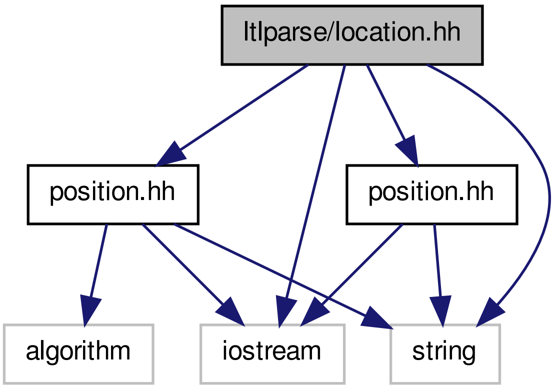
`#include <iostream>`

`#include <string>`

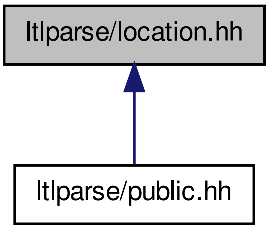
`#include "position.hh"`

`#include "position.hh"`

Include dependency graph for location.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class ltlyy::location

  Abstract a location.

Namespaces

- namespace ltlyy

Functions

- const location ltlyy::operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location ltlyy::operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & ltlyy::operator+= (location &res, unsigned int width)

  Add and assign a location.

- bool ltlyy::operator== (const location &loc1, const location &loc2)

  Compare two location objects.

- bool ltlyy::operator!= (const location &loc1, const location &loc2)

  Compare two location objects.

- std::ostream & ltlyy::operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.

8.9 neverparse/location.hh File Reference

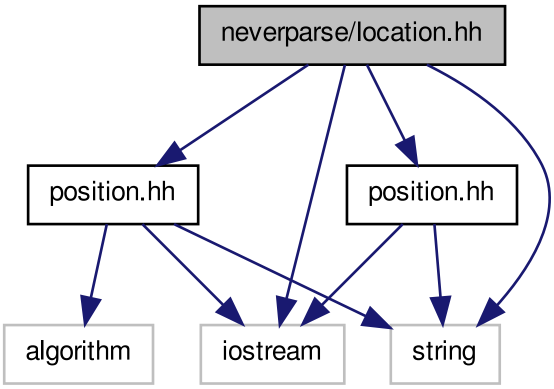
`#include <iostream>`

`#include <string>`

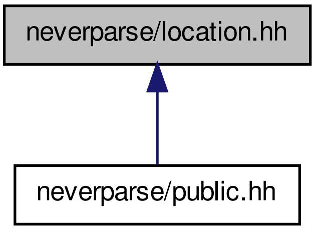
`#include "position.hh"`

`#include "position.hh"`

Include dependency graph for location.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class neverclaimyy::location

  Abstract a location.

Namespaces

- namespace neverclaimyy

Functions

- const location neverclaimyy::operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location neverclaimyy::operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & neverclaimyy::operator+= (location &res, unsigned int width)

  Add and assign a location.

- bool neverclaimyy::operator== (const location &loc1, const location &loc2)

  Compare two location objects.

- bool neverclaimyy::operator!= (const location &loc1, const location &loc2)

  Compare two location objects.

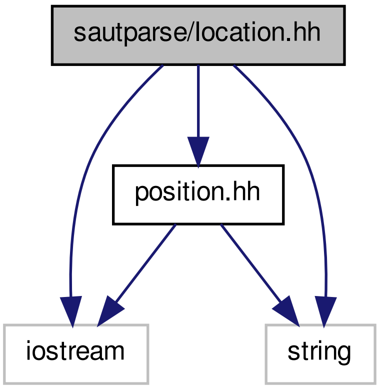
- std::ostream & neverclaimyy::operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.

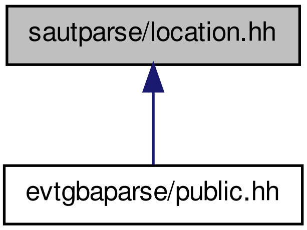
8.10 sautparse/location.hh File Reference

```
#include <iostream>
#include <string>
#include "position.hh"
```

Include dependency graph for location.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class sautyy::location

  Abstract a location.

Namespaces

- namespace sautyy

Functions

- const location sautyy::operator+ (const location &begin, const location &end)

  Join two location objects to create a location.

- const location sautyy::operator+ (const location &begin, unsigned int width)

  Add two location objects.

- location & sautyy::operator+= (location &res, unsigned int width)

  Add and assign a location.

- std::ostream & sautyy::operator<< (std::ostream &ostr, const location &loc)

  Intercept output stream redirection.

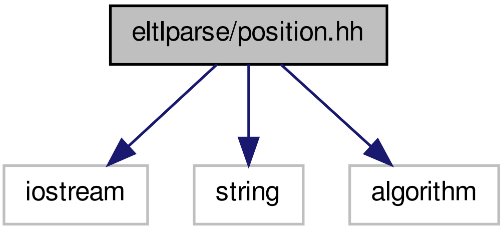
8.11 eltlparse/position.hh File Reference

`#include <iostream>`

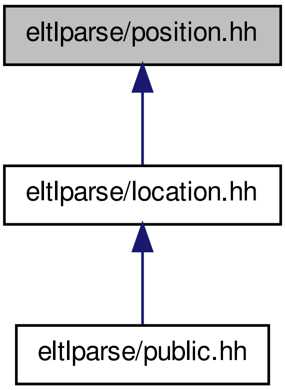
`#include <string>`

`#include <algorithm>`

Include dependency graph for position.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class eltlyy::position

    Abstract a position.

Namespaces

- namespace eltlyy

Functions

- const position & eltlyy::operator+= (position &res, const int width)

    Add and assign a position.

- const position eltlyy::operator+ (const position &begin, const int width)

    Add two position objects.

- const position & eltlyy::operator-= (position &res, const int width)

    Add and assign a position.

- const position eltlyy::operator- (const position &begin, const int width)

    Add two position objects.

- bool eltlyy::operator== (const position &pos1, const position &pos2)

    Compare two position objects.

- bool eltlyy::operator!= (const position &pos1, const position &pos2)

Compare two position objects.

- std::ostream & eltlyy::operator<< (std::ostream &ostr, const position &pos)

  Intercept output stream redirection.

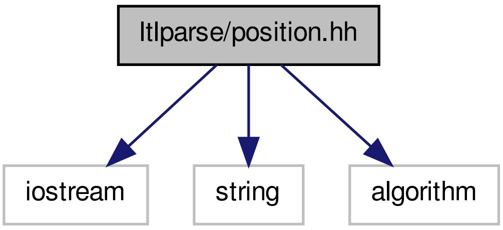
8.12 ltlparse/position.hh File Reference

`#include <iostream>`

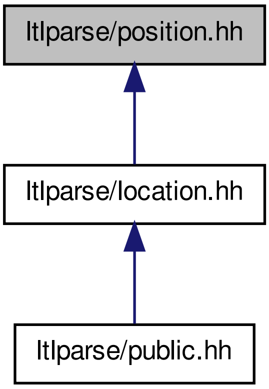
`#include <string>`

`#include <algorithm>`

Include dependency graph for position.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class ltlyy::position
  Abstract a position.

Namespaces

- namespace ltlyy

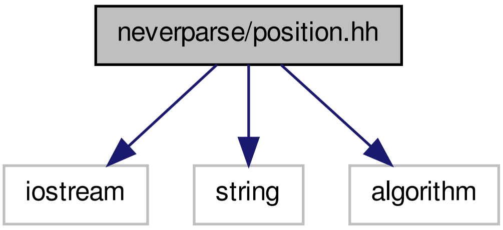
Functions

- const position & ltlyy::operator+= (position &res, const int width)
  Add and assign a position.
- const position ltlyy::operator+ (const position &begin, const int width)
  Add two position objects.
- const position & ltlyy::operator-= (position &res, const int width)
  Add and assign a position.
- const position ltlyy::operator- (const position &begin, const int width)
  Add two position objects.
- bool ltlyy::operator== (const position &pos1, const position &pos2)
  Compare two position objects.
- bool ltlyy::operator!= (const position &pos1, const position &pos2)
  Compare two position objects.
- std::ostream & ltlyy::operator<< (std::ostream &ostr, const position &pos)
  Intercept output stream redirection.

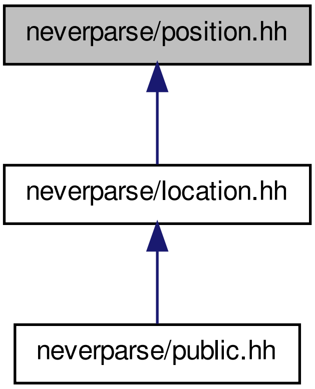
8.13 neverparse/position.hh File Reference

```
#include <iostream>
#include <string>
#include <algorithm>
```

Include dependency graph for position.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class neverclaimyy::position

  Abstract a position.

Namespaces

- namespace neverclaimyy

Functions

- const position & neverclaimyy::operator+= (position &res, const int width)

  Add and assign a position.

- const position neverclaimyy::operator+ (const position &begin, const int width)

  Add two position objects.

- const position & neverclaimyy::operator-= (position &res, const int width)

  Add and assign a position.

- const position neverclaimyy::operator- (const position &begin, const int width)

  Add two position objects.

- bool neverclaimyy::operator== (const position &pos1, const position &pos2)

  Compare two position objects.

- bool neverclaimyy::operator!= (const position &pos1, const position &pos2)

  Compare two position objects.

- std::ostream & neverclaimyy::operator<< (std::ostream &ostr, const position &pos)

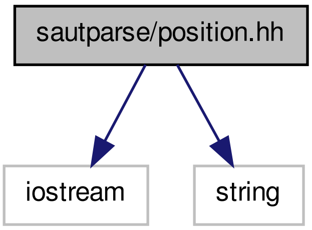
  Intercept output stream redirection.

8.14 sautparse/position.hh File Reference

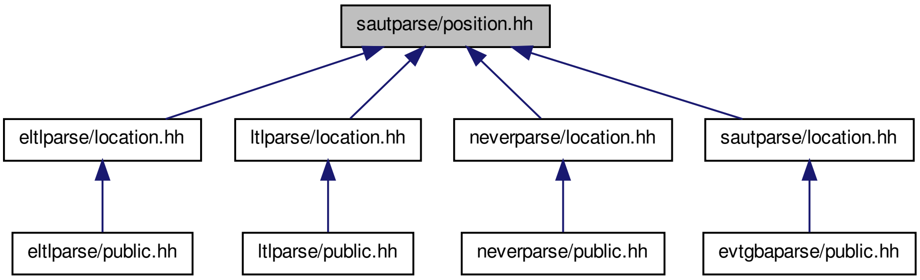
`#include <iostream>`

`#include <string>`

Include dependency graph for position.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class sautyy::position

    Abstract a position.

Namespaces

- namespace sautyy

Functions

- const position & sautyy::operator+= (position &res, const int width)

    Add and assign a position.

- const position sautyy::operator+ (const position &begin, const int width)

    Add two position objects.

- const position & sautyy::operator-= (position &res, const int width)

    Add and assign a position.

- const position sautyy::operator- (const position &begin, const int width)

    Add two position objects.

- std::ostream & sautyy::operator<< (std::ostream &ostr, const position &pos)

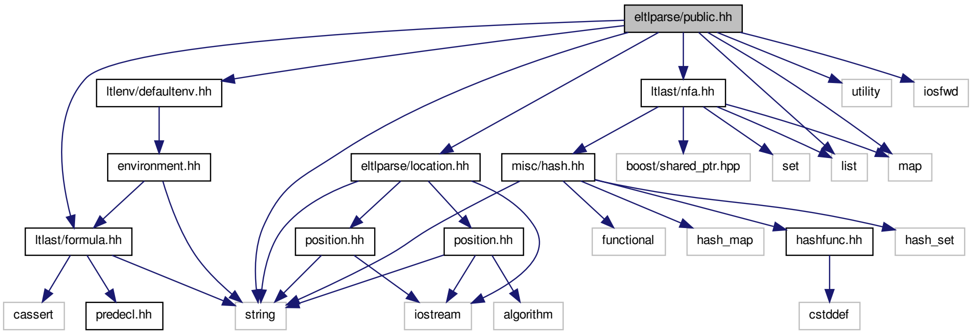
    Intercept output stream redirection.

8.15 eltlparse/public.hh File Reference

```
#include "ltlast/formula.hh"
#include "ltlenv/defaultenv.hh"
```

```
#include "ltlast/nfa.hh"
#include "eltlparse/location.hh"
#include <string>
#include <list>
#include <map>
#include <utility>
#include <iosfwd>
```

Include dependency graph for public.hh:



Namespaces

- namespace spot
- namespace spot::eltl

Typedefs

- typedef std::pair< std::string, std::string > spot::eltl::spair
- typedef std::pair< eltlyy::location, spair > spot::eltl::parse_error

  A parse diagnostic <location, <file, message>>.

- typedef std::list< parse_error > spot::eltl::parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- formula ∗ spot::eltl::parse_file (const std::string &filename, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from a text file.

- formula ∗ spot::eltl::parse_string (const std::string &eltl_string, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

Build a formula from an ELTL string.

- bool spot::eltl::format_parse_errors (std::ostream &os, parse_error_list &error_list)

  Format diagnostics produced by spot::eltl::parse.

8.16 evtgbaparse/public.hh File Reference

`#include "evtgba/explicit.hh"`

`#include "location.hh"`

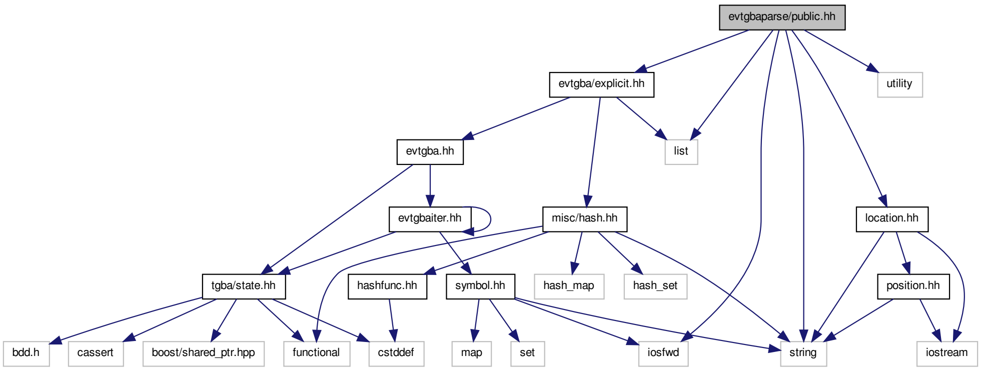
`#include <string>`

`#include <list>`

`#include <utility>`

`#include <iosfwd>`

Include dependency graph for public.hh:



Namespaces

- namespace spot

Typedefs

- typedef std::pair< evtgbayy::location, std::string > spot::evtgba_parse_error

  A parse diagnostic with its location.

- typedef std::list< evtgba_parse_error > spot::evtgba_parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- evtgba_explicit ∗ spot::evtgba_parse (const std::string &filename, evtgba_parse_error_list &error_list, bool debug=false)

  Build a spot::evtgba_explicit from a text file.

- bool spot::format_evtgba_parse_errors (std::ostream &os, const std::string &filename, evtgba_parse_error_list &error_list)

  Format diagnostics produced by spot::evtgba_parse.

8.17 ltlparse/public.hh File Reference

`#include "ltlast/formula.hh"`

`#include "ltlparse/location.hh"`

`#include "ltlenv/defaultenv.hh"`

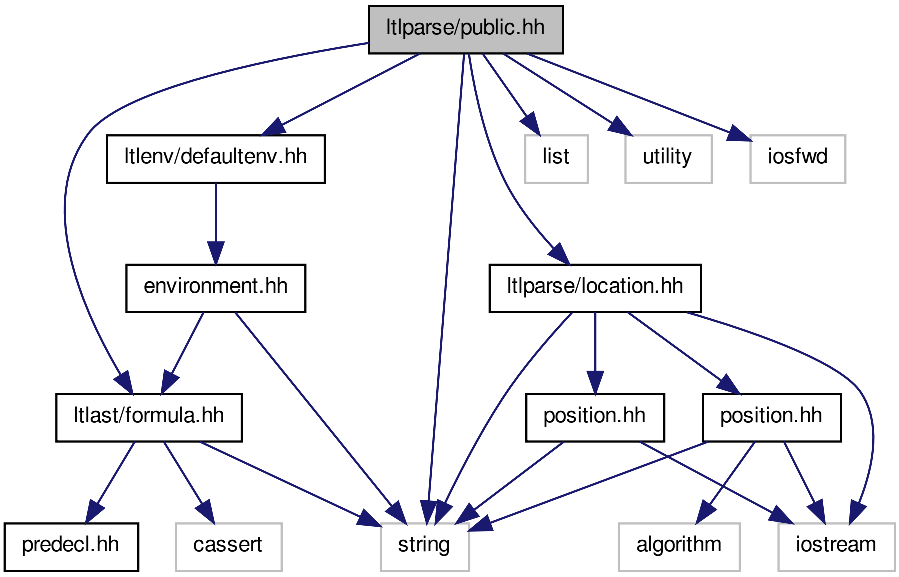
`#include <string>`

`#include <list>`

`#include <utility>`

`#include <iosfwd>`

Include dependency graph for public.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Typedefs

- typedef std::pair< ltlyy::location, std::string > spot::ltl::parse_error

  A parse diagnostic with its location.

- typedef std::list< parse_error > spot::ltl::parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- formula ∗ spot::ltl::parse (const std::string &ltl_string, parse_error_list &error_list, environment &env=default_environment::instance(), bool debug=false)

  Build a formula from an LTL string.

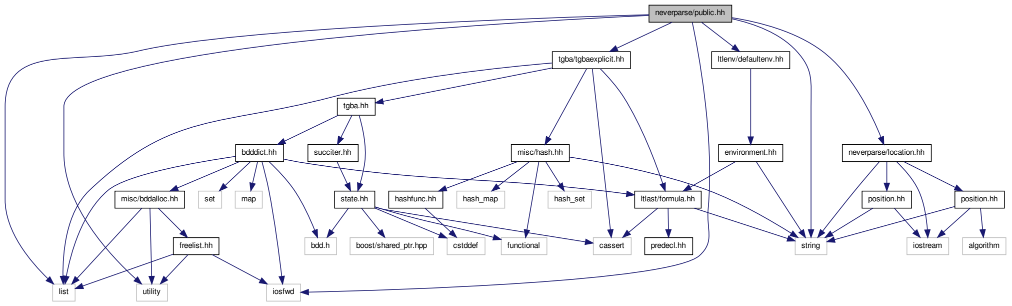
- bool spot::ltl::format_parse_errors (std::ostream &os, const std::string &ltl_string, parse_error_list &error_list)

  Format diagnostics produced by spot::ltl::parse.

8.18 neverparse/public.hh File Reference

```
#include "tgba/tgbaexplicit.hh"
#include "neverparse/location.hh"
#include "ltlenv/defaultenv.hh"
#include <string>
#include <list>
#include <utility>
#include <iosfwd>
```

Include dependency graph for public.hh:



Namespaces

- namespace spot

Typedefs

- typedef std::pair< neverclaimyy::location, std::string > spot::neverclaim_parse_error

  A parse diagnostic with its location.

- typedef std::list< neverclaim_parse_error > spot::neverclaim_parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- tgba_explicit_string ∗ spot::neverclaim_parse (const std::string &filename, neverclaim_parse_error_list &error_list, bdd_dict ∗dict, ltl::environment &env=ltl::default_environment::instance(), bool debug=false)

  Build a spot::tgba_explicit from a Spin never claim file.

- bool spot::format_neverclaim_parse_errors (std::ostream &os, const std::string &filename, neverclaim_parse_error_list &error_list)

  Format diagnostics produced by spot::neverclaim_parse.

8.19 tgba/public.hh File Reference

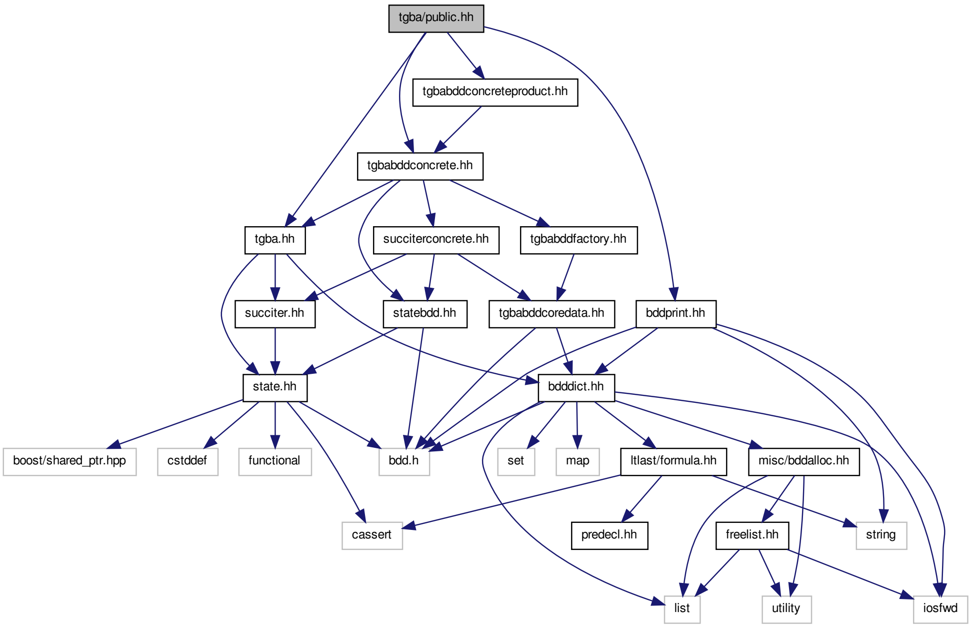
`#include "tgba.hh"`

`#include "tgbabddconcrete.hh"`

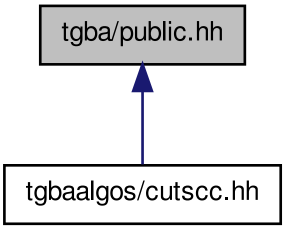
`#include "tgbabddconcreteproduct.hh"`

`#include "bddprint.hh"`

Include dependency graph for public.hh:



This graph shows which files directly or indirectly include this file:



8.20 tgbaparse/public.hh File Reference

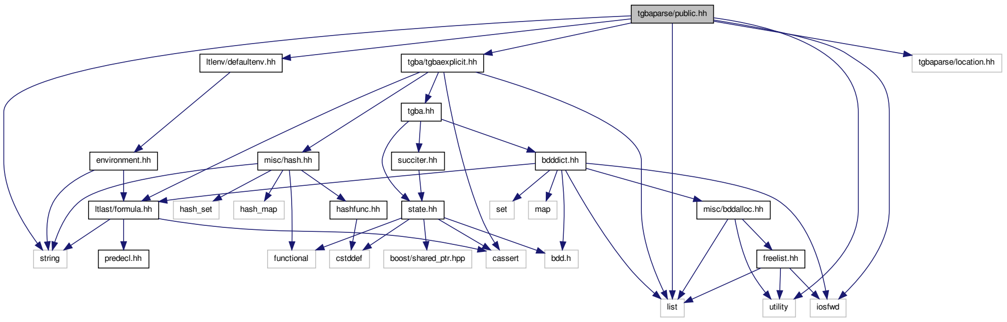
```
#include "tgba/tgbaexplicit.hh"
#include "tgbaparse/location.hh"
#include "ltlenv/defaultenv.hh"
#include <string>
```

`#include <list>`

`#include <utility>`

`#include <iosfwd>`

Include dependency graph for public.hh:



Namespaces

- namespace spot

Typedefs

- typedef std::pair< tgbayy::location, std::string > spot::tgba_parse_error

  A parse diagnostic with its location.

- typedef std::list< tgba_parse_error > spot::tgba_parse_error_list

  A list of parser diagnostics, as filled by parse.

Functions

- tgba_explicit_string ∗ spot::tgba_parse (const std::string &filename, tgba_parse_error_list &error_list, bdd_dict ∗dict, ltl::environment &env=ltl::default_environment::instance(), ltl::environment &envacc=ltl::default_environment::instance(), bool debug=false)

  Build a spot::tgba_explicit from a text file.

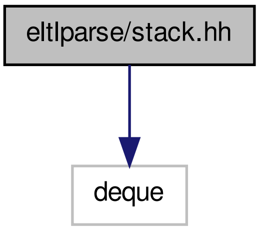
- bool spot::format_tgba_parse_errors (std::ostream &os, const std::string &filename, tgba_parse_error_list &error_list)

  Format diagnostics produced by spot::tgba_parse.

8.21 eltlparse/stack.hh File Reference

`#include <deque>`

Include dependency graph for stack.hh:



Classes

- class eltlyy::stack< T, S >
- class eltlyy::slice< T, S >

  Present a slice of the top of a stack.

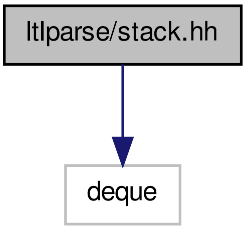
Namespaces

- namespace eltlyy

8.22 ltlparse/stack.hh File Reference

`#include <deque>`

Include dependency graph for stack.hh:



Classes

- class ltlyy::stack< T, S >
- class ltlyy::slice< T, S >

  Present a slice of the top of a stack.

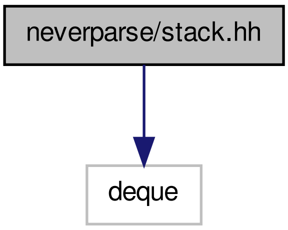
Namespaces

- namespace ltlyy

8.23 neverparse/stack.hh File Reference

`#include <deque>`

Include dependency graph for stack.hh:



Classes

- class neverclaimyy::stack< T, S >
- class neverclaimyy::slice< T, S >

  Present a slice of the top of a stack.

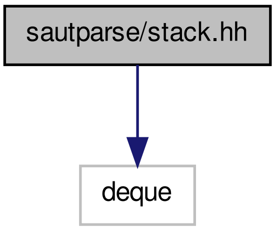
Namespaces

- namespace neverclaimyy

8.24 sautparse/stack.hh File Reference

`#include <deque>`

Include dependency graph for stack.hh:



Classes

- class sautyy::stack< T, S >
- class sautyy::slice< T, S >

    Present a slice of the top of a stack.

Namespaces

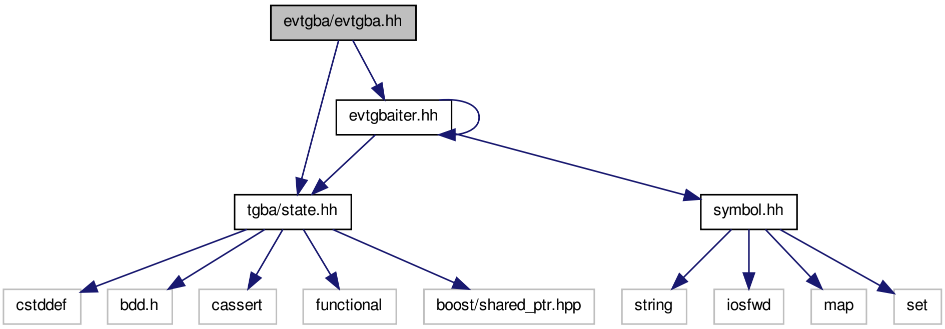
- namespace sautyy

8.25 evtgba/evtgba.hh File Reference

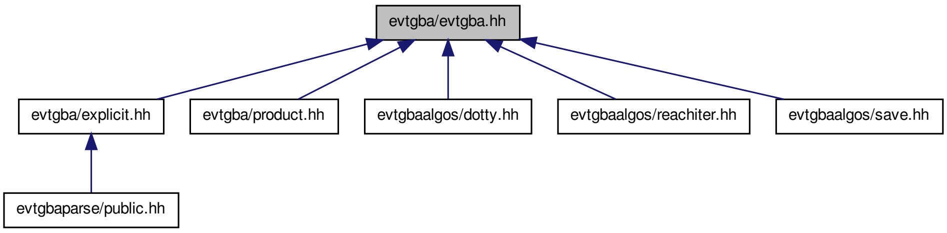
`#include "tgba/state.hh"`

`#include "evtgbaiter.hh"`

Include dependency graph for evtgba.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::evtgba

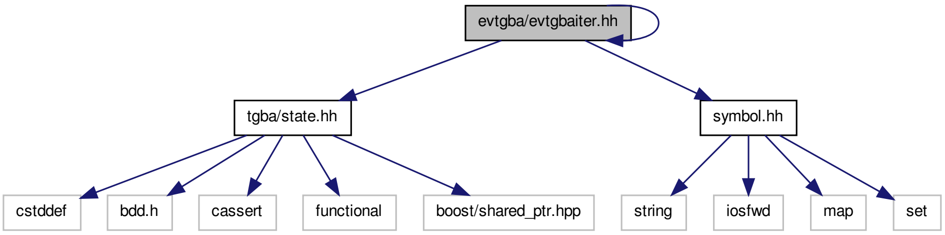
Namespaces

- namespace spot

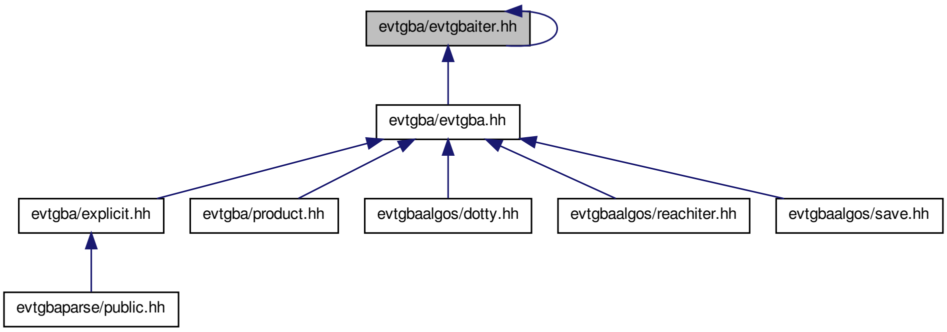
8.26 evtgba/evtgbaiter.hh File Reference

```
#include "tgba/state.hh"
#include "symbol.hh"
#include "evtgbaiter.hh"
```

Include dependency graph for evtgbaiter.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::evtgba_iterator

Namespaces

- namespace spot

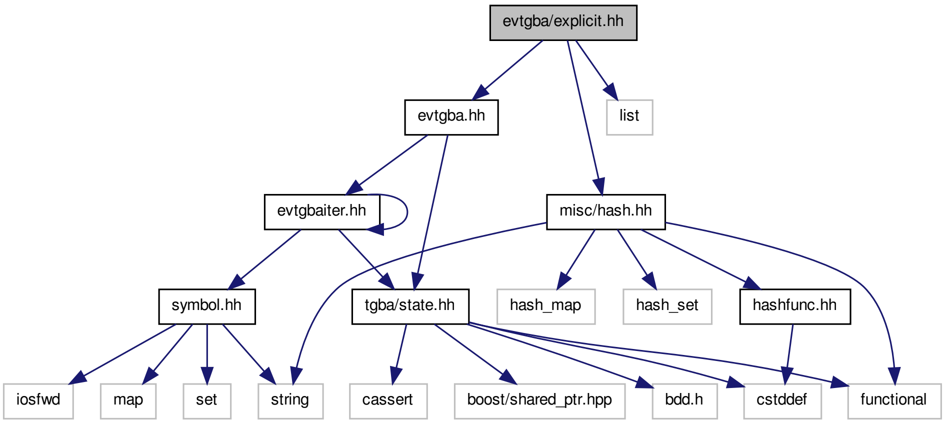
8.27 evtgba/explicit.hh File Reference

`#include "evtgba.hh"`

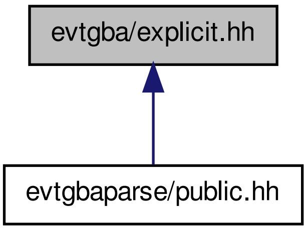
`#include <list>`

`#include "misc/hash.hh"`

Include dependency graph for explicit.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::evtgba_explicit
- struct spot::evtgba_explicit::state
- struct spot::evtgba_explicit::transition

  Explicit transitions (used by spot::evtgba_explicit).

- class spot::state_evtgba_explicit

  States used by spot::tgba_evtgba_explicit.

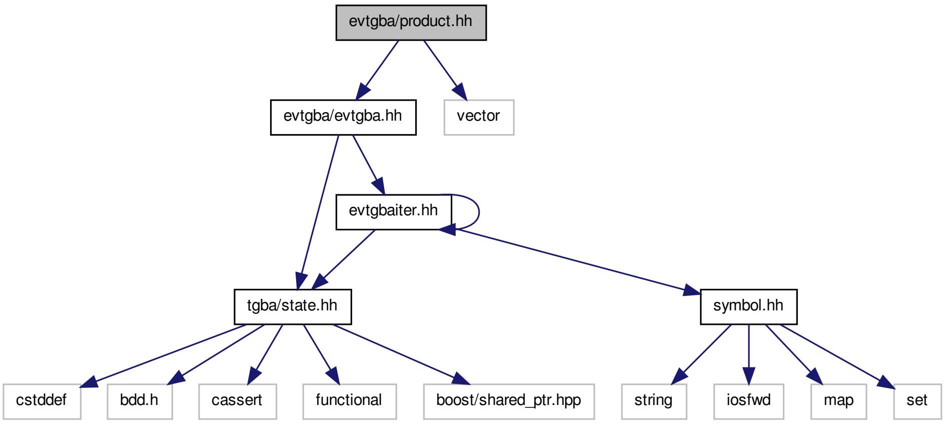
Namespaces

- namespace spot

8.28 evtgba/product.hh File Reference

```
#include "evtgba/evtgba.hh"
#include <vector>
```

Include dependency graph for product.hh:



Classes

- class spot::evtgba_product

Namespaces

- namespace spot

8.29 evtgba/symbol.hh File Reference

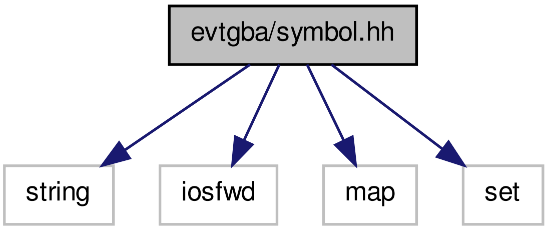
`#include <string>`

`#include <iosfwd>`

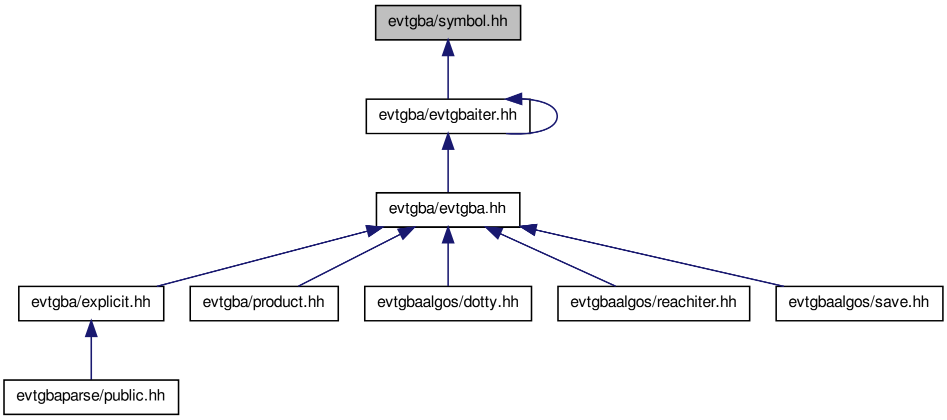
`#include <map>`

`#include <set>`

Include dependency graph for symbol.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::symbol
- class spot::rsymbol

Namespaces

- namespace spot

Typedefs

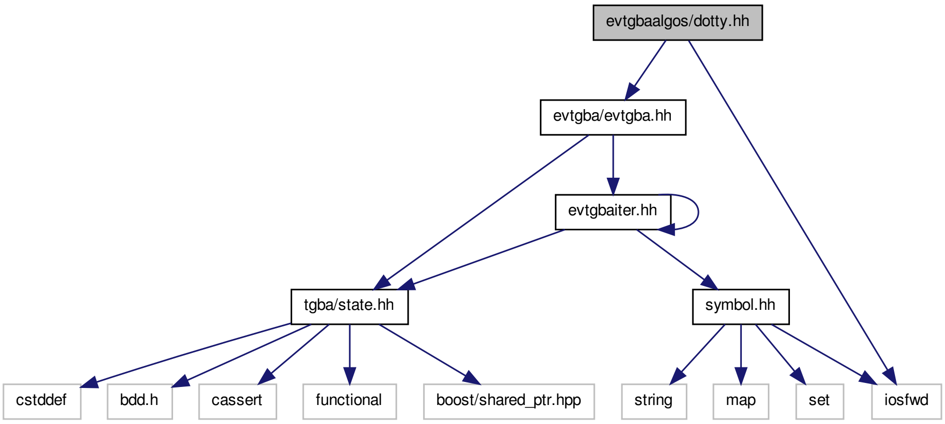
- typedef std::set< const symbol $*$ > spot::symbol_set
- typedef std::set< rsymbol > spot::rsymbol_set

8.30 evtgbaalgos/dotty.hh File Reference

`#include "evtgba/evtgba.hh"`

`#include <iosfwd>`

Include dependency graph for dotty.hh:



Namespaces

- namespace spot

Functions

- std::ostream & spot::dotty_reachable (std::ostream &os, const evtgba ∗g)

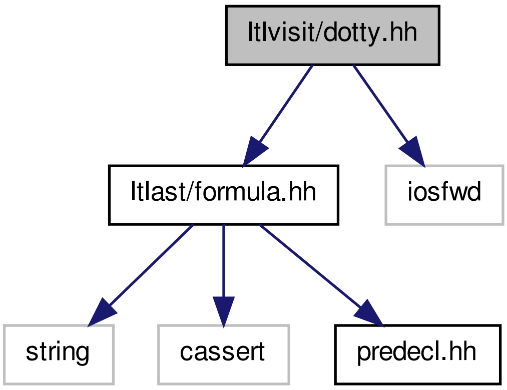
  Print reachable states in dot format.

8.31 ltlvisit/dotty.hh File Reference

`#include <ltlast/formula.hh>`

`#include <iosfwd>`

Include dependency graph for dotty.hh:



Namespaces

- namespace spot
- namespace spot::ltl

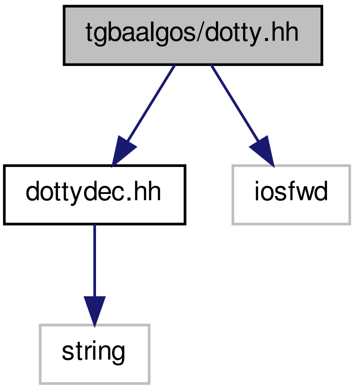
Functions

- std::ostream & spot::ltl::dotty (std::ostream &os, const formula ∗f)
  Write a formula tree using dot's syntax.

8.32 tgbaalgos/dotty.hh File Reference

```
#include "dottydec.hh"
#include <iosfwd>
```

Include dependency graph for dotty.hh:



Namespaces

- namespace spot

Functions

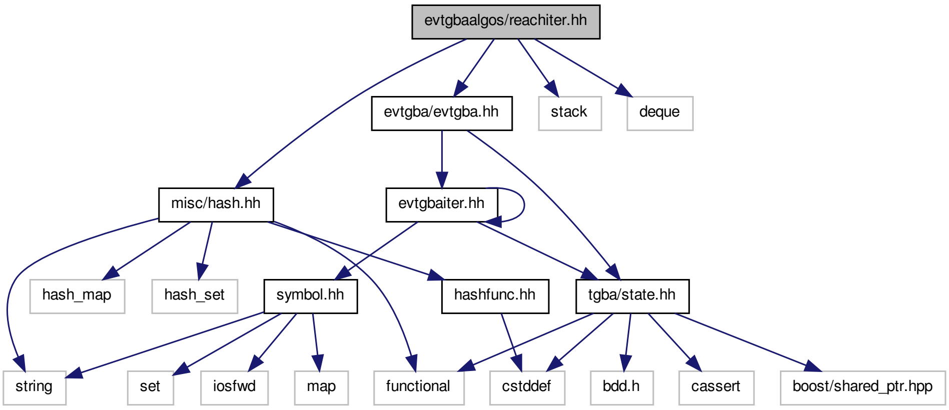
- std::ostream & spot::dotty_reachable (std::ostream &os, const tgba ∗g, dotty_decorator ∗dd=dotty_decorator::instance())

  Print reachable states in dot format.
  The dd argument allows to customize the output in various ways. See this page for a list of available decorators.

8.33 evtgbaalgos/reachiter.hh File Reference

```
#include "misc/hash.hh"
#include "evtgba/evtgba.hh"
#include <stack>
#include <deque>
```

Include dependency graph for reachiter.hh:



Classes

- class spot::evtgba_reachable_iterator

  Iterate over all reachable states of a spot::evtgba.

- class spot::evtgba_reachable_iterator_depth_first

  An implementation of spot::evtgba_reachable_iterator that browses states depth first.

- class spot::evtgba_reachable_iterator_breadth_first

  An implementation of spot::evtgba_reachable_iterator that browses states breadth first.

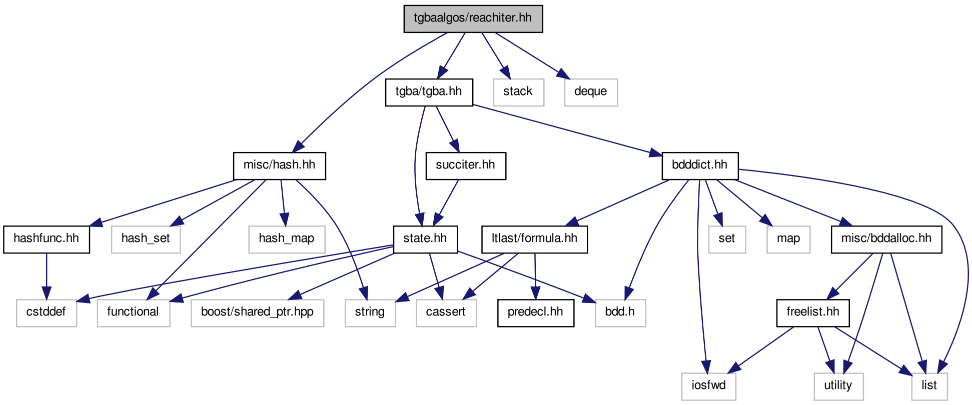
Namespaces

- namespace spot

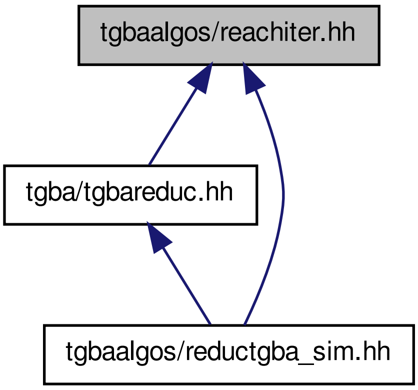
8.34 tgbaalgos/reachiter.hh File Reference

```
#include "misc/hash.hh"
#include "tgba/tgba.hh"
#include <stack>
#include <deque>
```

Include dependency graph for reachiter.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba_reachable_iterator

  Iterate over all reachable states of a spot::tgba.

- class spot::tgba_reachable_iterator_depth_first

  An implementation of spot::tgba_reachable_iterator that browses states depth first.

- class spot::tgba_reachable_iterator_breadth_first

  An implementation of spot::tgba_reachable_iterator that browses states breadth first.

Namespaces

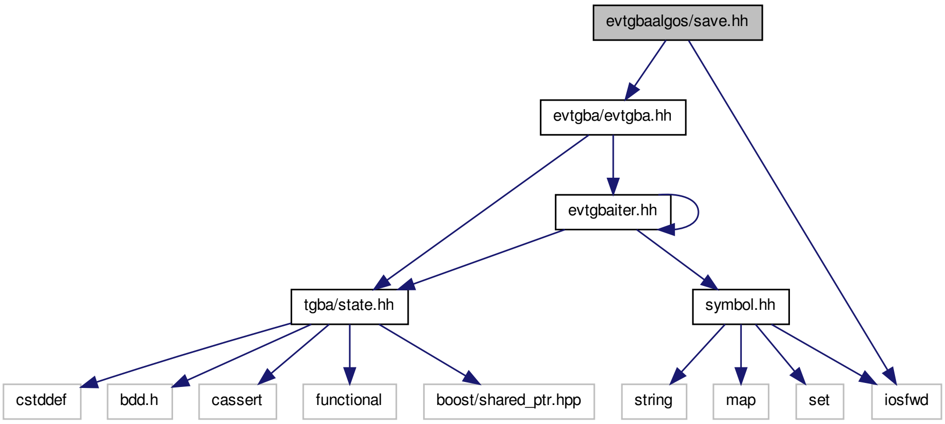
- namespace spot

8.35 evtgbaalgos/save.hh File Reference

`#include "evtgba/evtgba.hh"`

`#include <iosfwd>`

Include dependency graph for save.hh:



Namespaces

- namespace spot

Functions

- std::ostream & spot::evtgba_save_reachable (std::ostream &os, const evtgba ∗g)

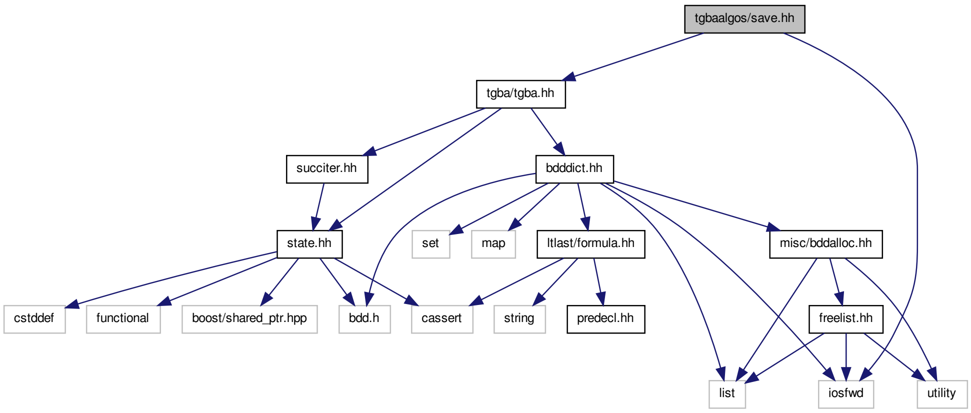
  Save reachable states in text format.

8.36 tgbaalgos/save.hh File Reference

`#include "tgba/tgba.hh"`

`#include <iosfwd>`

Include dependency graph for save.hh:



Namespaces

- namespace spot

Functions

- std::ostream & spot::tgba_save_reachable (std::ostream &os, const tgba ∗g)

  Save reachable states in text format.

8.37 evtgbaalgos/tgba2evtgba.hh File Reference

Namespaces

- namespace spot

Functions

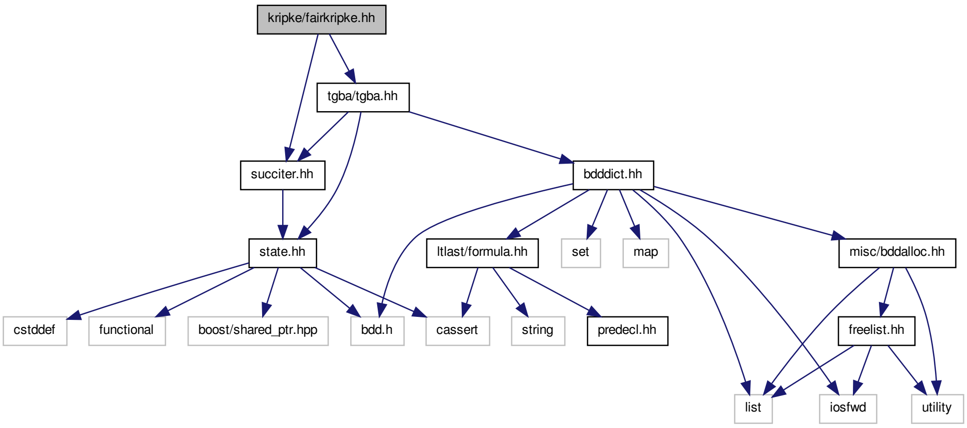
- evtgba_explicit ∗ spot::tgba_to_evtgba (const tgba ∗a)

  Convert a tgba into an evtgba.

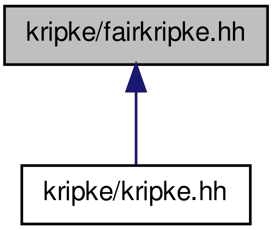
8.38 kripke/fairkripke.hh File Reference

```
#include "tgba/tgba.hh"
#include "tgba/succiter.hh"
```

Include dependency graph for fairkripke.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::fair_kripke_succ_iterator

  Iterator code for a Fair Kripke structure.
  This iterator can be used to simplify the writing of an iterator on a Fair Kripke structure (or lookalike).

- class spot::fair_kripke

  Interface for a Fair Kripke structure.
  A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition, and a set of acceptance conditions.

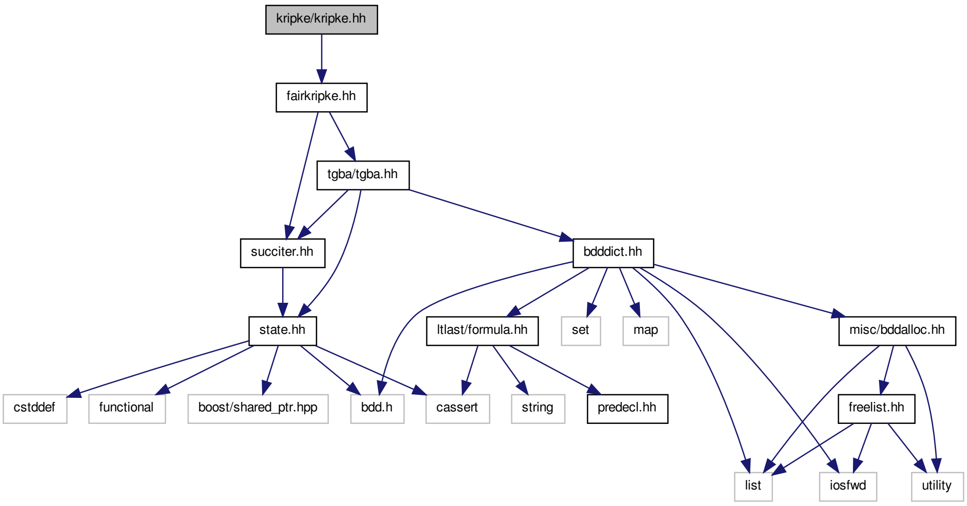
Namespaces

- namespace spot

8.39 kripke/kripke.hh File Reference

`#include "fairkripke.hh"`

Include dependency graph for kripke.hh:



Classes

- class spot::kripke_succ_iterator

  Iterator code for Kripke structure
  This iterator can be used to simplify the writing of an iterator on a Kripke structure (or lookalike).

- class spot::kripke

  Interface for a Kripke structure
  A Kripke structure is a graph in which each node (=state) is labeled by a conjunction of atomic proposition.

Namespaces

- namespace spot

8.40 ltlast/allnodes.hh File Reference

Define all LTL node types.

`#include "binop.hh"`

`#include "unop.hh"`

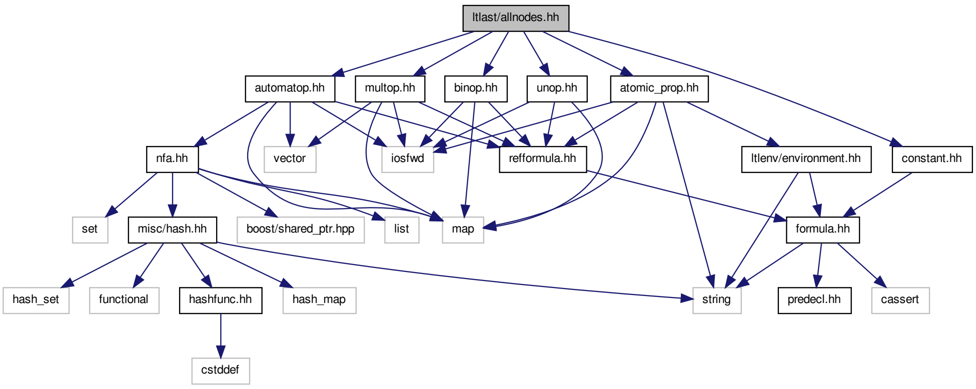
`#include "multop.hh"`

`#include "atomic_prop.hh"`

`#include "constant.hh"`

`#include "automatop.hh"`

Include dependency graph for allnodes.hh:



8.40.1 Detailed Description

Define all LTL node types. This file is usually needed when **defining** a visitor. Prefer ltlast/predecl.hh when only **declaring** methods and functions over LTL nodes.

8.41 ltlast/atomic_prop.hh File Reference

LTL atomic propositions.

`#include <string>`

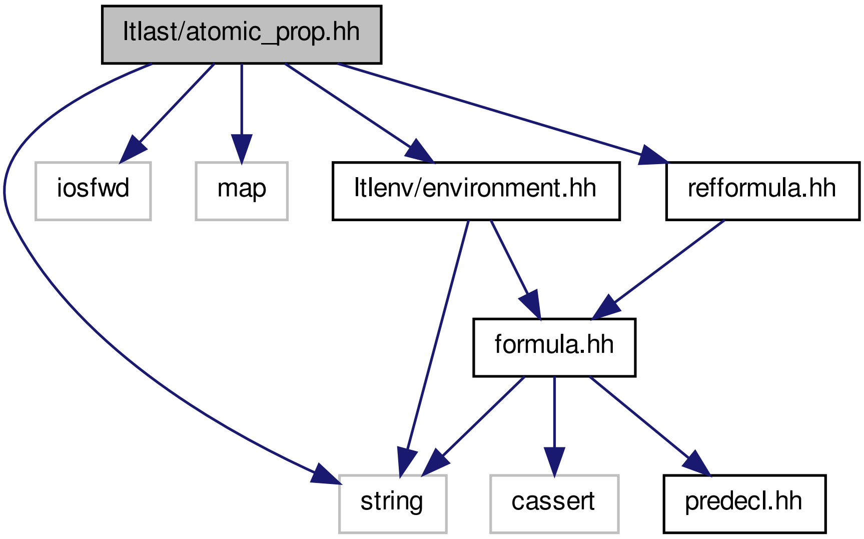
`#include <iosfwd>`

`#include <map>`

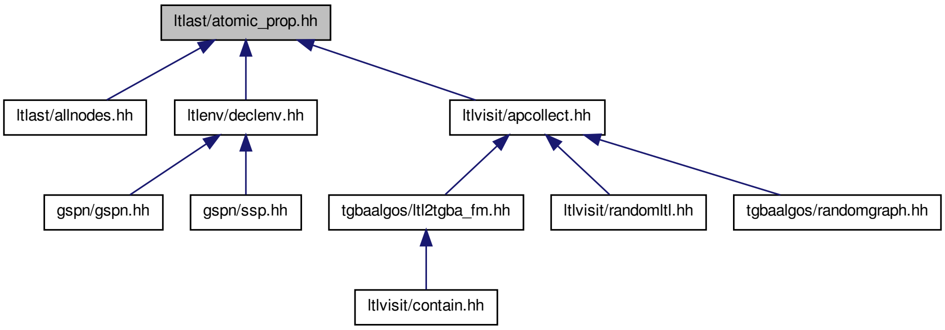
`#include "refformula.hh"`

`#include "ltlenv/environment.hh"`

Include dependency graph for atomic_prop.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::atomic_prop

  Atomic propositions.

Namespaces

- namespace spot
- namespace spot::ltl

8.41.1 Detailed Description

LTL atomic propositions.

8.42 ltlast/automatop.hh File Reference

ELTL automaton operators.

`#include <vector>`

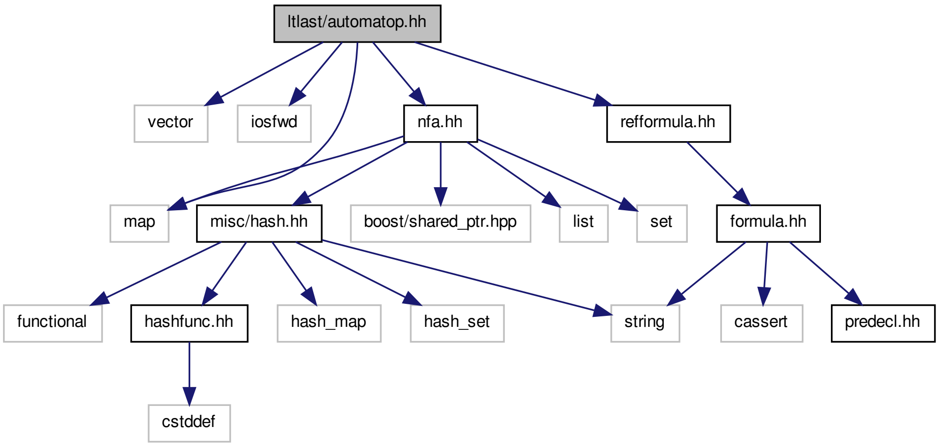
`#include <iosfwd>`

`#include <map>`

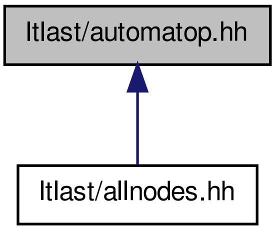
`#include "nfa.hh"`

`#include "refformula.hh"`

Include dependency graph for automatop.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::automatop

  Automaton operators.

- struct spot::ltl::automatop::tripletcmp

  Comparison functor used internally by ltl::automatop.

Namespaces

- namespace spot
- namespace spot::ltl

8.42.1 Detailed Description

ELTL automaton operators.

8.43 ltlast/binop.hh File Reference

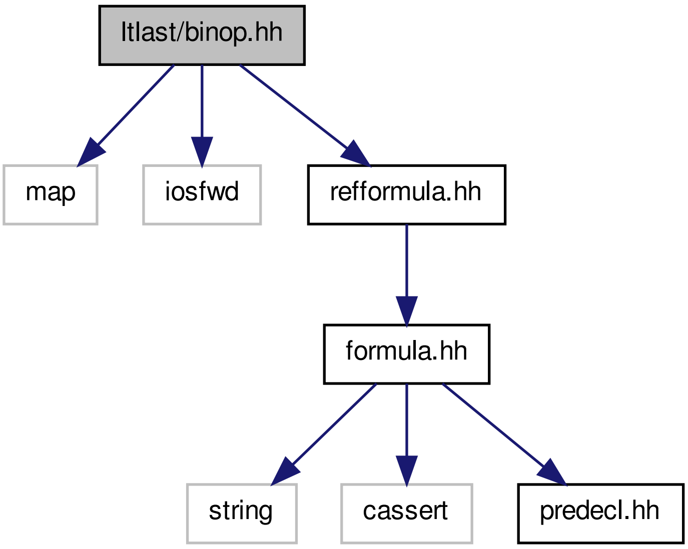
LTL binary operators.

`#include <map>`

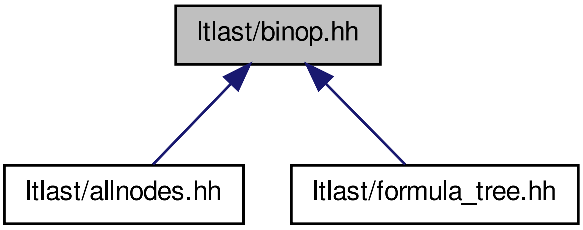
`#include <iosfwd>`

`#include "refformula.hh"`

Include dependency graph for binop.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::binop

  Binary operator.

Namespaces

- namespace spot
- namespace spot::ltl

8.43.1 Detailed Description

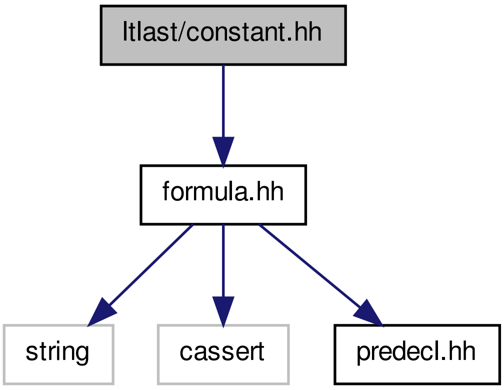
LTL binary operators. This does not include `AND` and `OR` operators. These are considered to be multi-operand operators (see spot::ltl::multop).

8.44 ltlast/constant.hh File Reference

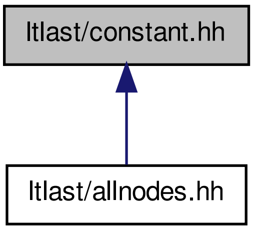
LTL constants.

`#include "formula.hh"`

Include dependency graph for constant.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::constant

  A constant (True or False).

Namespaces

- namespace spot
- namespace spot::ltl

8.44.1 Detailed Description

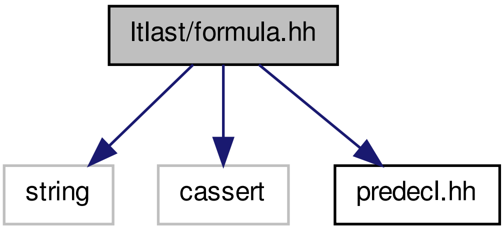
LTL constants.

8.45 ltlast/formula.hh File Reference

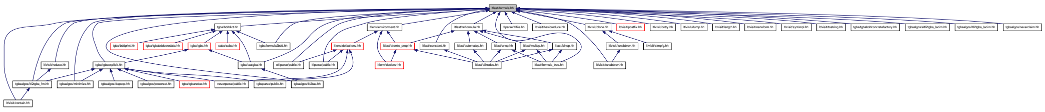
LTL formula interface.

```
#include <string>
#include <cassert>
#include "predecl.hh"
```

Include dependency graph for formula.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::formula

  An LTL formula.
  The only way you can work with a formula is to build a spot::ltl::visitor or spot::ltl::const_visitor.

- struct spot::ltl::formula_ptr_less_than

  Strict Weak Ordering for `const formula*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `const formula*`*.*

- struct spot::ltl::formula_ptr_hash

  Hash Function for `const formula*`*.*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `const formula*`*.*

Namespaces

- namespace spot
- namespace spot::ltl

8.45.1 Detailed Description

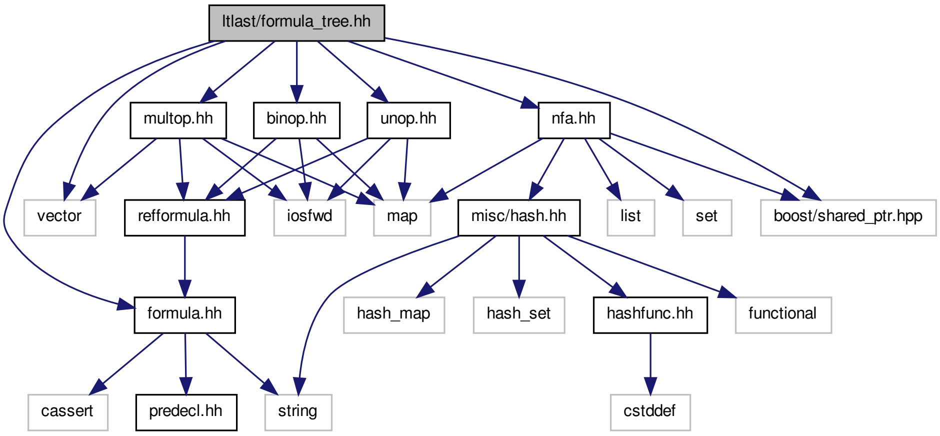
LTL formula interface.

8.46 ltlast/formula_tree.hh File Reference

Trees representing formulae where atomic propositions are unknown.

```
#include <vector>
#include <boost/shared_ptr.hpp>
#include "formula.hh"
#include "multop.hh"
#include "binop.hh"
#include "unop.hh"
#include "nfa.hh"
```

Include dependency graph for formula_tree.hh:



Classes

- struct spot::ltl::formula_tree::node
- struct spot::ltl::formula_tree::node_unop
- struct spot::ltl::formula_tree::node_binop
- struct spot::ltl::formula_tree::node_multop
- struct spot::ltl::formula_tree::node_nfa
- struct spot::ltl::formula_tree::node_atomic

Namespaces

- namespace spot
- namespace spot::ltl
- namespace spot::ltl::formula_tree

  Trees representing formulae where atomic propositions are unknown.

Typedefs

- typedef boost::shared_ptr< node > spot::ltl::formula_tree::node_ptr

  We use boost::shared_ptr to easily handle deletion.

Enumerations

- enum { spot::ltl::formula_tree::True = -1, spot::ltl::formula_tree::False = -2 }

  Integer values for True and False used in node_atomic.

Functions

- formula $*$ spot::ltl::formula_tree::instanciate (const node_ptr np, const std::vector< formula $*$ > &v)
- size_t spot::ltl::formula_tree::arity (const node_ptr np)

  Get the arity.

8.46.1 Detailed Description

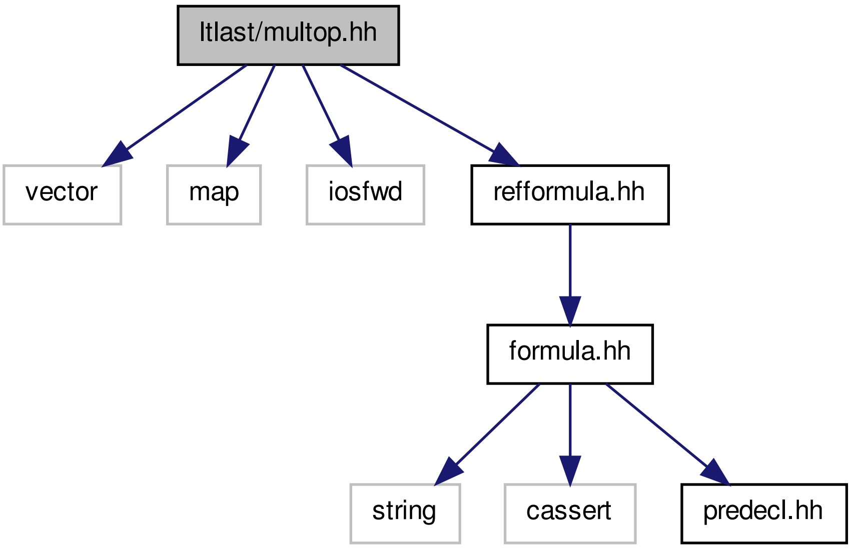
Trees representing formulae where atomic propositions are unknown.

8.47 ltlast/multop.hh File Reference

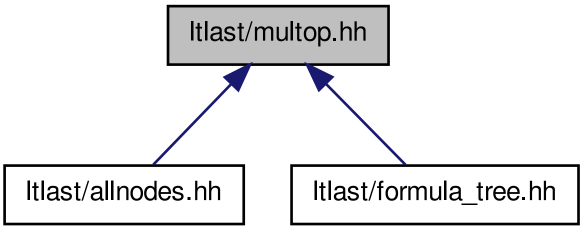
LTL multi-operand operators.

```
#include <vector>
#include <map>
#include <iosfwd>
#include "refformula.hh"
```

Include dependency graph for multop.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::multop

  Multi-operand operators.
  These operators are considered commutative and associative.

- struct spot::ltl::multop::paircmp

Comparison functor used internally by ltl::multop.

Namespaces

- namespace spot
- namespace spot::ltl

8.47.1 Detailed Description

LTL multi-operand operators.

8.48 ltlast/nfa.hh File Reference

NFA interface used by automatop.

`#include "misc/hash.hh"`

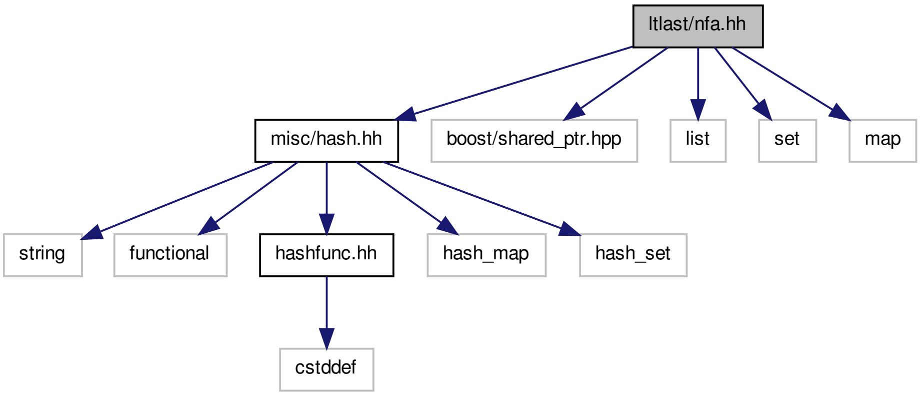
`#include <boost/shared_ptr.hpp>`

`#include <list>`

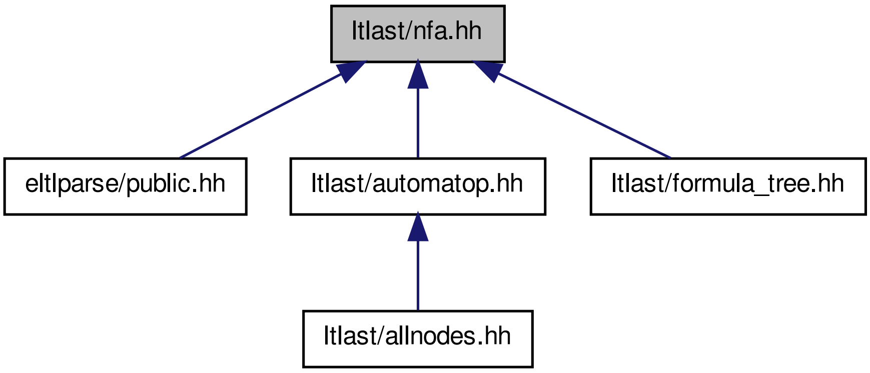
`#include <set>`

`#include <map>`

Include dependency graph for nfa.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::nfa

  Nondeterministic Finite Automata used by automata operators.

- struct spot::ltl::nfa::transition

  Explicit transitions.

- class spot::ltl::succ_iterator

Namespaces

- namespace spot
- namespace spot::ltl
- namespace spot::ltl::formula_tree

  Trees representing formulae where atomic propositions are unknown.

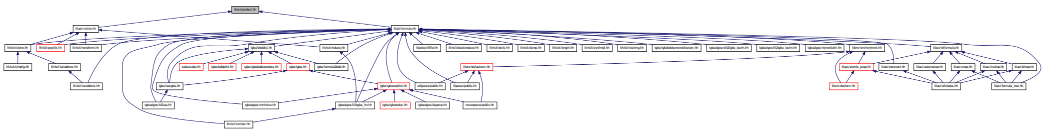
8.48.1 Detailed Description

NFA interface used by automatop.

8.49 ltlast/predecl.hh File Reference

Predeclare all LTL node types.

This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot
- namespace spot::ltl

8.49.1 Detailed Description

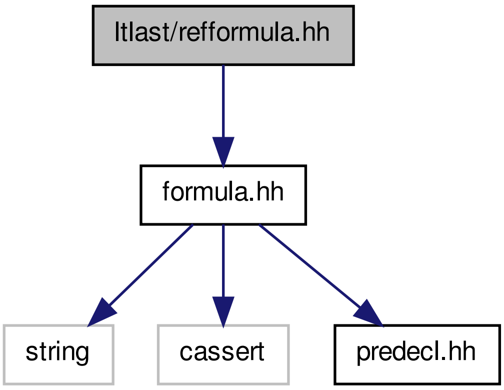
Predeclare all LTL node types. This file is usually used when **declaring** methods and functions over LTL nodes. Use ltlast/allnodes.hh or an individual header when the definition of the node is actually needed.

8.50 ltlast/refformula.hh File Reference

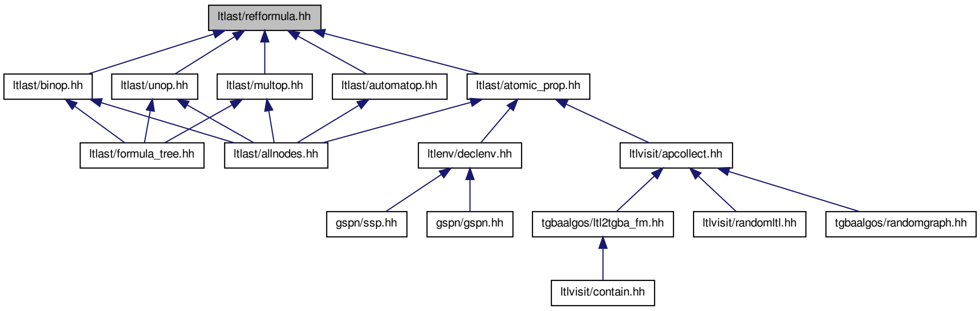
Reference-counted LTL formulae.

`#include "formula.hh"`

Include dependency graph for refformula.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::ref_formula

  A reference-counted LTL formula.

Namespaces

- namespace spot
- namespace spot::ltl

8.50.1 Detailed Description

Reference-counted LTL formulae.

8.51 ltlast/unop.hh File Reference

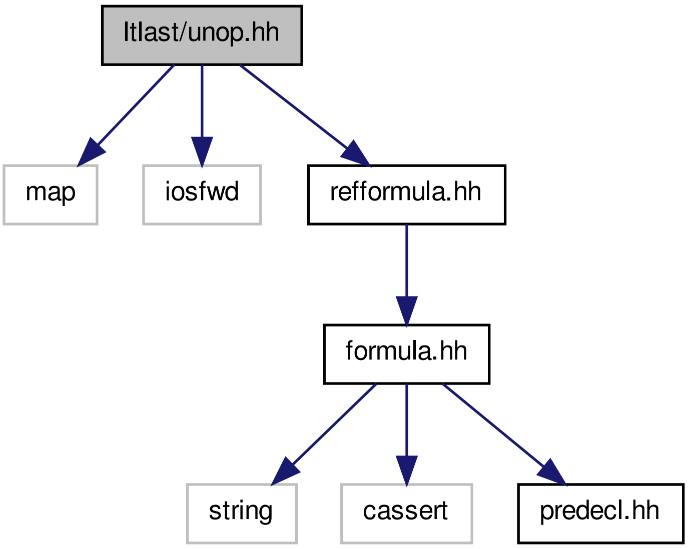
LTL unary operators.

`#include <map>`

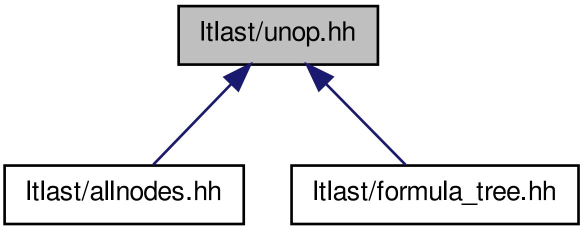
`#include <iosfwd>`

`#include "refformula.hh"`

Include dependency graph for unop.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::unop

  Unary operators.

Namespaces

- namespace spot
- namespace spot::ltl

8.51.1 Detailed Description

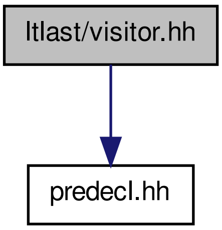
LTL unary operators.

8.52 ltlast/visitor.hh File Reference

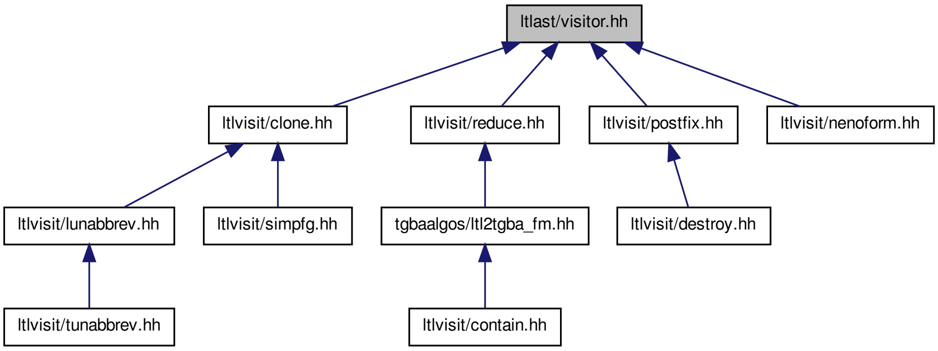
LTL visitor interface.

`#include "predecl.hh"`

Include dependency graph for visitor.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::ltl::visitor

  Formula visitor that can modify the formula.
  Writing visitors is the prefered way to traverse a formula, since it doesn't involve any cast.

- struct spot::ltl::const_visitor

  Formula visitor that cannot modify the formula.

Namespaces

- namespace spot
- namespace spot::ltl

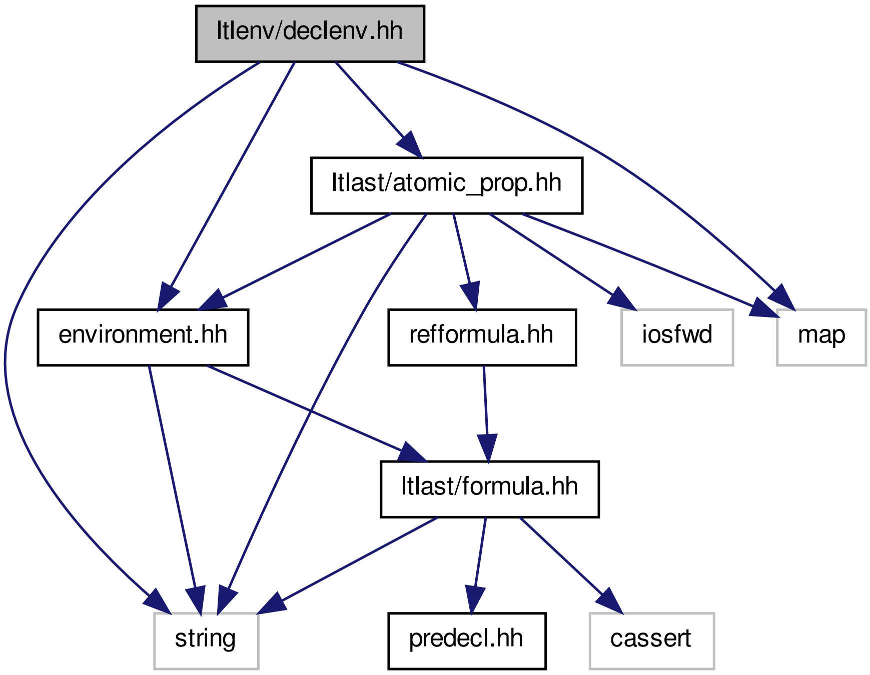
8.52.1 Detailed Description

LTL visitor interface.

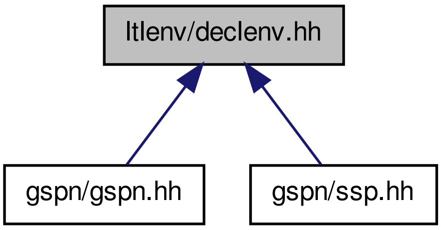
8.53 ltlenv/declenv.hh File Reference

```
#include "environment.hh"
#include <string>
#include <map>
#include "ltlast/atomic_prop.hh"
```

Include dependency graph for declenv.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::declarative_environment

A declarative environment.
This environment recognizes all atomic propositions that have been previously declared. It will reject other.

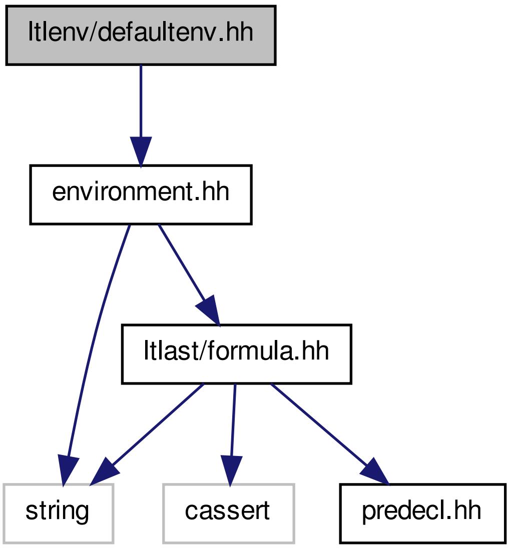
Namespaces

- namespace spot
- namespace spot::ltl

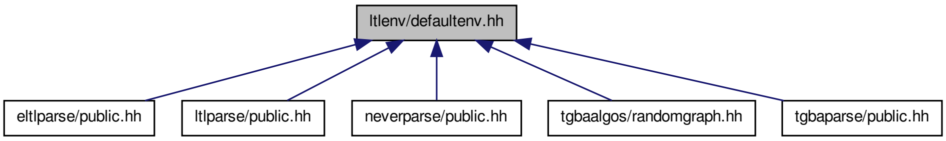
8.54 ltlenv/defaultenv.hh File Reference

`#include "environment.hh"`

Include dependency graph for defaultenv.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::default_environment

  A laxist environment.
  This environment recognizes all atomic propositions.

Namespaces

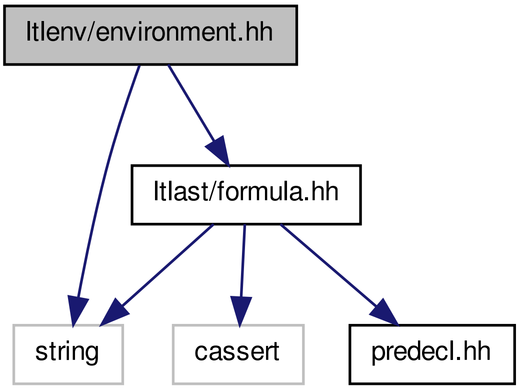
- namespace spot
- namespace spot::ltl

8.55 ltlenv/environment.hh File Reference

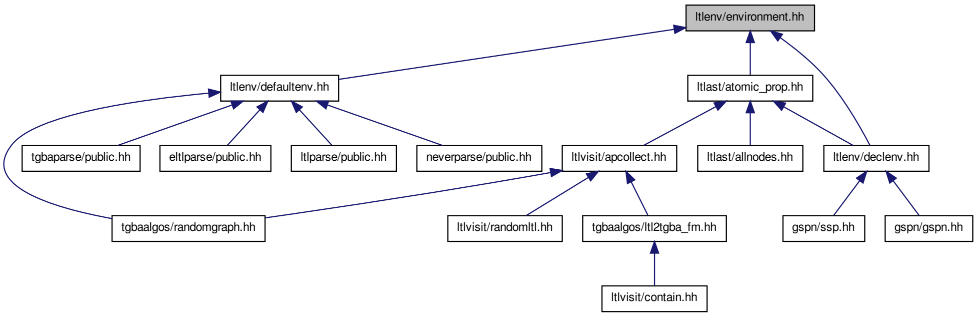
`#include "ltlast/formula.hh"`

`#include <string>`

Include dependency graph for environment.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::environment

  An environment that describes atomic propositions.

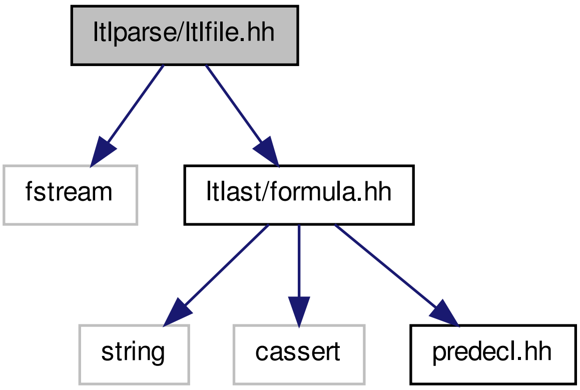
Namespaces

- namespace spot
- namespace spot::ltl

8.56 ltlparse/ltlfile.hh File Reference

```
#include <fstream>
#include "ltlast/formula.hh"
```

Include dependency graph for ltlfile.hh:



Classes

- class spot::ltl::ltl_file

    Read LTL formulae from a file, one by one.

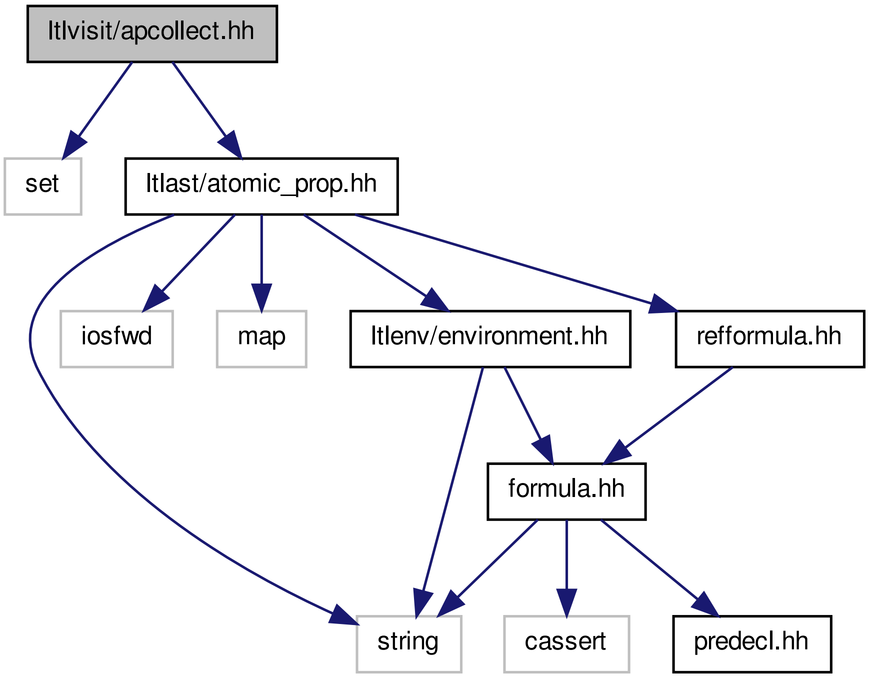
Namespaces

- namespace spot
- namespace spot::ltl

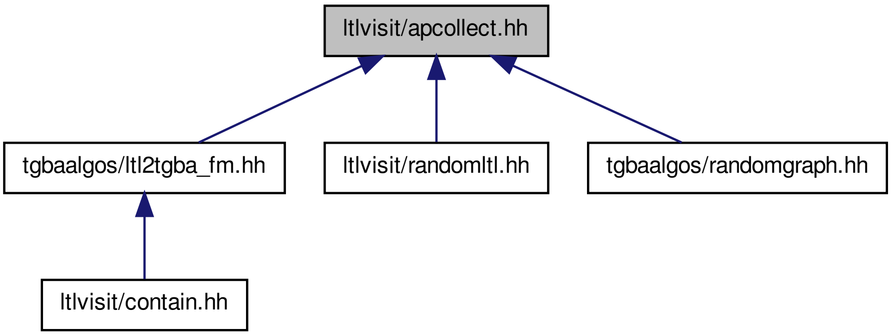
8.57 ltlvisit/apcollect.hh File Reference

```
#include <set>
#include "ltlast/atomic_prop.hh"
```

Include dependency graph for apcollect.hh:



This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot
- namespace spot::ltl

Typedefs

- typedef std::set< atomic_prop ∗, formula_ptr_less_than > spot::ltl::atomic_prop_set

  Set of atomic propositions.

Functions

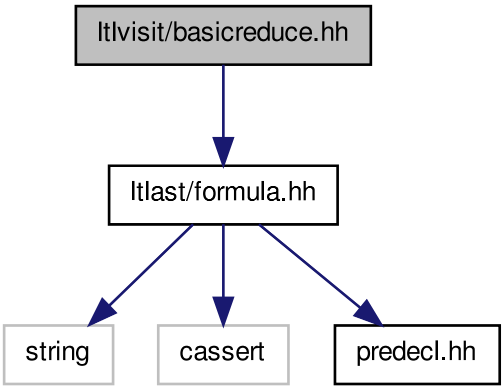
- atomic_prop_set ∗ spot::ltl::atomic_prop_collect (const formula ∗f, atomic_prop_set ∗s=0)

  Return the set of atomic propositions occurring in a formula.

8.58 ltlvisit/basicreduce.hh File Reference

```
#include "ltlast/formula.hh"
```

Include dependency graph for basicreduce.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

- formula ∗ spot::ltl::basic_reduce (const formula ∗f)

  Basic rewritings.

- bool spot::ltl::is_GF (const formula ∗f)

  Whether a formula starts with GF.

- bool spot::ltl::is_FG (const formula ∗f)

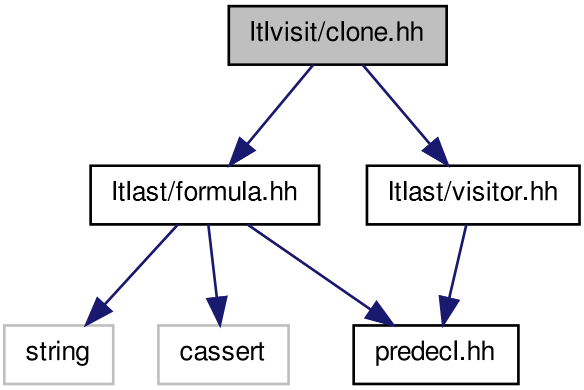
  Whether a formula starts with FG.

8.59 ltlvisit/clone.hh File Reference

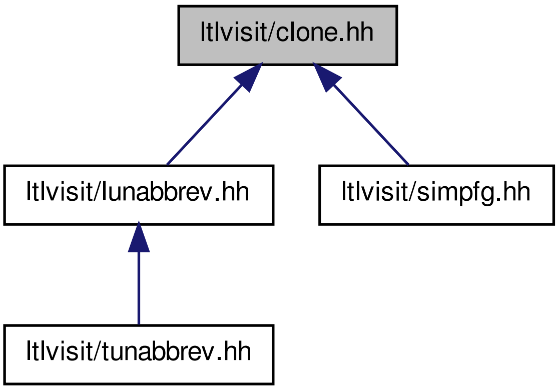
`#include "ltlast/formula.hh"`

`#include "ltlast/visitor.hh"`

Include dependency graph for clone.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::clone_visitor

  Clone a formula.
  This visitor is public, because it's convenient to derive from it and override part of its methods. But if you just want the functionality, consider using spot::ltl::formula::clone instead, it is way faster.

Namespaces

- namespace spot
- namespace spot::ltl

Functions

- formula ∗ spot::ltl::clone (const formula ∗f)

  Clone a formula.

8.60 ltlvisit/contain.hh File Reference

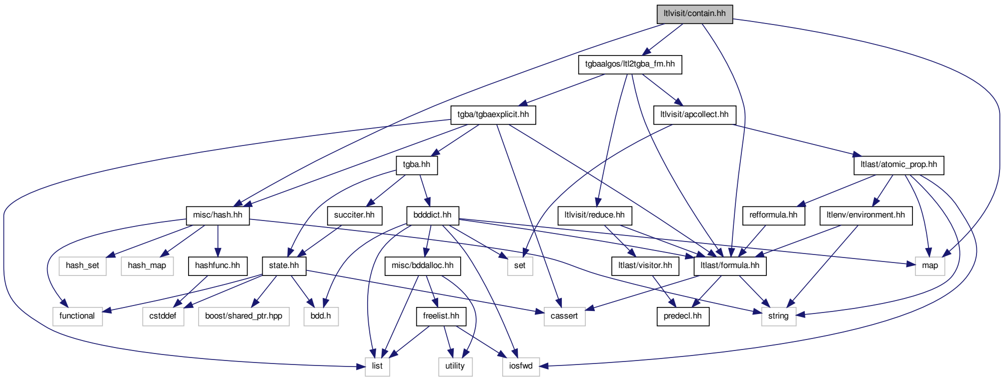
`#include "ltlast/formula.hh"`

`#include "tgbaalgos/ltl2tgba_fm.hh"`

`#include "misc/hash.hh"`

`#include <map>`

Include dependency graph for contain.hh:



Classes

- class spot::ltl::language_containment_checker
- struct spot::ltl::language_containment_checker::record_

Namespaces

- namespace spot
- namespace spot::ltl

Functions

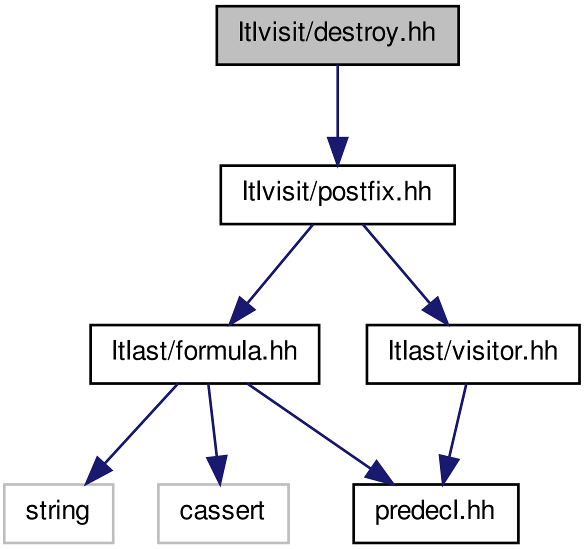
- formula $*$ spot::ltl::reduce_tau03 (const formula $*$f, bool stronger=true)

  Reduce a formula using language containment relationships.

8.61 ltlvisit/destroy.hh File Reference

```
#include "ltlvisit/postfix.hh"
```

Include dependency graph for destroy.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

- void spot::ltl::destroy (const formula ∗f)

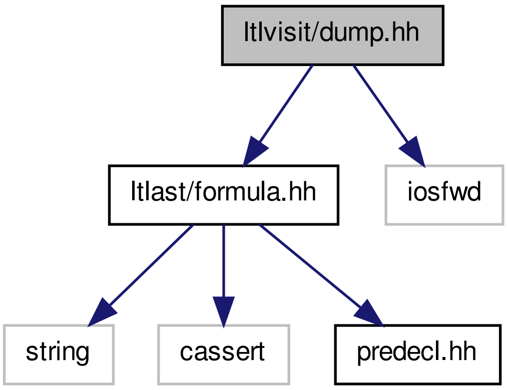
  Destroys a formula.

8.62 ltlvisit/dump.hh File Reference

`#include "ltlast/formula.hh"`

`#include <iosfwd>`

Include dependency graph for dump.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

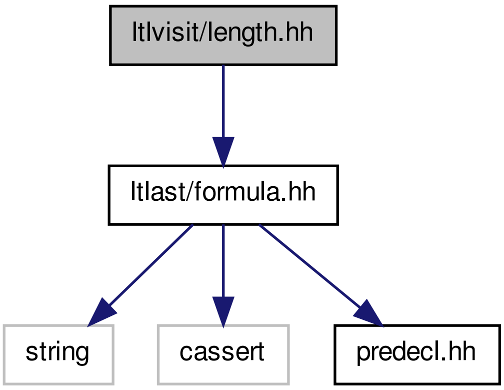
- std::ostream & spot::ltl::dump (std::ostream &os, const formula ∗f)

  Dump a formula tree.

8.63 ltlvisit/length.hh File Reference

```
#include "ltlast/formula.hh"
```

Include dependency graph for length.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

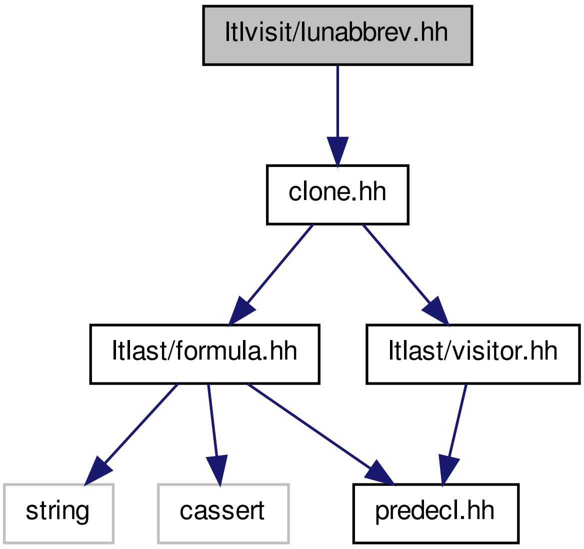
- int spot::ltl::length (const formula ∗f)

  Compute the length of a formula.
  The length of a formula is the number of atomic properties, constants, and operators (logical and temporal) occurring in the formula. spot::ltl::multops count only for 1, even if they have more than two operands (e.g. `a | b | c` *has length 4, because* | *is represented once internally).*

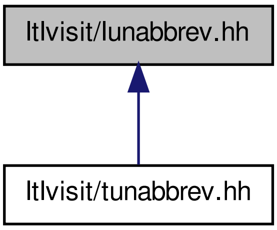
8.64 ltlvisit/lunabbrev.hh File Reference

```
#include "clone.hh"
```

Include dependency graph for lunabbrev.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::unabbreviate_logic_visitor

  Clone and rewrite a formula to remove most of the abbreviated logical operators.
  This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

Namespaces

- namespace spot
- namespace spot::ltl

Functions

- formula ∗ spot::ltl::unabbreviate_logic (const formula ∗f)

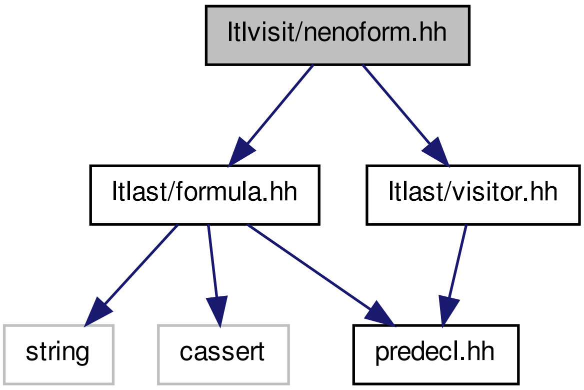
  Clone and rewrite a formula to remove most of the abbreviated logical operators.
  This will rewrite binary operators such as binop::Implies, binop::Equals, and binop::Xor, using only unop::Not, multop::Or, and multop::And.

8.65 ltlvisit/nenoform.hh File Reference

`#include "ltlast/formula.hh"`

`#include "ltlast/visitor.hh"`

Include dependency graph for nenoform.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

- formula ∗ spot::ltl::negative_normal_form (const formula ∗f, bool negated=false)

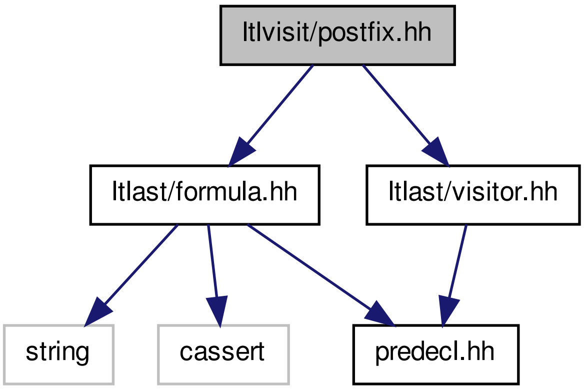
  Build the negative normal form of f.
  All negations of the formula are pushed in front of the atomic propositions.

8.66 ltlvisit/postfix.hh File Reference

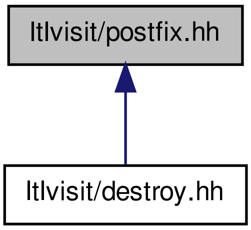
`#include "ltlast/formula.hh"`

`#include "ltlast/visitor.hh"`

Include dependency graph for postfix.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::ltl::postfix_visitor

  Apply an algorithm on each node of an AST, during a postfix traversal.
  Override one or more of the postifix_visitor::doit methods with the algorithm to apply.

Namespaces

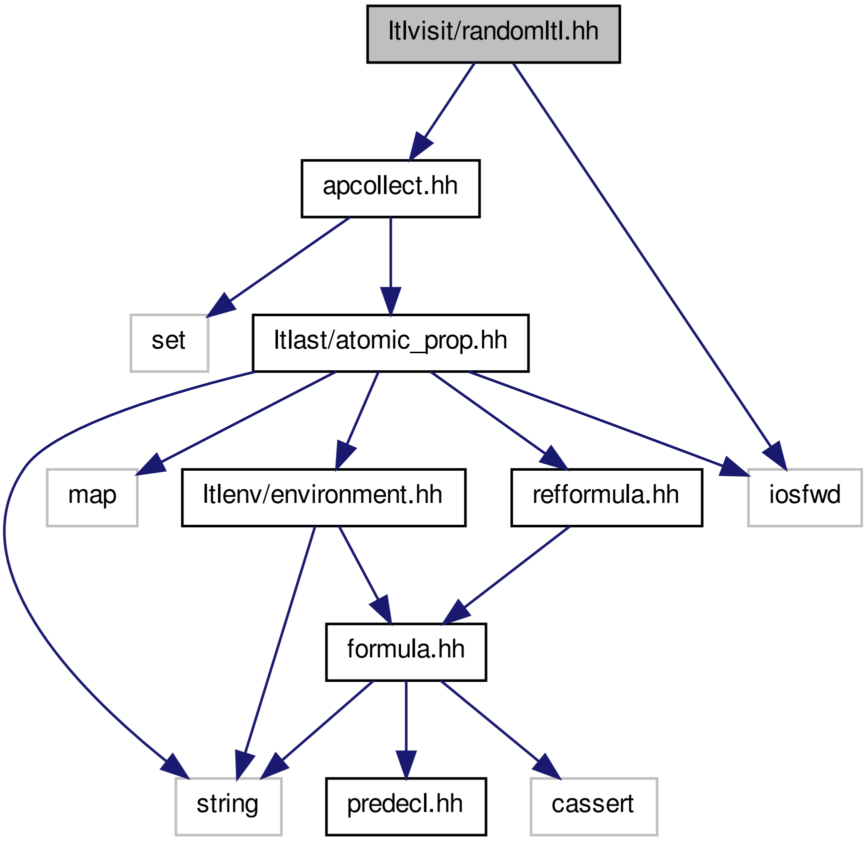
- namespace spot
- namespace spot::ltl

8.67 ltlvisit/randomltl.hh File Reference

`#include "apcollect.hh"`

`#include <iosfwd>`

Include dependency graph for randomltl.hh:



Classes

- class spot::ltl::random_ltl
  Generate random LTL formulae.

This class recursively construct LTL formulae of a given size. The formulae will use the use atomic propositions from the set of proposition passed to the constructor, in addition to the constant and all LTL operators supported by Spot.

- struct spot::ltl::random_ltl::op_proba

Namespaces

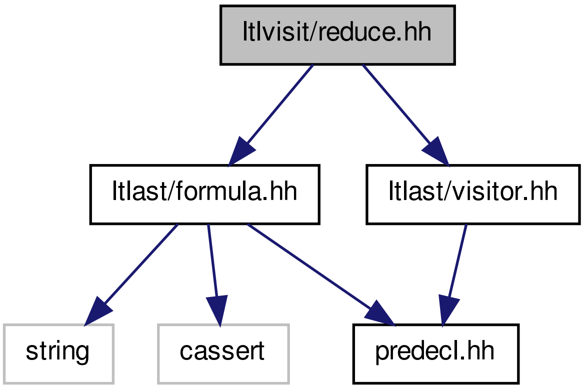
- namespace spot
- namespace spot::ltl

8.68 ltlvisit/reduce.hh File Reference

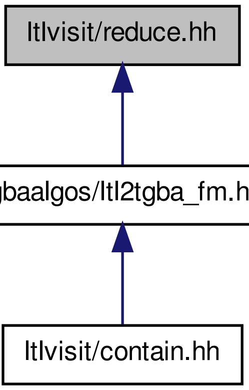
`#include "ltlast/formula.hh"`

`#include "ltlast/visitor.hh"`

Include dependency graph for reduce.hh:



This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot
- namespace spot::ltl

Enumerations

- enum spot::ltl::reduce_options {

  spot::ltl::Reduce_None = 0, spot::ltl::Reduce_Basics = 1, spot::ltl::Reduce_Syntactic_Implications = 2, spot::ltl::Reduce_Eventuality_And_Universality = 4,

  spot::ltl::Reduce_Containment_Checks = 8, spot::ltl::Reduce_Containment_Checks_Stronger = 16, spot::ltl::Reduce_All = -1U }

  Options for spot::ltl::reduce.

Functions

- formula ∗ spot::ltl::reduce (const formula ∗f, int opt=Reduce_All)

  Reduce a formula f.

- bool spot::ltl::is_eventual (const formula ∗f)

  Check whether a formula is a pure eventuality.
  Pure eventuality formulae are defined in.

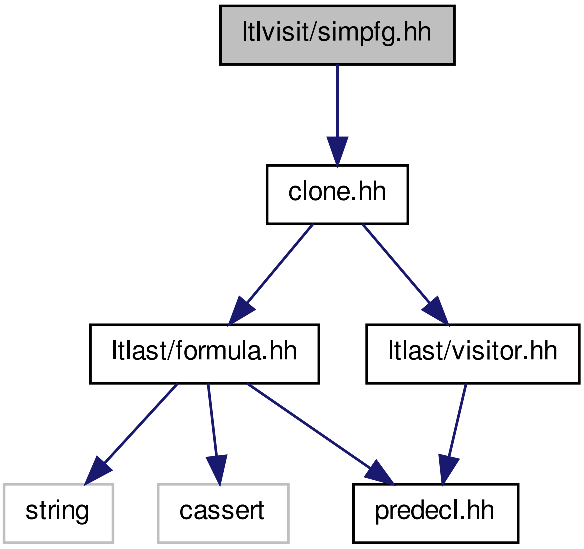
- bool spot::ltl::is_universal (const formula ∗f)

  Check whether a formula is purely universal.
  Purely universal formulae are defined in.

8.69 ltlvisit/simpfg.hh File Reference

`#include "clone.hh"`

Include dependency graph for simpfg.hh:



Classes

- class spot::ltl::simplify_f_g_visitor

  Replace `true U f` *and* `false R g` *by* `F f` *and* `G g`*.*

Namespaces

- namespace spot
- namespace spot::ltl

Functions

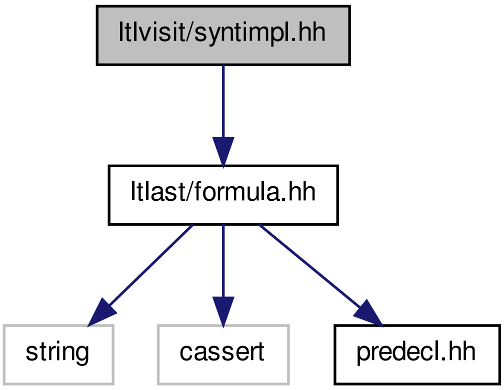
- formula ∗ spot::ltl::simplify_f_g (const formula ∗f)

  Replace `true U f` *and* `false R g` *by* `F f` *and* `G g`*.*

8.70 ltlvisit/syntimpl.hh File Reference

`#include "ltlast/formula.hh"`

Include dependency graph for syntimpl.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

- bool spot::ltl::syntactic_implication (const formula ∗f1, const formula ∗f2)

  Syntactic implication.
  This comes from.

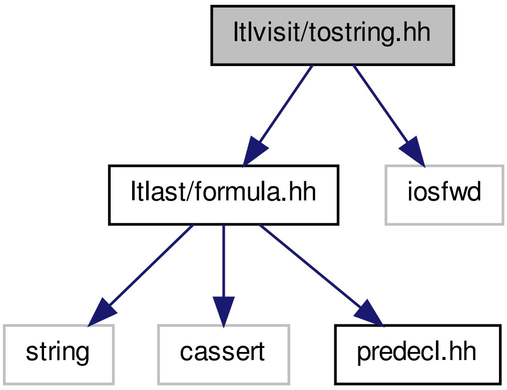
- bool spot::ltl::syntactic_implication_neg (const formula ∗f1, const formula ∗f2, bool right)

  Syntactic implication.
  If right==false, true if !f1 < f2, false otherwise. If right==true, true if f1 < !f2, false otherwise.

8.71 ltlvisit/tostring.hh File Reference

```
#include <ltlast/formula.hh>
#include <iosfwd>
```

Include dependency graph for tostring.hh:



Namespaces

- namespace spot
- namespace spot::ltl

Functions

- std::ostream & spot::ltl::to_string (const formula ∗f, std::ostream &os, bool full_parent=false)

  Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

- std::string spot::ltl::to_string (const formula ∗f, bool full_parent=false)

  Output a formula as a string which is parsable unless the formula contains automaton operators (used in ELTL formulae).

- std::ostream & spot::ltl::to_spin_string (const formula ∗f, std::ostream &os, bool full_parent=false)

  Output a formula as a (parsable by Spin) string.

- std::string spot::ltl::to_spin_string (const formula ∗f, bool full_parent=false)

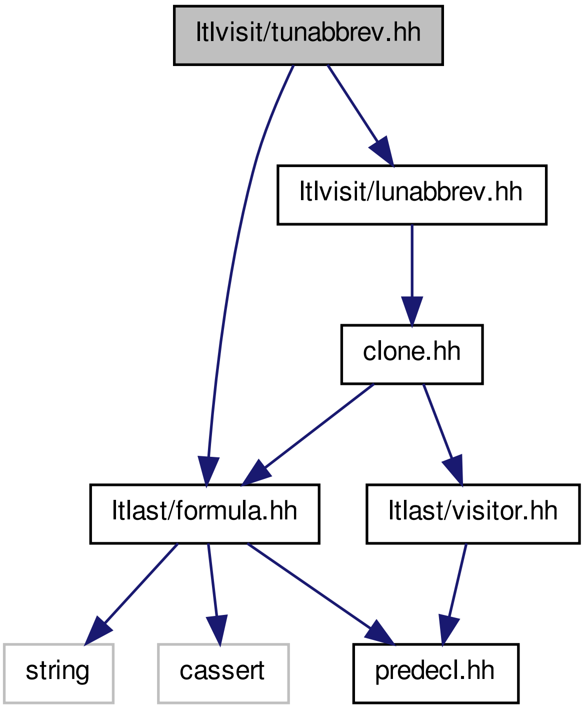
  Convert a formula into a (parsable by Spin) string.

8.72 ltlvisit/tunabbrev.hh File Reference

`#include "ltlast/formula.hh"`

`#include "ltlvisit/lunabbrev.hh"`

Include dependency graph for tunabbrev.hh:



Classes

- class spot::ltl::unabbreviate_ltl_visitor

  Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.
  The rewriting performed on logical operator is the same as the one done by spot::ltl::unabbreviate_logic_visitor.

Namespaces

- namespace spot
- namespace spot::ltl

Functions

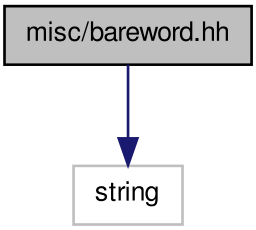
- formula ∗ spot::ltl::unabbreviate_ltl (const formula ∗f)

  Clone and rewrite a formula to remove most of the abbreviated LTL and logical operators.

8.73 misc/bareword.hh File Reference

`#include <string>`

Include dependency graph for bareword.hh:



Namespaces

- namespace spot

Functions

- bool spot::is_bare_word (const char ∗str)
- std::string spot::quote_unless_bare_word (const std::string &str)

    Double-quote words that are not bare.

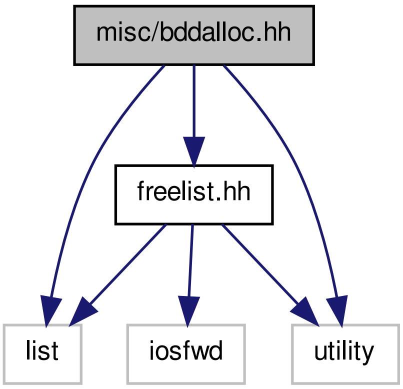
8.74 misc/bddalloc.hh File Reference

`#include "freelist.hh"`

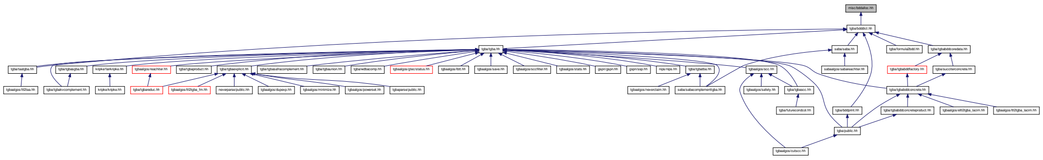
`#include <list>`

`#include <utility>`

Include dependency graph for bddalloc.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::bdd_allocator

  Manage ranges of variables.

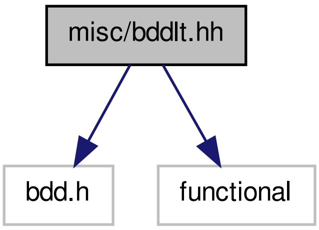
Namespaces

- namespace spot

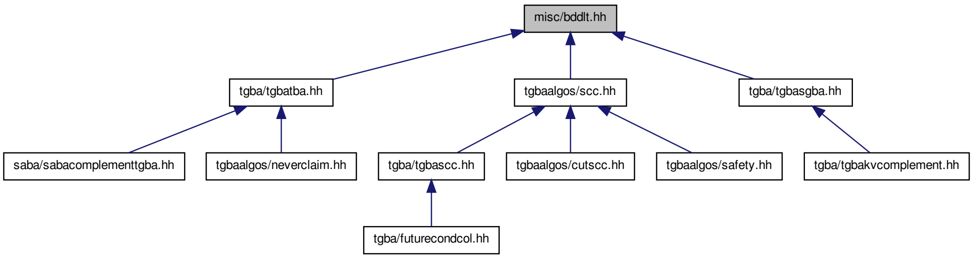
8.75 misc/bddlt.hh File Reference

```
#include <bdd.h>
#include <functional>
```

Include dependency graph for bddlt.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::bdd_less_than

  Comparison functor for BDDs.

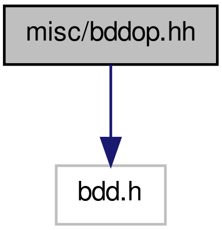
Namespaces

- namespace spot

8.76 misc/bddop.hh File Reference

`#include "bdd.h"`

Include dependency graph for bddop.hh:



Namespaces

- namespace spot

Functions

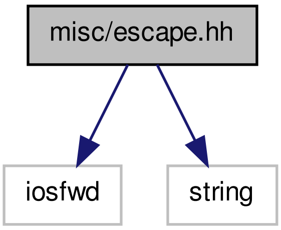
- bdd spot::compute_all_acceptance_conditions (bdd neg_acceptance_conditions)
  Compute all acceptance conditions from all neg acceptance conditions.
- bdd spot::compute_neg_acceptance_conditions (bdd all_acceptance_conditions)
  Compute neg acceptance conditions from all acceptance conditions.

8.77 misc/escape.hh File Reference

`#include <iosfwd>`

`#include <string>`

Include dependency graph for escape.hh:



Namespaces

- namespace spot

Functions

- std::ostream & spot::escape_str (std::ostream &os, const std::string &str)

  Escape " and \ characters in str.

- std::string spot::escape_str (const std::string &str)

  Escape " and \ characters in str.

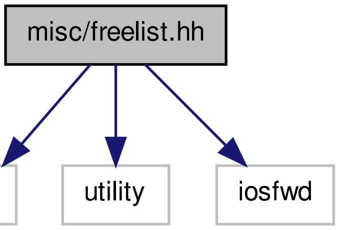
8.78 misc/freelist.hh File Reference

`#include <list>`

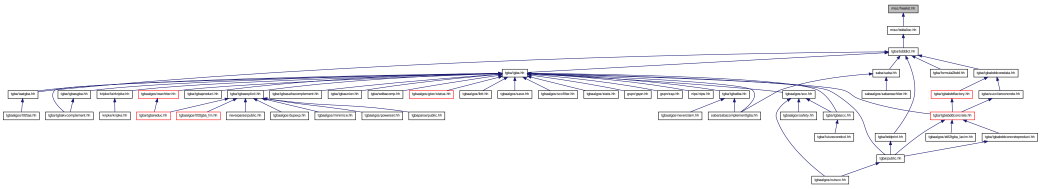
`#include <utility>`

`#include <iosfwd>`

Include dependency graph for freelist.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::free_list

Manage list of free integers.

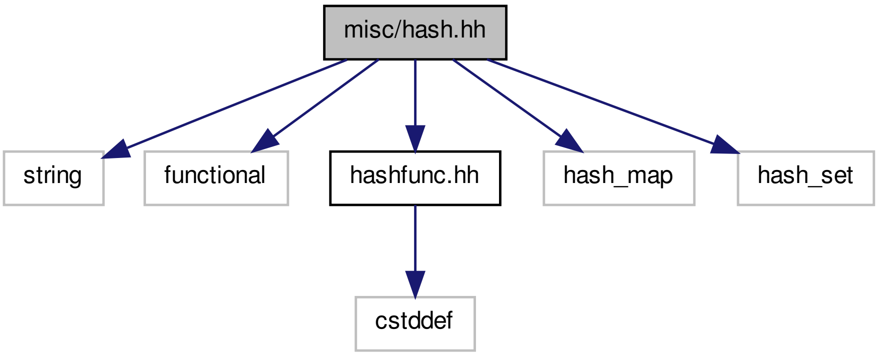
Namespaces

- namespace spot

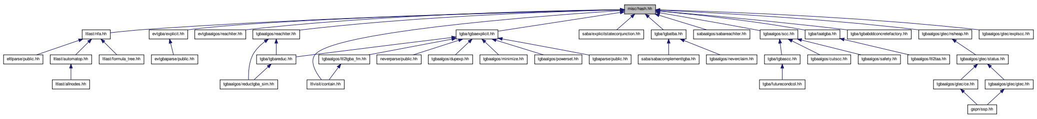
8.79 misc/hash.hh File Reference

```
#include <string>
#include <functional>
#include "hashfunc.hh"
#include <hash_map>
#include <hash_set>
```

Include dependency graph for hash.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::ptr_hash< T >

  A hash function for pointers.

- struct spot::string_hash

  A hash function for strings.

- struct spot::identity_hash< T >

  A hash function that returns identity.

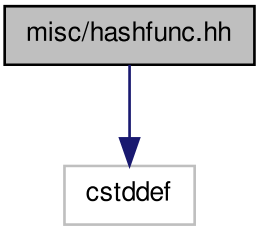
Namespaces

- namespace spot

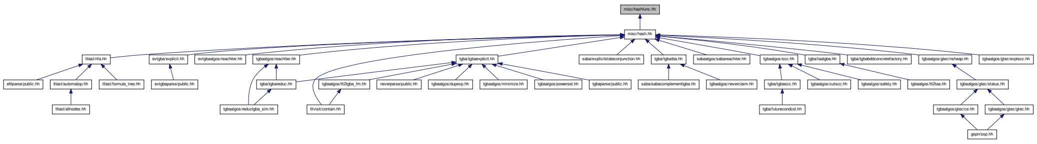
8.80 misc/hashfunc.hh File Reference

`#include <cstddef>`

Include dependency graph for hashfunc.hh:



This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot

Functions

- size_t spot::wang32_hash (size_t key)

  Thomas Wang's 32 bit hash function.

- size_t spot::knuth32_hash (size_t key)

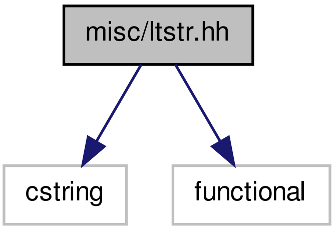
  Knuth's Multiplicative hash function.

8.81 misc/ltstr.hh File Reference

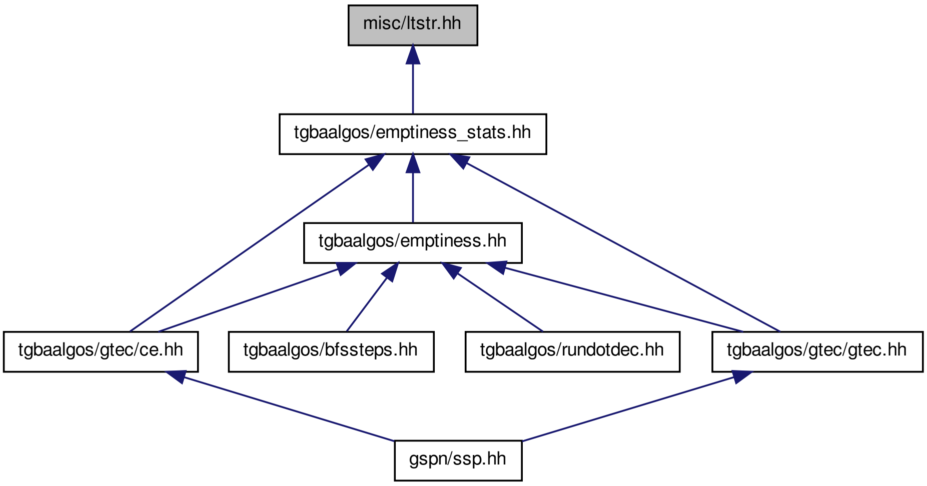
`#include <cstring>`

`#include <functional>`

Include dependency graph for ltstr.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::char_ptr_less_than

  Strict Weak Ordering for `char*`.
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `const char*`.

Namespaces

- namespace spot

8.82 misc/memusage.hh File Reference

Namespaces

- namespace spot

Functions

- int spot::memusage ()

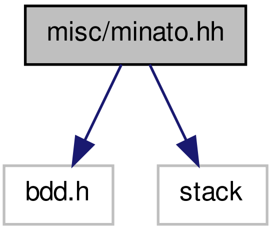
  Total number of pages in use by the program.

8.83 misc/minato.hh File Reference

`#include <bdd.h>`

`#include <stack>`

Include dependency graph for minato.hh:



Classes

- class spot::minato_isop

Generate an irredundant sum-of-products (ISOP) form of a BDD function.
This algorithm implements a derecursived version the Minato-Morreale algorithm presented in the following paper.

- struct spot::minato_isop::local_vars

  Internal variables for minato_isop.

Namespaces

- namespace spot

8.84 misc/modgray.hh File Reference

Classes

- class spot::loopless_modular_mixed_radix_gray_code

  Loopless modular mixed radix Gray code iteration.
  This class is based on the loopless modular mixed radix gray code algorithm described in exercise 77 of "The Art of Computer Programming", Pre-Fascicle 2A (Draft of section 7.2.1.1: generating all n-tuples) by Donald E. Knuth.

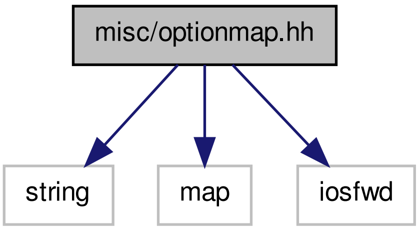
Namespaces

- namespace spot

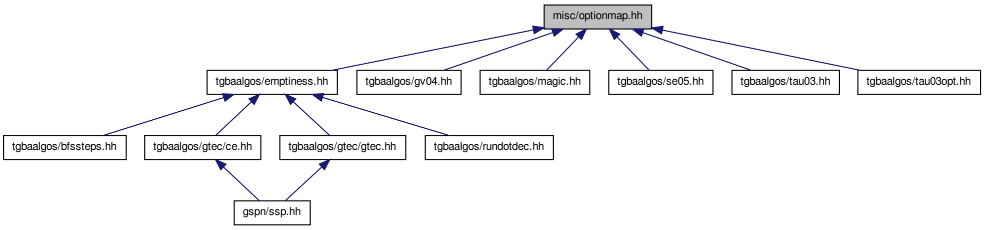
8.85 misc/optionmap.hh File Reference

```
#include <string>
#include <map>
#include <iosfwd>
```

Include dependency graph for optionmap.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::option_map

  Manage a map of options.
  Each option is defined by a string and is associated to an integer value.

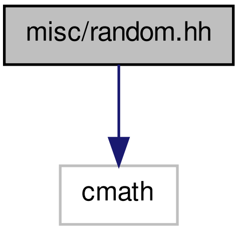
Namespaces

- namespace spot

8.86 misc/random.hh File Reference

`#include <cmath>`

Include dependency graph for random.hh:



Classes

- class spot::barand< gen >

  Compute pseudo-random integer value between 0 and n included, following a binomial distribution for probability p.

Namespaces

- namespace spot

Functions

- void spot::srand (unsigned int seed)

  Reset the seed of the pseudo-random number generator.

- int spot::rrand (int min, int max)

  Compute a pseudo-random integer value between min and max included.

- int spot::mrand (int max)

  Compute a pseudo-random integer value between 0 and max-1 included.

- double spot::drand ()

  Compute a pseudo-random double value between 0.0 and 1.0 (1.0 excluded).

- double spot::nrand ()

  Compute a pseudo-random double value following a standard normal distribution. (Odeh & Evans).

- double spot::bmrand ()

  Compute a pseudo-random double value following a standard normal distribution. (Box-Muller).

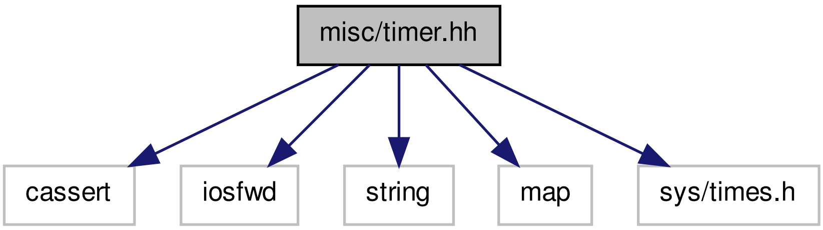
- int spot::prand (double p)

  Return a pseudo-random positive integer value following a Poisson distribution with parameter p.

8.87 misc/timer.hh File Reference

```
#include <cassert>
#include <iosfwd>
#include <string>
#include <map>
#include <sys/times.h>
```

Include dependency graph for timer.hh:



Classes

- struct spot::time_info

  A structure to record elapsed time in clock ticks.

- class spot::timer

  A timekeeper that accumulate interval of time.

- class spot::timer_map

  A map of timer, where each timer has a name.

Namespaces

- namespace spot

8.88 misc/version.hh File Reference

Namespaces

- namespace spot

Functions

- const char ∗ spot::version ()

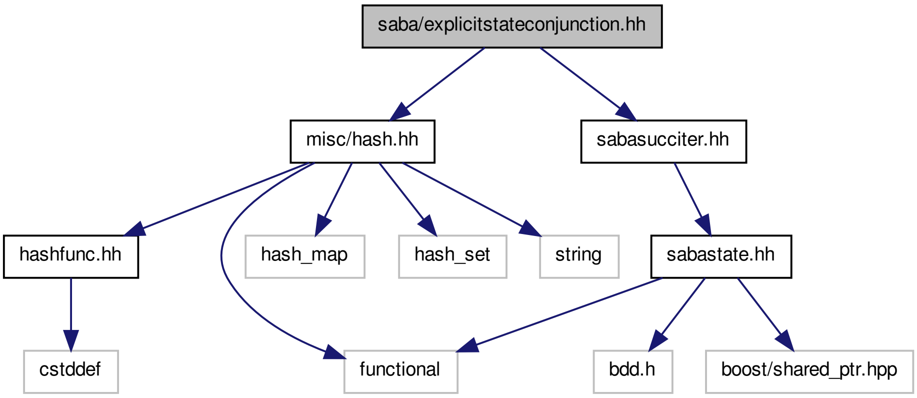
  Return Spot's version.

8.89 saba/explicitstateconjunction.hh File Reference

`#include <misc/hash.hh>`

`#include "sabasucciter.hh"`

Include dependency graph for explicitstateconjunction.hh:



Classes

- class spot::explicit_state_conjunction

  Basic implementation of saba_state_conjunction.
  This class provides a basic implementation to iterate over a conjunction of states of a saba.

Namespaces

- namespace spot

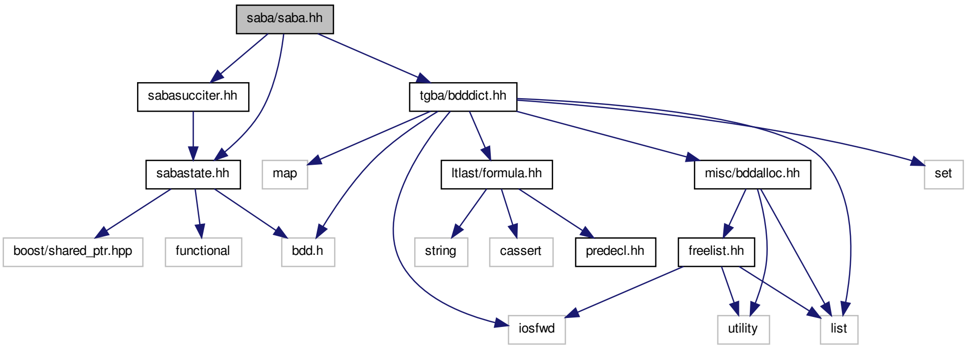
8.90 saba/saba.hh File Reference

`#include "sabastate.hh"`

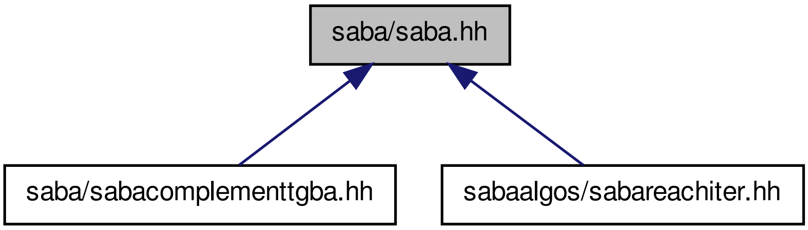
`#include "sabasucciter.hh"`

`#include <tgba/bdddict.hh>`

Include dependency graph for saba.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::saba

  A State-based Alternating (Generalized) Büchi Automaton.
  Browsing such automaton can be achieved using two functions: `get_init_state`*, and* `succ_iter`*. The former returns the initial state while the latter lists the successor states of any state.*

Namespaces

- namespace spot

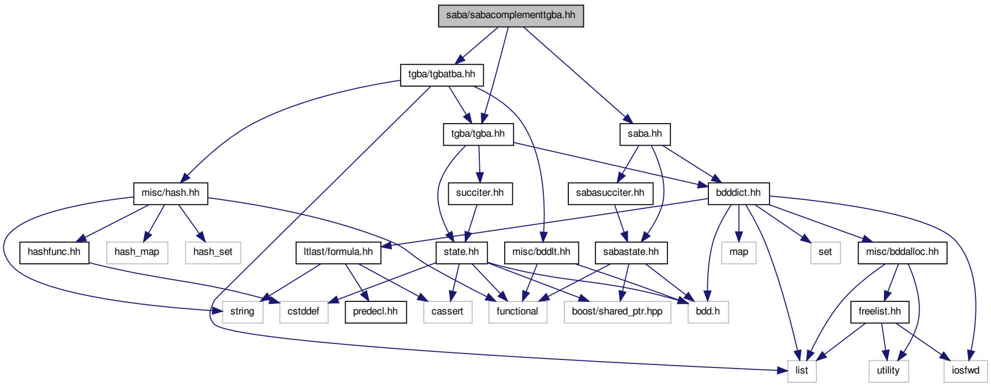
8.91 saba/sabacomplementtgba.hh File Reference

`#include <tgba/tgba.hh>`

`#include <tgba/tgbatba.hh>`

`#include "saba.hh"`

Include dependency graph for sabacomplementtgba.hh:



Classes

- class spot::saba_complement_tgba

  Complement a TGBA and produce a SABA.
  The original TGBA is transformed into a States-based Büchi Automaton.

Namespaces

- namespace spot

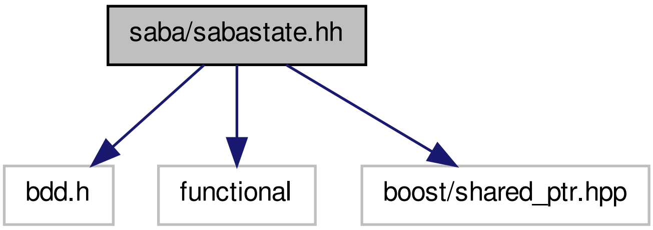
8.92 saba/sabastate.hh File Reference

`#include <bdd.h>`

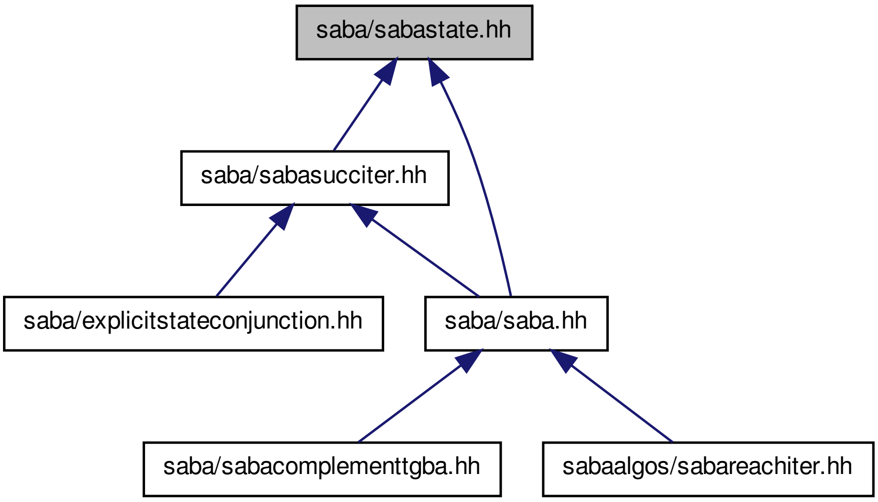
`#include <functional>`

`#include <boost/shared_ptr.hpp>`

Include dependency graph for sabastate.hh:



This graph shows which files directly or indirectly include this file:


saba/sabastate.hh
saba/sabasucciter.hh
saba/explicitstateconjunction.hh
saba/saba.hh
saba/sabacomplementtgba.hh
sabaalgos/sabareachiter.hh

Classes

- class spot::saba_state

  Abstract class for saba states.

- struct spot::saba_state_ptr_less_than

  Strict Weak Ordering for `saba_state*`*.*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `saba_state*`*.*

- struct spot::saba_state_ptr_equal

  An Equivalence Relation for `saba_state*`.
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `saba_state*`.

- struct spot::saba_state_ptr_hash

  Hash Function for `saba_state*`.
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `saba_state*`.

- struct spot::saba_state_shared_ptr_less_than

  Strict Weak Ordering for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `shared_saba_state`.

- struct spot::saba_state_shared_ptr_equal

  An Equivalence Relation for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `shared_saba_state`.

- struct spot::saba_state_shared_ptr_hash

  Hash Function for `shared_saba_state` *(shared_ptr<const saba_state*>).*
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_saba_state`.

Namespaces

- namespace spot

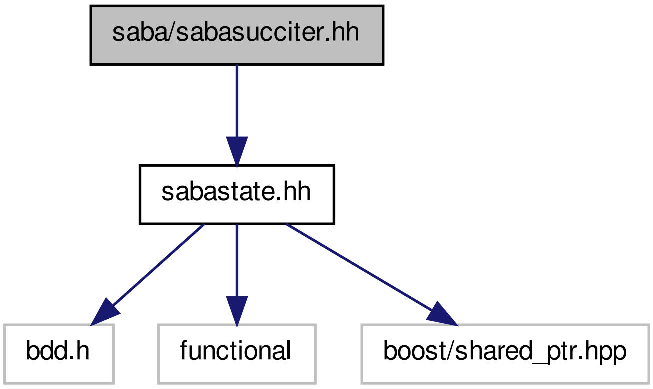
Typedefs

- typedef boost::shared_ptr< const saba_state > spot::shared_saba_state

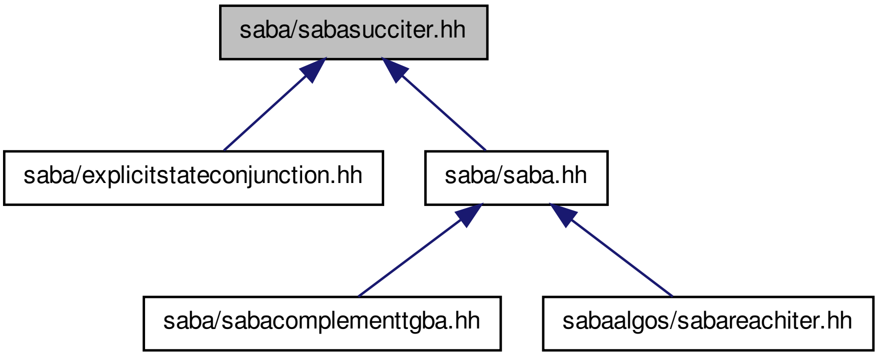
8.93 saba/sabasucciter.hh File Reference

`#include "sabastate.hh"`

Include dependency graph for sabasucciter.hh:



This graph shows which files directly or indirectly include this file:


saba/sabasucciter.hh
saba/explicitstateconjunction.hh
saba/saba.hh
saba/sabacomplementtgba.hh
sabaalgos/sabareachiter.hh

Classes

- class spot::saba_state_conjunction

  Iterate over a conjunction of saba_state.
  This class provides the basic functionalities required to iterate over a conjunction of states of a saba.

- class spot::saba_succ_iterator

  Iterate over the successors of a saba_state.

This class provides the basic functionalities required to iterate over the successors of a state of a saba. Since transitions of an alternating automaton are defined as a boolean function with conjunctions (universal) and disjunctions (non-deterministic),.

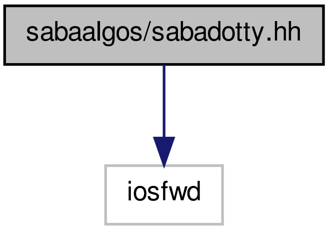
Namespaces

- namespace spot

8.94 sabaalgos/sabadotty.hh File Reference

`#include <iosfwd>`

Include dependency graph for sabadotty.hh:



Namespaces

- namespace spot

Functions

- std::ostream & spot::saba_dotty_reachable (std::ostream &os, const saba ∗g)

  Print reachable states in dot format.

8.95 sabaalgos/sabareachiter.hh File Reference

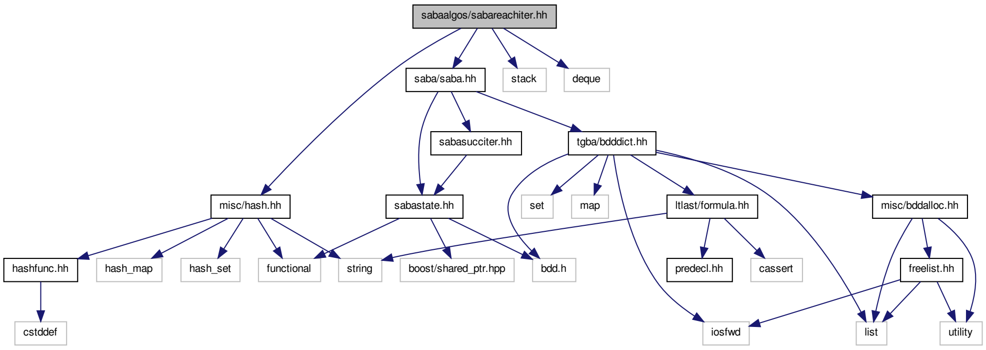
`#include "misc/hash.hh"`

`#include "saba/saba.hh"`

`#include <stack>`

`#include <deque>`

Include dependency graph for sabareachiter.hh:



Classes

- class spot::saba_reachable_iterator

  Iterate over all reachable states of a spot::saba.

- class spot::saba_reachable_iterator_depth_first

  An implementation of spot::saba_reachable_iterator that browses states depth first.

- class spot::saba_reachable_iterator_breadth_first

  An implementation of spot::saba_reachable_iterator that browses states breadth first.

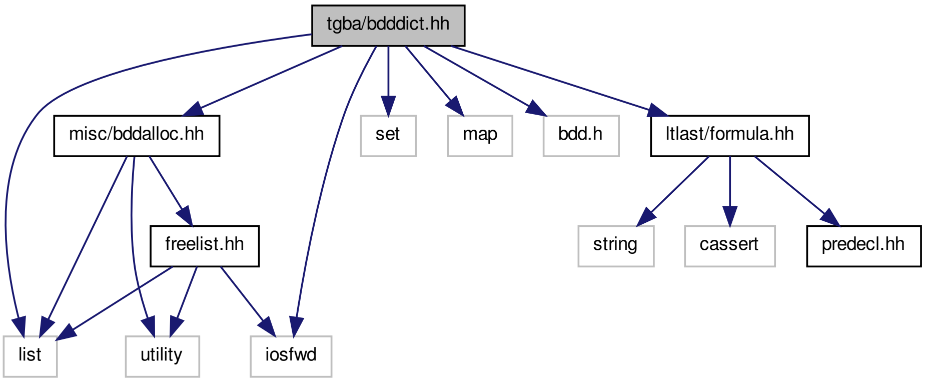
Namespaces

- namespace spot

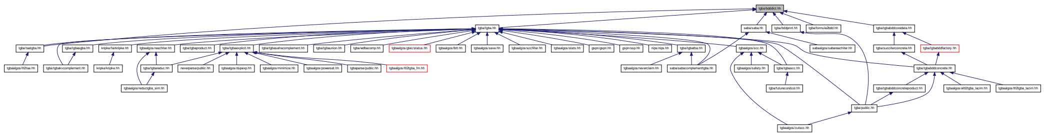
8.96 tgba/bdddict.hh File Reference

```
#include <list>
#include <set>
#include <map>
#include <iosfwd>
#include <bdd.h>
#include "ltlast/formula.hh"
#include "misc/bddalloc.hh"
```

Include dependency graph for bdddict.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::bdd_dict
- class spot::bdd_dict::anon_free_list

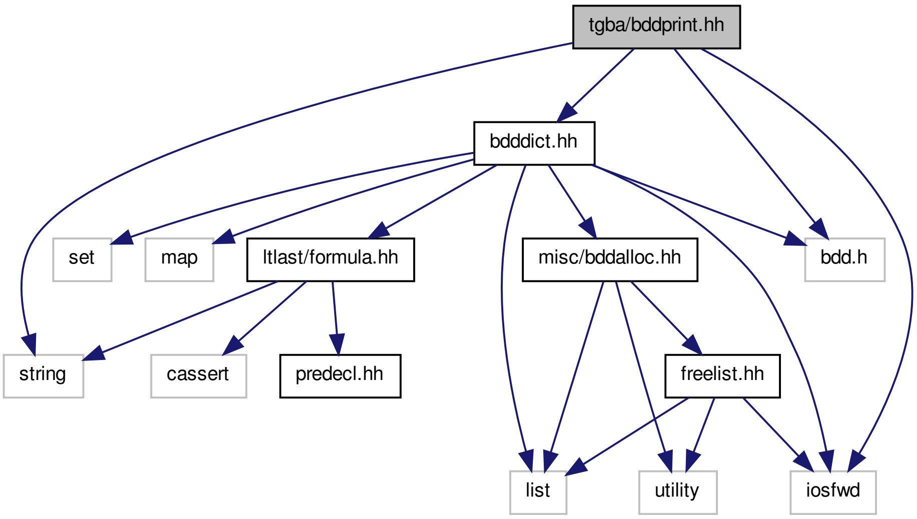
Namespaces

- namespace spot

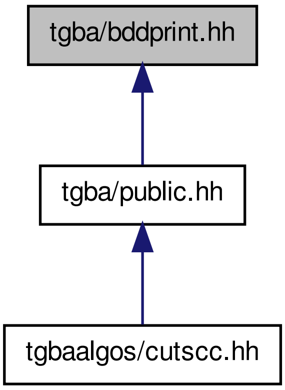
8.97 tgba/bddprint.hh File Reference

```
#include <string>
#include <iosfwd>
#include "bdddict.hh"
#include <bdd.h>
```

Include dependency graph for bddprint.hh:



This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot

Functions

- std::ostream & spot::bdd_print_sat (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a list of literals.
- std::string spot::bdd_format_sat (const bdd_dict ∗dict, bdd b)

  Format a BDD as a list of literals.
- std::ostream & spot::bdd_print_acc (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a list of acceptance conditions.
- std::ostream & spot::bdd_print_accset (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a set of acceptance conditions.
- std::string spot::bdd_format_accset (const bdd_dict ∗dict, bdd b)

  Format a BDD as a set of acceptance conditions.
- std::ostream & spot::bdd_print_set (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a set.
- std::string spot::bdd_format_set (const bdd_dict ∗dict, bdd b)

  Format a BDD as a set.
- std::ostream & spot::bdd_print_formula (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a formula.
- std::string spot::bdd_format_formula (const bdd_dict ∗dict, bdd b)

  Format a BDD as a formula.
- std::ostream & spot::bdd_print_dot (std::ostream &os, const bdd_dict ∗dict, bdd b)

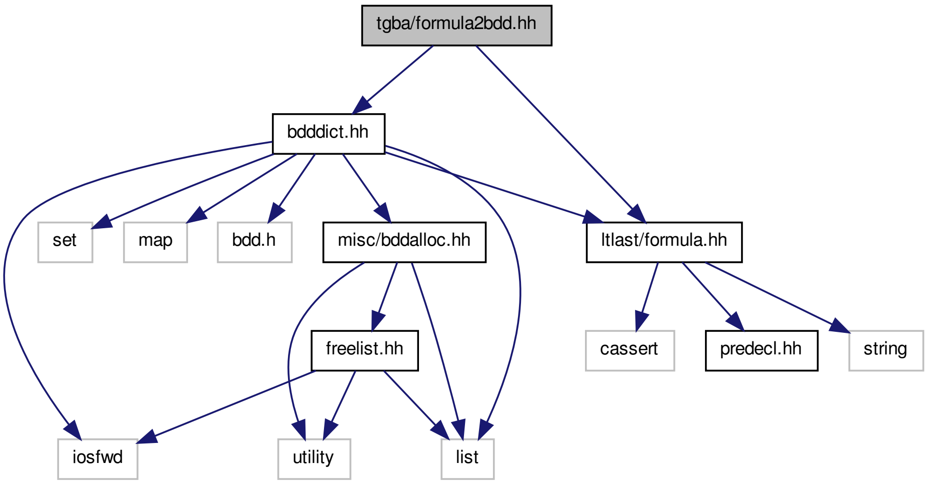
  Print a BDD as a diagram in dotty format.
- std::ostream & spot::bdd_print_table (std::ostream &os, const bdd_dict ∗dict, bdd b)

  Print a BDD as a table.

8.98 tgba/formula2bdd.hh File Reference

```
#include "bdddict.hh"
#include "ltlast/formula.hh"
```

Include dependency graph for formula2bdd.hh:



Namespaces

- namespace spot

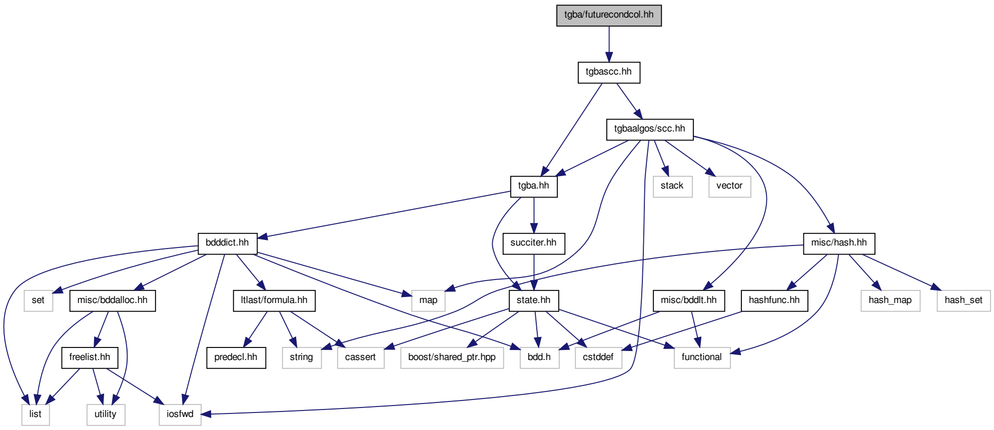
Functions

- bdd spot::formula_to_bdd (const ltl::formula ∗f, bdd_dict ∗d, void ∗for_me)
- const ltl::formula ∗ spot::bdd_to_formula (bdd f, const bdd_dict ∗d)

8.99 tgba/futurecondcol.hh File Reference

```
#include "tgbascc.hh"
```

Include dependency graph for futurecondcol.hh:



Classes

- class spot::future_conditions_collector

  Wrap a tgba to offer information about upcoming conditions.
  This class is a spot::tgba wrapper that simply add a new method, future_conditions(), to any spot::tgba.

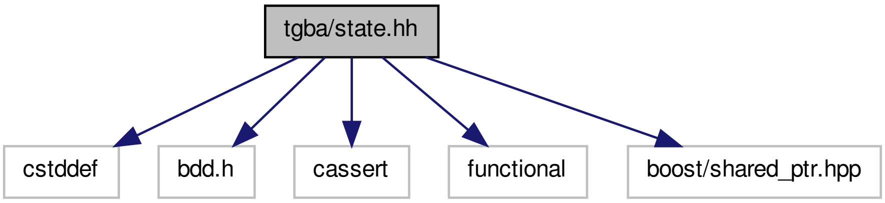
Namespaces

- namespace spot

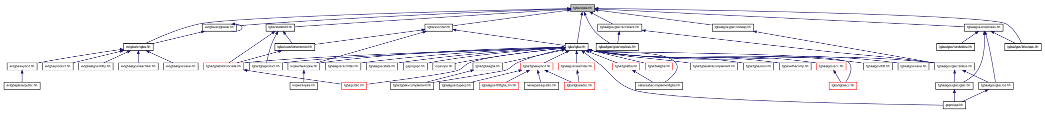
8.100 tgba/state.hh File Reference

```
#include <cstddef>
#include <bdd.h>
#include <cassert>
#include <functional>
#include <boost/shared_ptr.hpp>
```

Include dependency graph for state.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::state

  Abstract class for states.

- struct spot::state_ptr_less_than

  Strict Weak Ordering for `state*`.
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `state*`.

- struct spot::state_ptr_equal

  An Equivalence Relation for `state*`.
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `state*`.

- struct spot::state_ptr_hash

  Hash Function for `state*`.
  This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `state*`.

- struct spot::state_shared_ptr_less_than

  Strict Weak Ordering for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a comparison functor for STL `map` *whose key are of type* `shared_state`.

- struct spot::state_shared_ptr_equal

  An Equivalence Relation for `shared_state` *(shared_ptr<const state*>).*
  This is meant to be used as a comparison functor for Sgi `hash_map` *whose key are of type* `shared_state`.

- struct spot::state_shared_ptr_hash

Hash Function for `shared_state` *(shared_ptr<const state∗>).*
This is meant to be used as a hash functor for Sgi's `hash_map` *whose key are of type* `shared_state`*.*

Namespaces

- namespace spot

Typedefs

- typedef boost::shared_ptr< const state > spot::shared_state

Functions

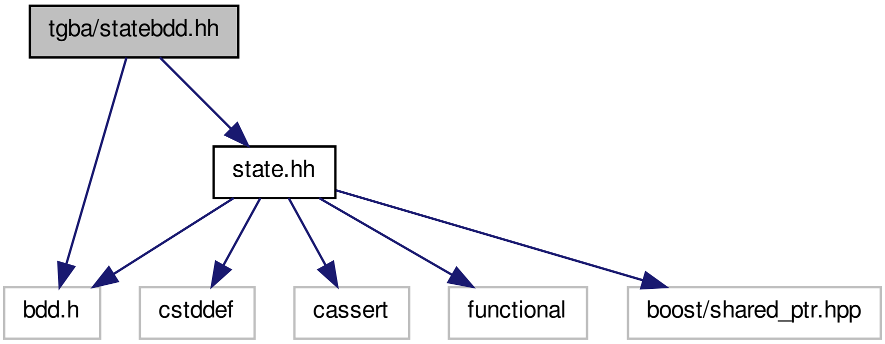
- void spot::shared_state_deleter (state ∗s)

8.101 tgba/statebdd.hh File Reference

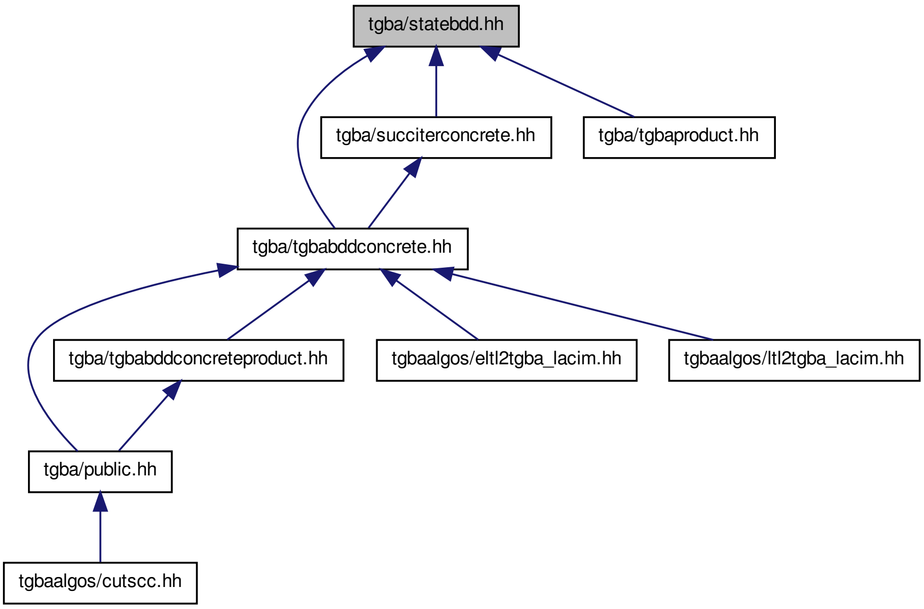
`#include <bdd.h>`

`#include "state.hh"`

Include dependency graph for statebdd.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::state_bdd

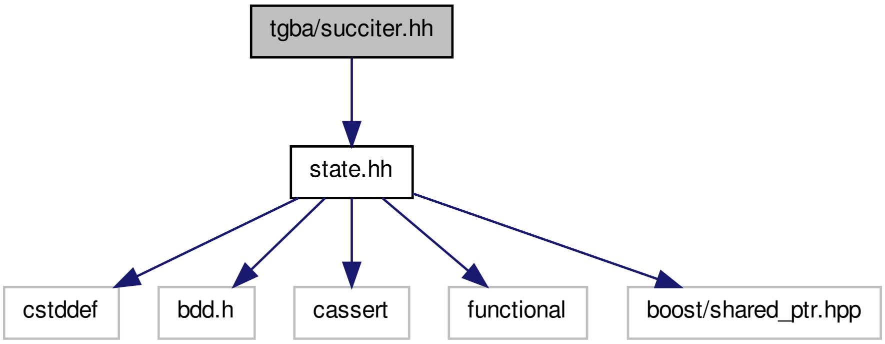
Namespaces

- namespace spot

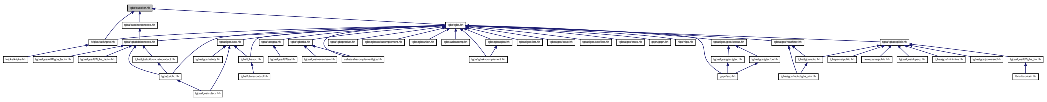
8.102 tgba/succiter.hh File Reference

```
#include "state.hh"
```

Include dependency graph for succiter.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba_succ_iterator

  Iterate over the successors of a state.
  This class provides the basic functionalities required to iterate over the successors of a state, as well as querying transition labels. Because transitions are never explicitely encoded, labels (conditions and acceptance conditions) can only be queried while iterating over the successors.

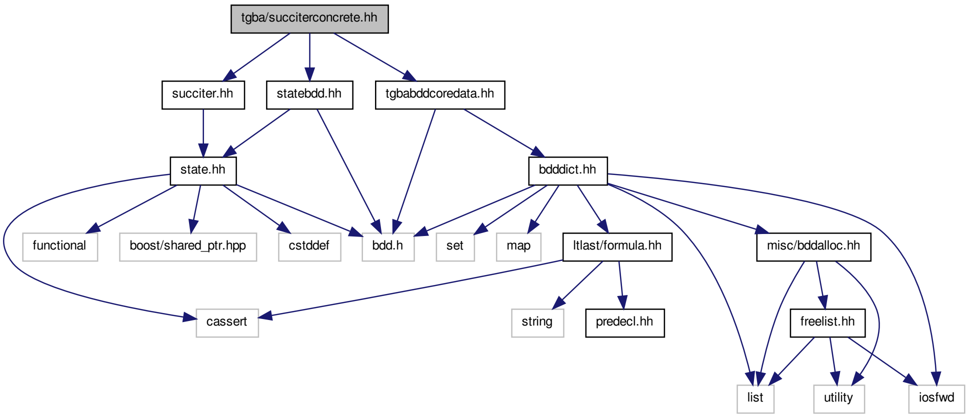
Namespaces

- namespace spot

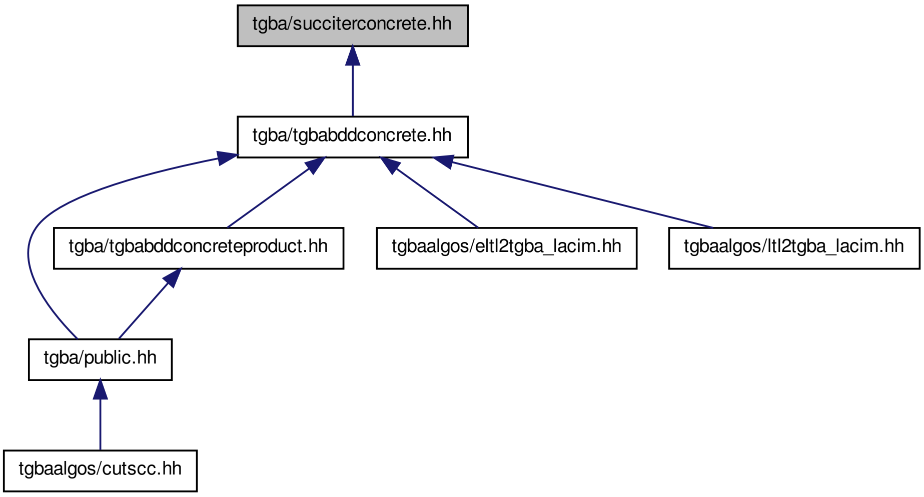
8.103 tgba/succiterconcrete.hh File Reference

```
#include "statebdd.hh"
#include "succiter.hh"
#include "tgbabddcoredata.hh"
```

Include dependency graph for succiterconcrete.hh:



This graph shows which files directly or indirectly include this file:


tgba/succiterconcrete.hh
tgba/tgbabddconcrete.hh
tgba/tgbabddconcreteproduct.hh
tgbaalgos/eltl2tgba_lacim.hh
tgbaalgos/ltl2tgba_lacim.hh
tgba/public.hh
tgbaalgos/cutscc.hh

Classes

- class spot::tgba_succ_iterator_concrete

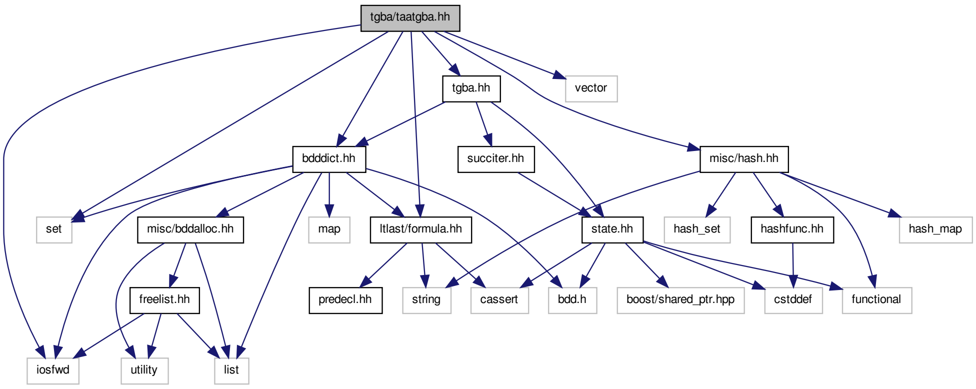
Namespaces

- namespace spot

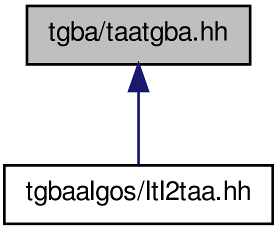
8.104 tgba/taatgba.hh File Reference

```
#include <set>
#include <iosfwd>
#include <vector>
#include "misc/hash.hh"
#include "ltlast/formula.hh"
#include "bdddict.hh"
#include "tgba.hh"
```

Include dependency graph for taatgba.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::taa_tgba

A self-loop Transition-based Alternating Automaton (TAA) which is seen as a TGBA (abstract class, see below).

- struct spot::taa_tgba::transition

  Explicit transitions.

- class spot::state_set

  Set of states deriving from spot::state.

- class spot::taa_succ_iterator
- struct spot::taa_succ_iterator::distance_sort
- class spot::taa_tgba_labelled< label, label_hash >
- class spot::taa_tgba_string
- class spot::taa_tgba_formula

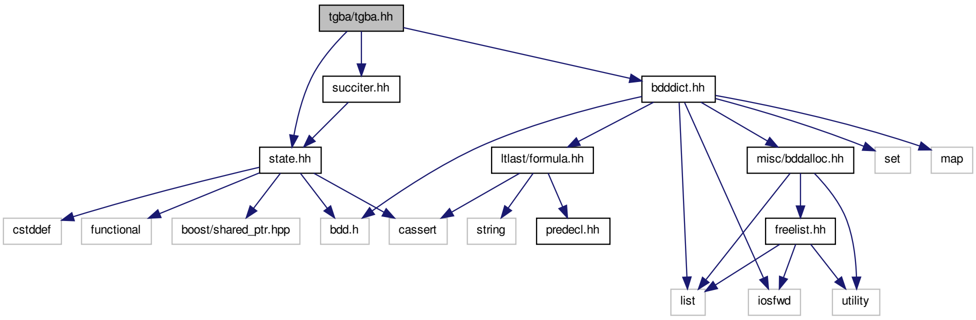
Namespaces

- namespace spot

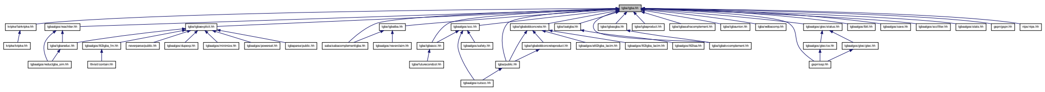
8.105 tgba/tgba.hh File Reference

```
#include "state.hh"
#include "succiter.hh"
#include "bdddict.hh"
```

Include dependency graph for tgba.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba

  A Transition-based Generalized Büchi Automaton.

  The acronym TGBA (Transition-based Generalized Büchi Automaton) was coined by Dimitra Giannakopoulou and Flavio Lerda in "From States to Transitions: Improving Translation of LTL Formulae to Büchi Automata". (FORTE'02).

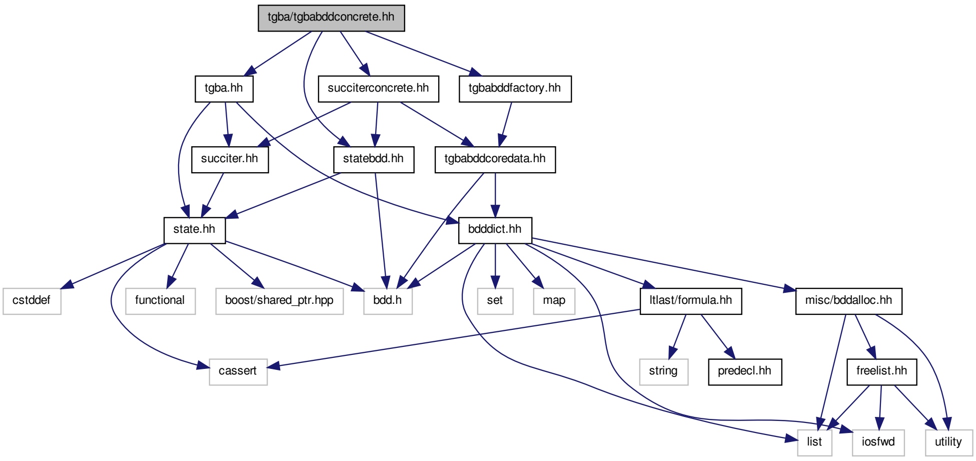
Namespaces

- namespace spot

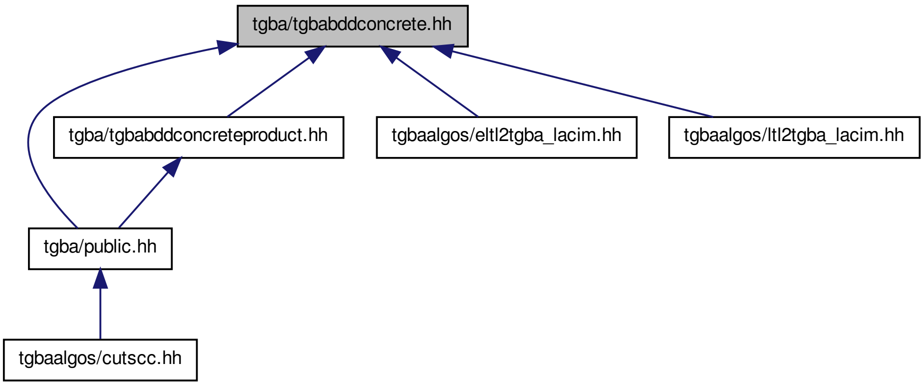
8.106 tgba/tgbabddconcrete.hh File Reference

```
#include "tgba.hh"
#include "statebdd.hh"
#include "tgbabddfactory.hh"
#include "succiterconcrete.hh"
```

Include dependency graph for tgbabddconcrete.hh:



This graph shows which files directly or indirectly include this file:


tgba/tgbabddconcrete.hh
tgba/tgbabddconcreteproduct.hh
tgbaalgos/eltl2tgba_lacim.hh
tgbaalgos/ltl2tgba_lacim.hh
tgba/public.hh
tgbaalgos/cutscc.hh

Classes

- class spot::tgba_bdd_concrete

  A concrete spot::tgba implemented using BDDs.

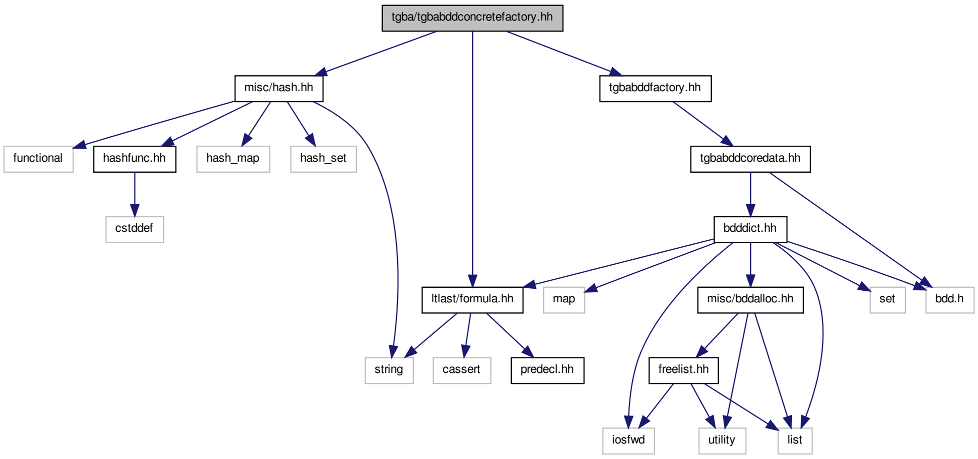
Namespaces

- namespace spot

8.107 tgba/tgbabddconcretefactory.hh File Reference

```
#include "misc/hash.hh"
#include "ltlast/formula.hh"
#include "tgbabddfactory.hh"
```

Include dependency graph for tgbabddconcretefactory.hh:



Classes

- class spot::tgba_bdd_concrete_factory

  Helper class to build a spot::tgba_bdd_concrete object.

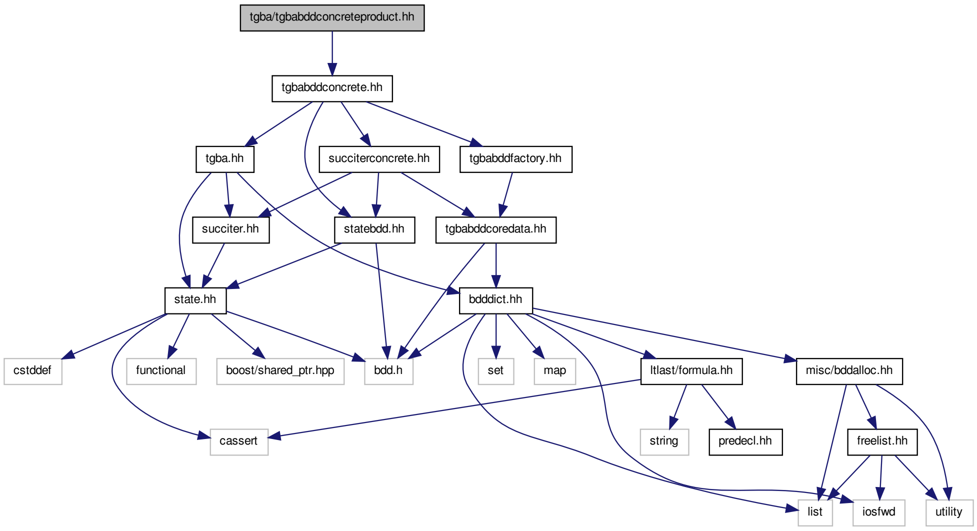
Namespaces

- namespace spot

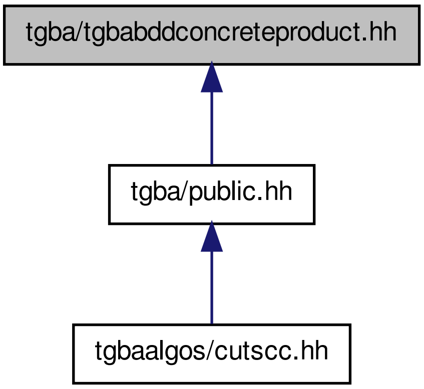
8.108 tgba/tgbabddconcreteproduct.hh File Reference

```
#include "tgbabddconcrete.hh"
```

Include dependency graph for tgbabddconcreteproduct.hh:



This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot

Functions

- tgba_bdd_concrete ∗ spot::product (const tgba_bdd_concrete ∗left, const tgba_bdd_concrete ∗right)

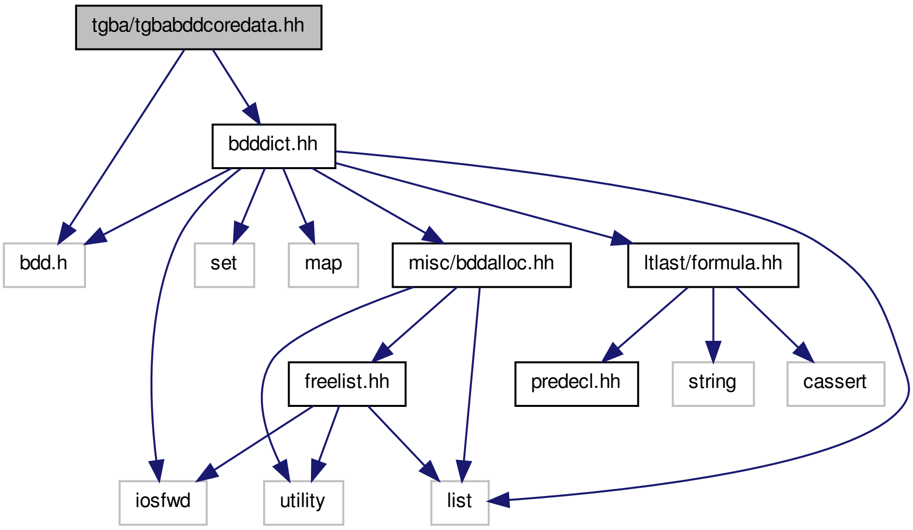
  Multiplies two spot::tgba_bdd_concrete automata.
  This function builds the resulting product as another spot::tgba_bdd_concrete automaton.

8.109 tgba/tgbabddcoredata.hh File Reference

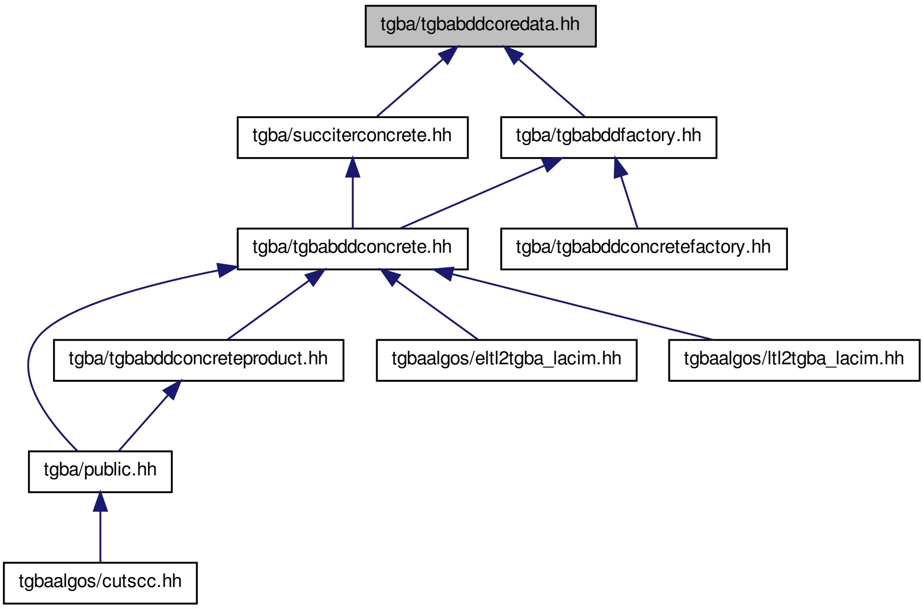
`#include <bdd.h>`

`#include "bdddict.hh"`

Include dependency graph for tgbabddcoredata.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::tgba_bdd_core_data

    Core data for a TGBA encoded using BDDs.

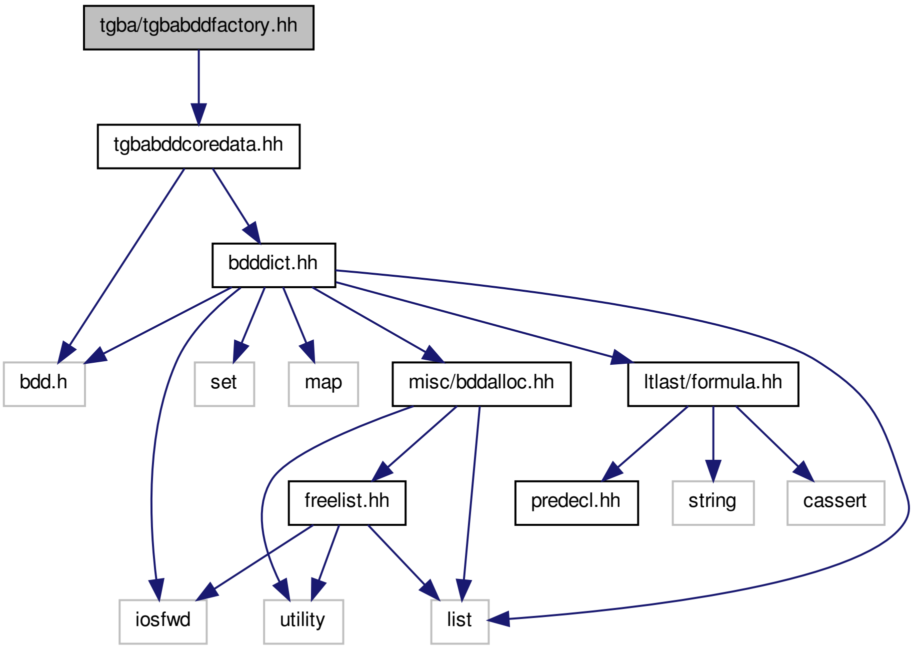
Namespaces

- namespace spot

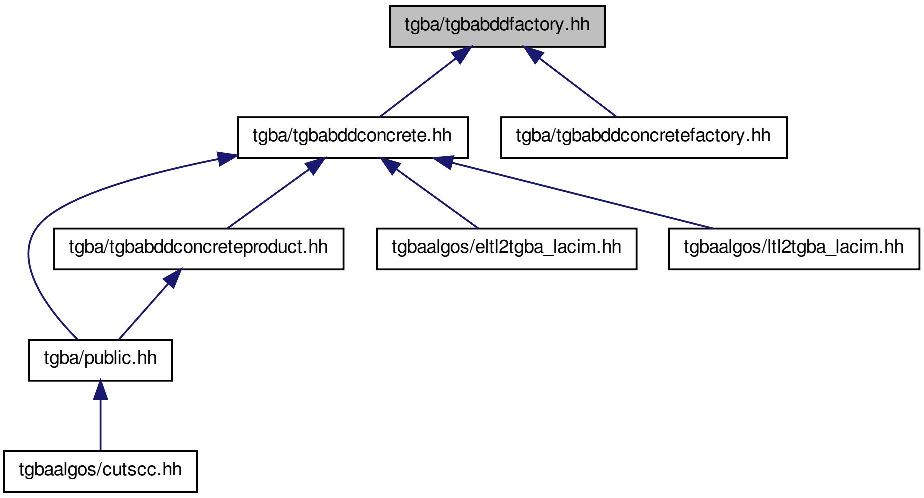
8.110 tgba/tgbabddfactory.hh File Reference

```
#include "tgbabddcoredata.hh"
```

Include dependency graph for tgbabddfactory.hh:



This graph shows which files directly or indirectly include this file:


tgba/tgbabddfactory.hh
tgba/tgbabddconcrete.hh
tgba/tgbabddconcretefactory.hh
tgba/tgbabddconcreteproduct.hh
tgbaalgos/eltl2tgba_lacim.hh
tgbaalgos/ltl2tgba_lacim.hh
tgba/public.hh
tgbaalgos/cutscc.hh

Classes

- class spot::tgba_bdd_factory

  Abstract class for spot::tgba_bdd_concrete factories.

Namespaces

- namespace spot

8.111 tgba/tgbaexplicit.hh File Reference

`#include "misc/hash.hh"`

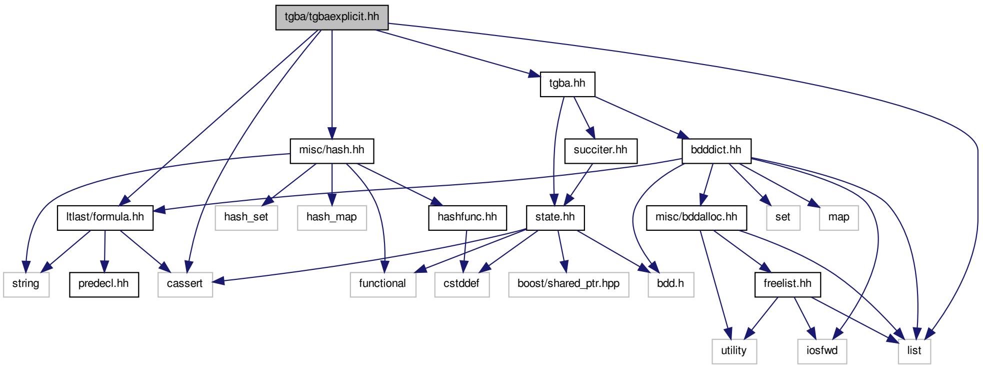
`#include <list>`

`#include "tgba.hh"`

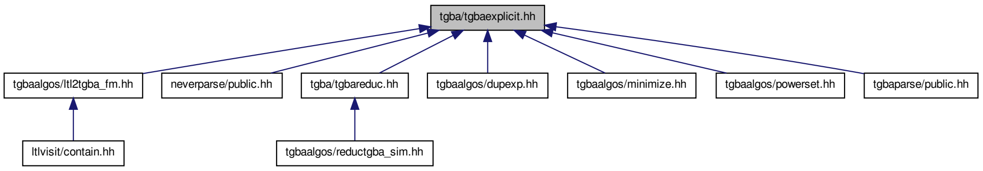
`#include "ltlast/formula.hh"`

`#include <cassert>`

Include dependency graph for tgbaexplicit.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba_explicit
- struct spot::tgba_explicit::transition

  Explicit transitions (used by spot::tgba_explicit).

- class spot::state_explicit
- class spot::tgba_explicit_succ_iterator
- class spot::tgba_explicit_labelled< label, label_hash >

  A tgba_explicit instance with states labeled by a given type.

- class spot::tgba_explicit_string
- class spot::tgba_explicit_formula
- class spot::tgba_explicit_number

Namespaces

- namespace spot

8.112 tgba/tgbakvcomplement.hh File Reference

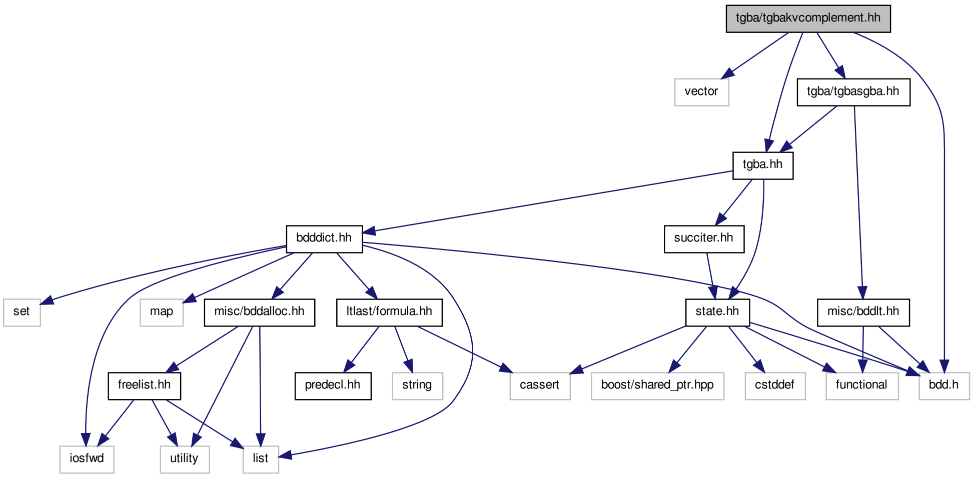
`#include <vector>`

`#include "bdd.h"`

`#include "tgba.hh"`

`#include "tgba/tgbasgba.hh"`

Include dependency graph for tgbakvcomplement.hh:



Classes

- class spot::bdd_ordered
- class spot::tgba_kv_complement

  Build a complemented automaton.
  The construction comes from:

Namespaces

- namespace spot

Typedefs

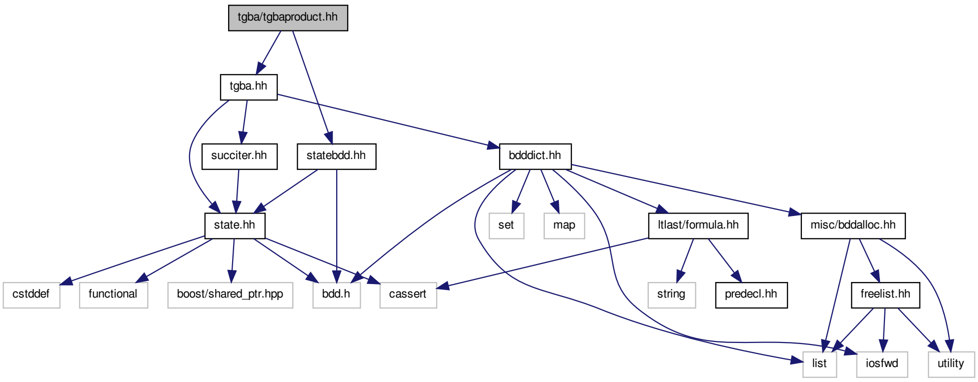
- typedef std::vector< bdd_ordered > spot::acc_list_t

8.113 tgba/tgbaproduct.hh File Reference

`#include "tgba.hh"`

`#include "statebdd.hh"`

Include dependency graph for tgbaproduct.hh:



Classes

- class spot::state_product

  A state for spot::tgba_product.
  This state is in fact a pair of state: the state from the left automaton and that of the right.

- class spot::tgba_succ_iterator_product

  Iterate over the successors of a product computed on the fly.

- class spot::tgba_product

  A lazy product. (States are computed on the fly.).

- class spot::tgba_product_init

  A lazy product with different initial states.

Namespaces

- namespace spot

8.114 tgba/tgbareduc.hh File Reference

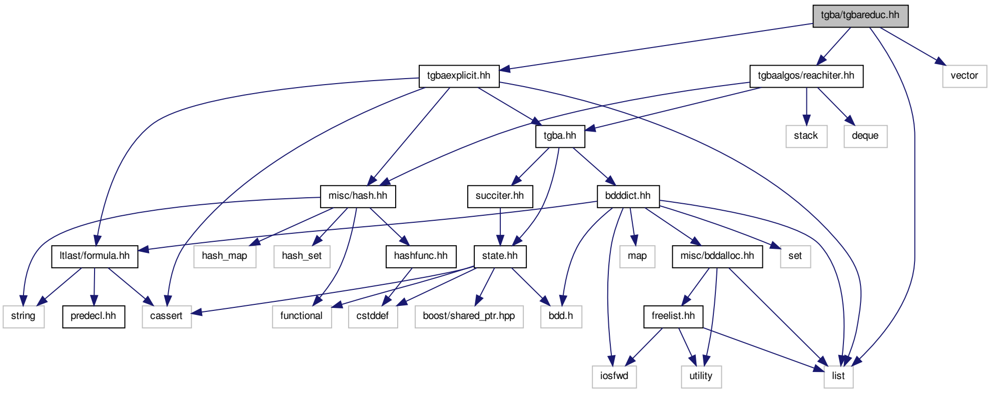
`#include "tgbaexplicit.hh"`

`#include "tgbaalgos/reachiter.hh"`

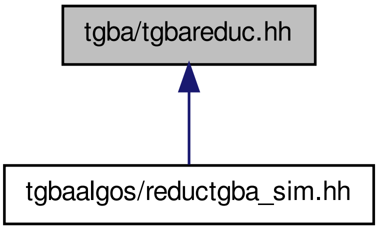
`#include <list>`

`#include <vector>`

Include dependency graph for tgbareduc.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::direct_simulation_relation
- class spot::delayed_simulation_relation
- class spot::tgba_reduc

Namespaces

- namespace spot

Typedefs

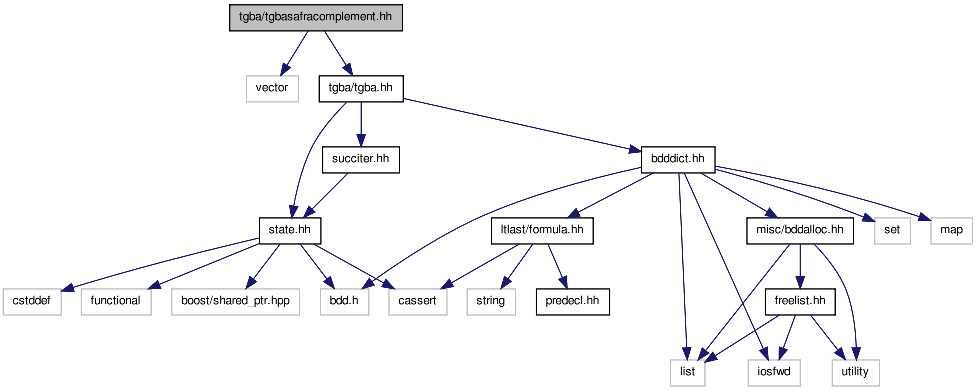
- typedef std::pair< const spot::state ∗, const spot::state ∗ > spot::state_couple
- typedef std::vector< state_couple ∗ > spot::simulation_relation

8.115 tgba/tgbasafracomplement.hh File Reference

`#include <vector>`

`#include "tgba/tgba.hh"`

Include dependency graph for tgbasafracomplement.hh:



Classes

- class spot::tgba_safra_complement

  Build a complemented automaton.
  It creates an automaton that recognizes the negated language of aut.

Namespaces

- namespace spot

Defines

- #define TRANSFORM_TO_TBA 0
- #define TRANSFORM_TO_TGBA (!TRANSFORM_TO_TBA)

Functions

- void spot::display_safra (const tgba_safra_complement ∗a)

  Produce a dot output of the Safra automaton associated to a.

8.115.1 Define Documentation

8.115.1.1 #define TRANSFORM_TO_TBA 0

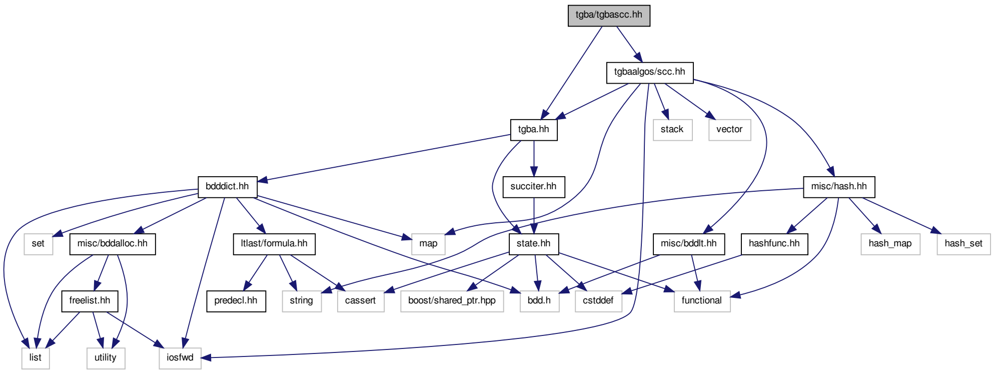
8.115.1.2 #define TRANSFORM_TO_TGBA (!TRANSFORM_TO_TBA)

8.116 tgba/tgbascc.hh File Reference

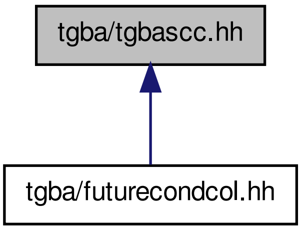
`#include "tgba.hh"`

`#include "tgbaalgos/scc.hh"`

Include dependency graph for tgbascc.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba_scc

  Wrap a tgba to offer information about strongly connected components.
  This class is a spot::tgba wrapper that simply add a new method scc_of_state() to retrieve the number of a SCC a state belongs to.

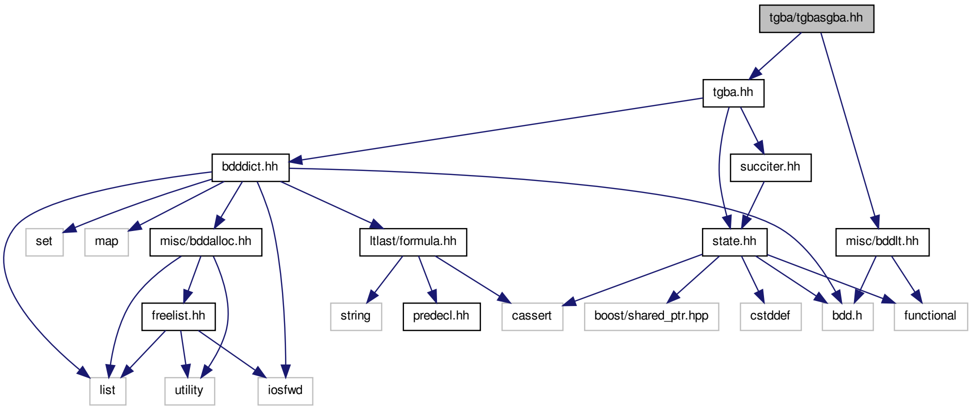
Namespaces

- namespace spot

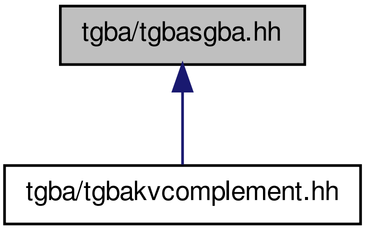
8.117 tgba/tgbasgba.hh File Reference

```
#include "tgba.hh"
#include "misc/bddlt.hh"
```

Include dependency graph for tgbasgba.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba_sgba_proxy

  Change the labeling-mode of spot::tgba on the fly, producing a state-based generalized Büchi automaton. This class acts as a proxy in front of a spot::tgba, that should label on states on-the-fly. The result is still a spot::tgba, but acceptances conditions are also on states.

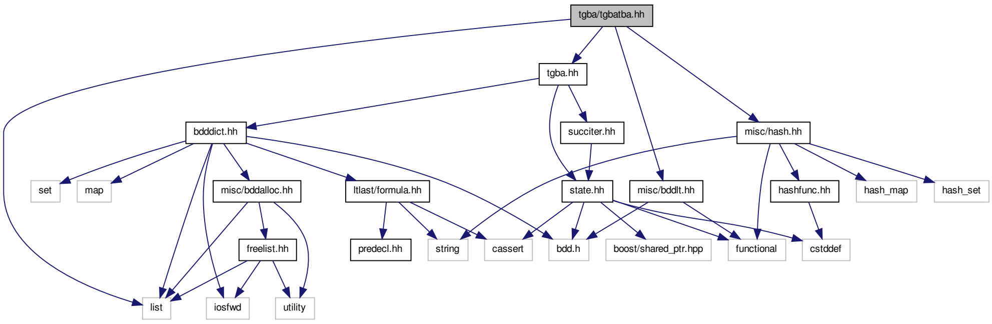
Namespaces

- namespace spot

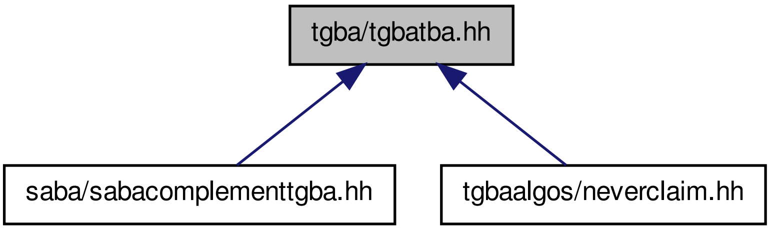
8.118 tgba/tgbatba.hh File Reference

```
#include <list>
#include "tgba.hh"
#include "misc/bddlt.hh"
#include "misc/hash.hh"
```

Include dependency graph for tgbatba.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::tgba_tba_proxy

  Degeneralize a spot::tgba on the fly, producing a TBA.
  This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly. The result is still a spot::tgba, but it will always have exactly one acceptance condition so it could be called TBA (without the G).

- class spot::tgba_sba_proxy

  Degeneralize a spot::tgba on the fly, producing an SBA.
  This class acts as a proxy in front of a spot::tgba, that should be degeneralized on the fly.

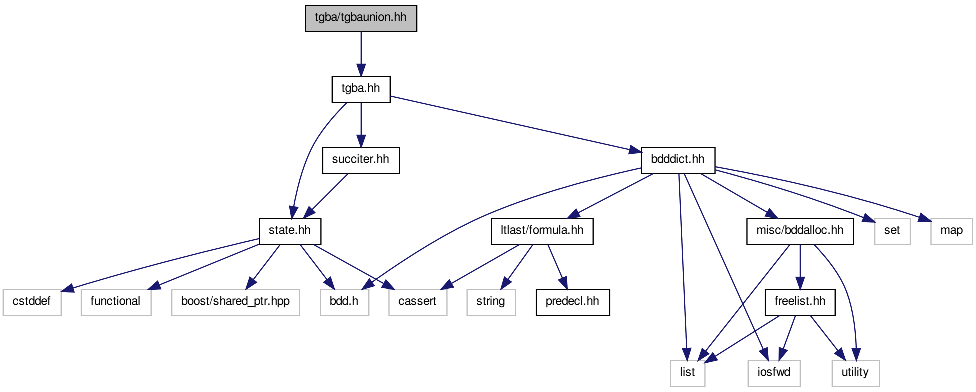
Namespaces

- namespace spot

8.119 tgba/tgbaunion.hh File Reference

`#include "tgba.hh"`

Include dependency graph for tgbaunion.hh:



Classes

- class spot::state_union

  A state for spot::tgba_union.
  This state is in fact a pair. If the first member equals 0 and the second is different from 0, the state belongs to the left automaton. If the first member is different from 0 and the second is 0, the state belongs to the right automaton. If both members are 0, the state is the initial state.

- class spot::tgba_succ_iterator_union

  Iterate over the successors of an union computed on the fly.

- class spot::tgba_union

  A lazy union. (States are computed on the fly.).

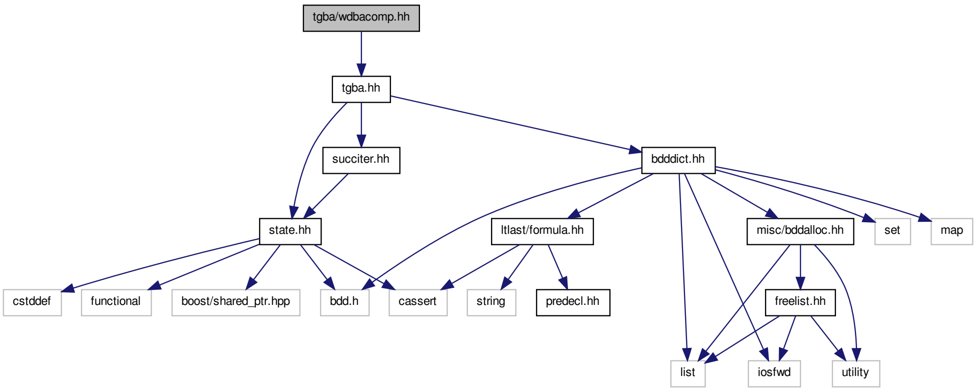
Namespaces

- namespace spot

8.120 tgba/wdbacomp.hh File Reference

`#include "tgba.hh"`

Include dependency graph for wdbacomp.hh:



Namespaces

- namespace spot

Functions

- tgba ∗ spot::wdba_complement (const tgba ∗aut)

  Complement a weak deterministic Büchi automaton.

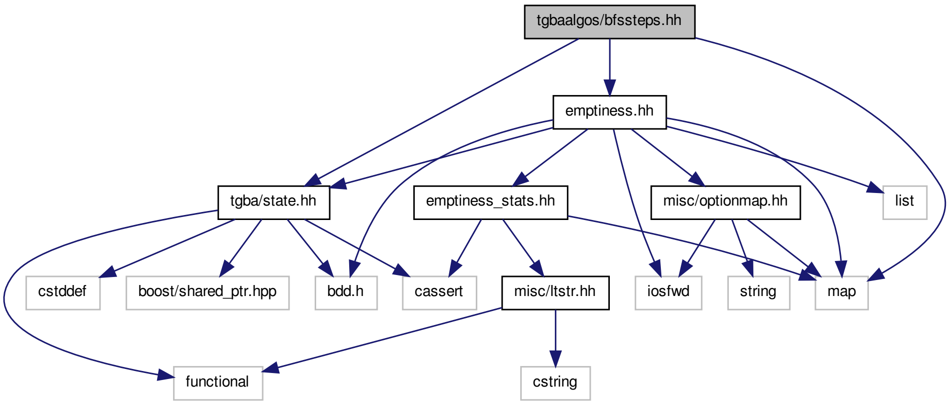
8.121 tgbaalgos/bfssteps.hh File Reference

`#include <map>`

`#include "tgba/state.hh"`

`#include "emptiness.hh"`

Include dependency graph for bfssteps.hh:



Classes

- class spot::bfs_steps

  Make a BFS in a spot::tgba to compute a tgba_run::steps.
  This class should be used to compute the shortest path between a state of a spot::tgba and the first transition or state that matches some conditions.

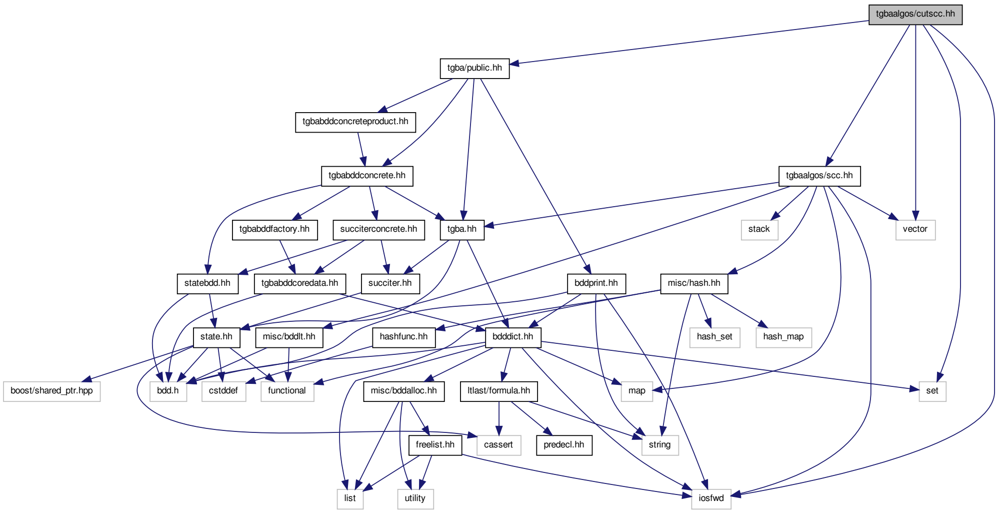
Namespaces

- namespace spot

8.122 tgbaalgos/cutscc.hh File Reference

```
#include <iosfwd>
#include <set>
#include <vector>
#include "tgba/public.hh"
#include "tgbaalgos/scc.hh"
```

Include dependency graph for cutscc.hh:



Classes

- struct spot::sccs_set

Namespaces

- namespace spot

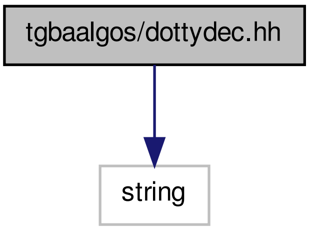
Functions

- std::vector< std::vector< sccs_set ∗ > > ∗ spot::find_paths (tgba ∗a, const scc_map &m)
- unsigned spot::max_spanning_paths (std::vector< sccs_set ∗ > ∗paths, scc_map &m)
- std::list< tgba ∗ > spot::split_tgba (tgba ∗a, const scc_map &m, unsigned split_number)

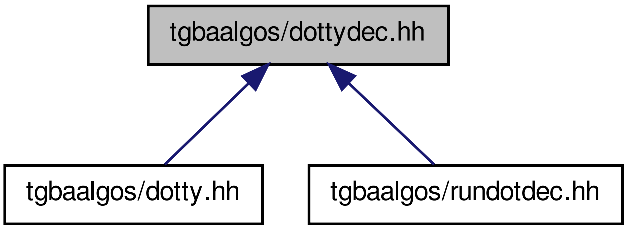
8.123 tgbaalgos/dottydec.hh File Reference

```
#include <string>
```

Include dependency graph for dottydec.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::dotty_decorator

  Choose state and link styles for spot::dotty_reachable.

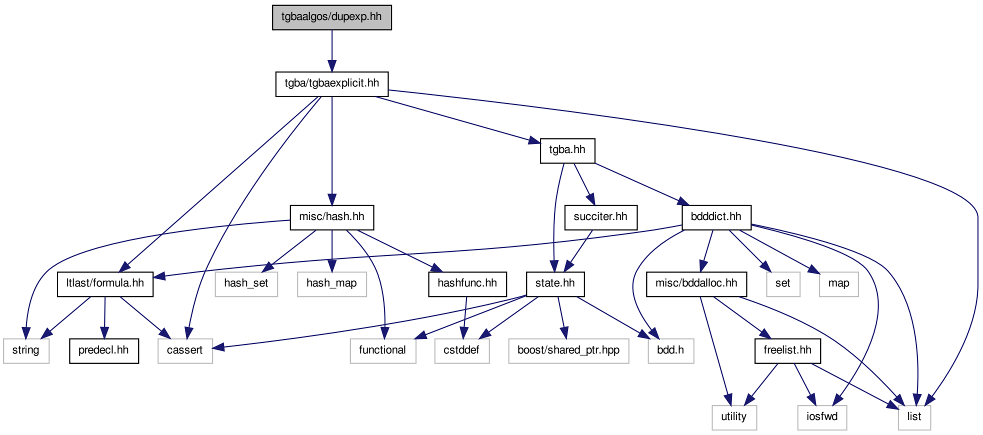
Namespaces

- namespace spot

8.124 tgbaalgos/dupexp.hh File Reference

```
#include "tgba/tgbaexplicit.hh"
```

Include dependency graph for dupexp.hh:



Namespaces

- namespace spot

Functions

- tgba_explicit ∗ spot::tgba_dupexp_bfs (const tgba ∗aut)

  Build an explicit automata from all states of aut, numbering states in bread first order as they are processed.

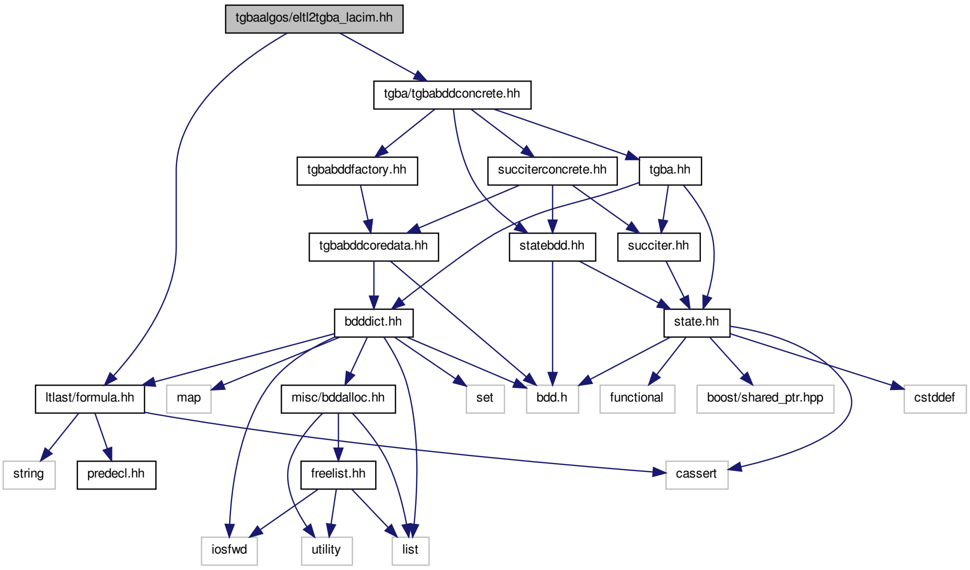
- tgba_explicit ∗ spot::tgba_dupexp_dfs (const tgba ∗aut)

  Build an explicit automata from all states of aut, numbering states in depth first order as they are processed.

8.125 tgbaalgos/eltl2tgba_lacim.hh File Reference

```
#include "ltlast/formula.hh"
#include "tgba/tgbabddconcrete.hh"
```

Include dependency graph for eltl2tgba_lacim.hh:



Namespaces

- namespace spot

Functions

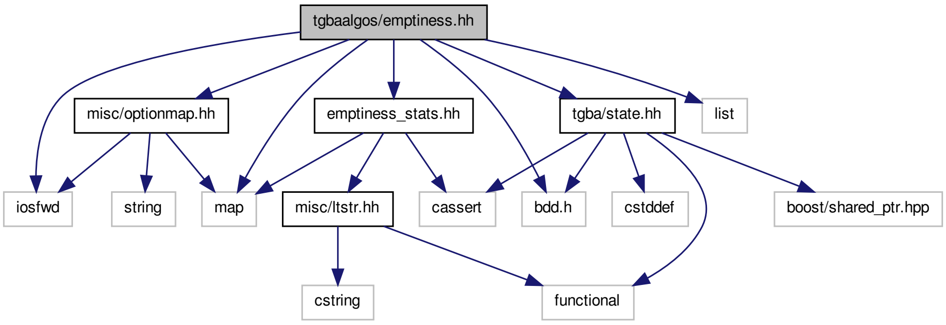
- tgba_bdd_concrete ∗ spot::eltl_to_tgba_lacim (const ltl::formula ∗f, bdd_dict ∗dict)

  Build a spot::tgba_bdd_concrete from an ELTL formula.
  This is based on the following paper.

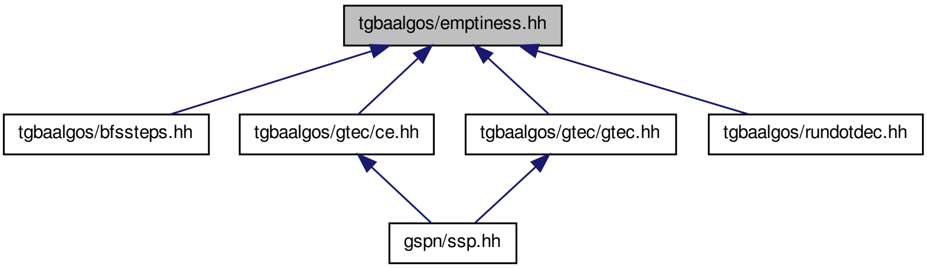
8.126 tgbaalgos/emptiness.hh File Reference

```
#include <map>
#include <list>
#include <iosfwd>
#include <bdd.h>
#include "misc/optionmap.hh"
#include "tgba/state.hh"
#include "emptiness_stats.hh"
```

Include dependency graph for emptiness.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::emptiness_check_result

  The result of an emptiness check.

- class spot::emptiness_check

  Common interface to emptiness check algorithms.

- class spot::emptiness_check_instantiator
- struct spot::tgba_run

  An accepted run, for a tgba.

- struct spot::tgba_run::step

Namespaces

- namespace spot

Functions

- std::ostream & spot::print_tgba_run (std::ostream &os, const tgba ∗a, const tgba_run ∗run)

  Display a tgba_run.

- tgba ∗ spot::tgba_run_to_tgba (const tgba ∗a, const tgba_run ∗run)

  Return an explicit_tgba corresponding to run (i.e. comparable states are merged).

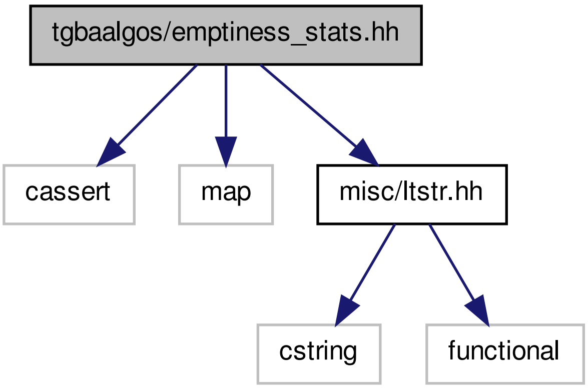
8.127 tgbaalgos/emptiness_stats.hh File Reference

`#include <cassert>`

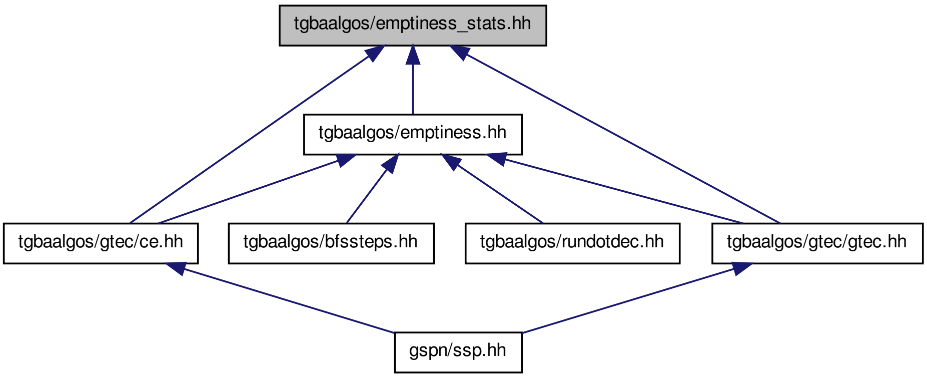
`#include <map>`

`#include "misc/ltstr.hh"`

Include dependency graph for emptiness_stats.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::unsigned_statistics
- class spot::unsigned_statistics_copy

  comparable statistics

- class spot::ec_statistics

  Emptiness-check statistics.

- class spot::ars_statistics

  Accepting Run Search statistics.

- class spot::acss_statistics

  Accepting Cycle Search Space statistics.

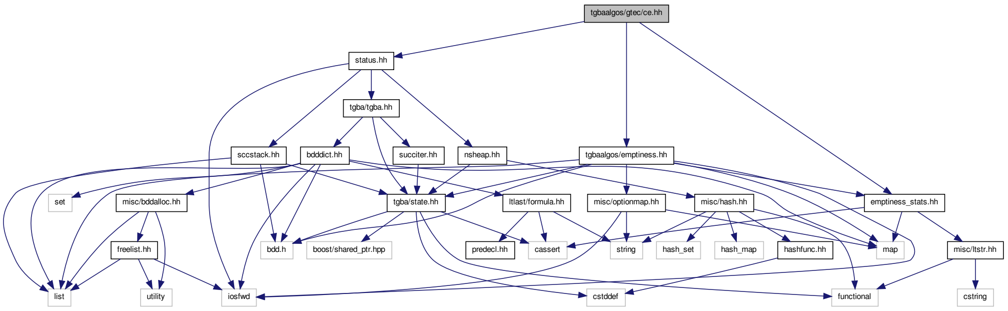
Namespaces

- namespace spot

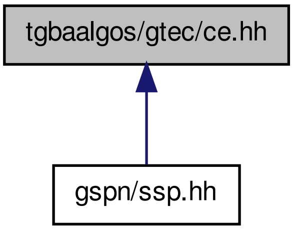
8.128 tgbaalgos/gtec/ce.hh File Reference

```
#include "status.hh"
#include "tgbaalgos/emptiness.hh"
#include "tgbaalgos/emptiness_stats.hh"
```

Include dependency graph for ce.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::couvreur99_check_result

    Compute a counter example from a spot::couvreur99_check_status.

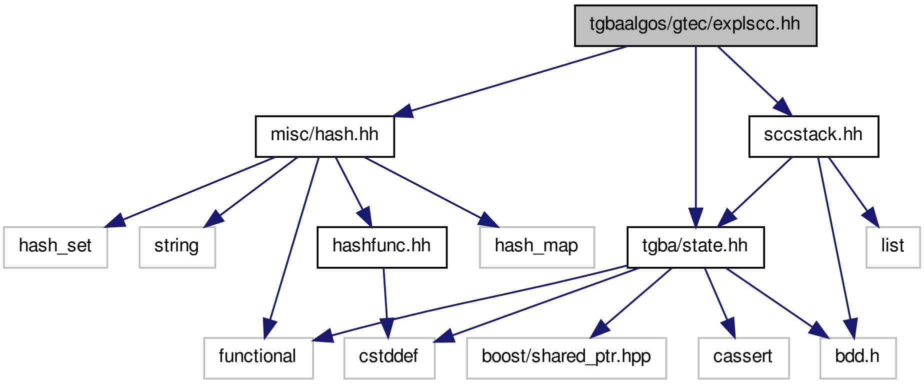
Namespaces

- namespace spot

8.129 tgbaalgos/gtec/explscc.hh File Reference

```
#include "misc/hash.hh"
#include "tgba/state.hh"
#include "sccstack.hh"
```

Include dependency graph for explscc.hh:



Classes

- class spot::explicit_connected_component

  An SCC storing all its states explicitly.

- class spot::connected_component_hash_set
- class spot::explicit_connected_component_factory

  Abstract factory for explicit_connected_component.

- class spot::connected_component_hash_set_factory

  Factory for connected_component_hash_set.

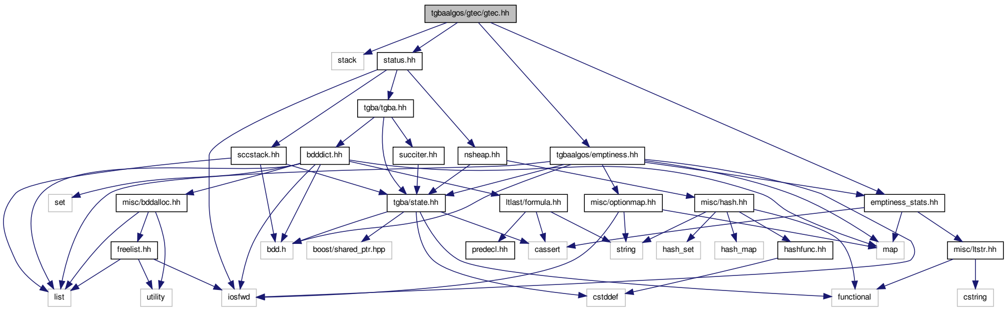
Namespaces

- namespace spot

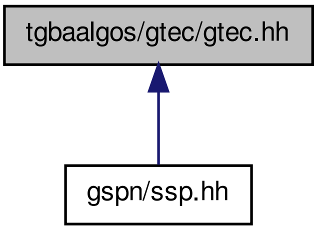
8.130 tgbaalgos/gtec/gtec.hh File Reference

```
#include <stack>
#include "status.hh"
#include "tgbaalgos/emptiness.hh"
#include "tgbaalgos/emptiness_stats.hh"
```

Include dependency graph for gtec.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::couvreur99_check

  An implementation of the Couvreur99 emptiness-check algorithm.

- class spot::couvreur99_check_shy

  A version of spot::couvreur99_check that tries to visit known states first.

- struct spot::couvreur99_check_shy::successor
- struct spot::couvreur99_check_shy::todo_item

Namespaces

- namespace spot

Functions

- emptiness_check ∗ spot::couvreur99 (const tgba ∗a, option_map options=option_map(), const numbered_state_heap_factory ∗nshf=numbered_state_heap_hash_map_factory::instance())

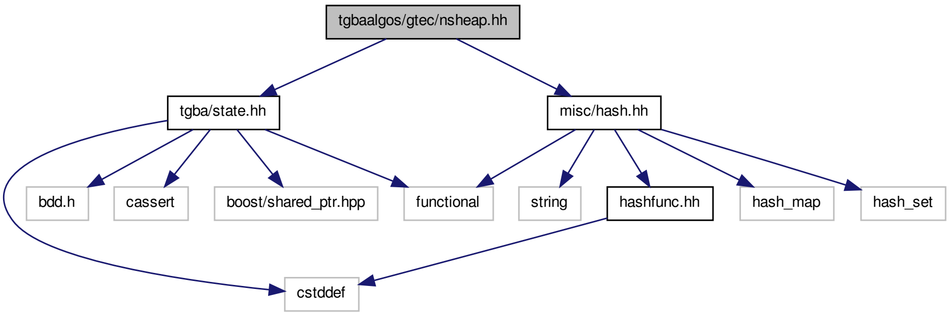
Check whether the language of an automate is empty.

8.131 tgbaalgos/gtec/nsheap.hh File Reference

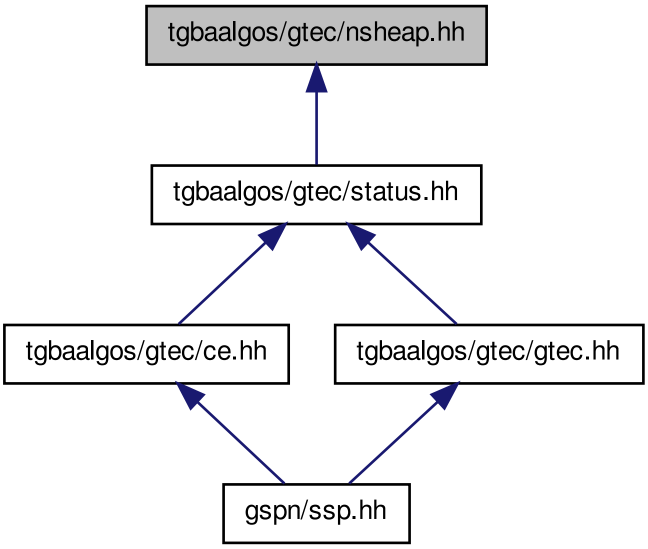
`#include "tgba/state.hh"`

`#include "misc/hash.hh"`

Include dependency graph for nsheap.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::numbered_state_heap_const_iterator

  Iterator on numbered_state_heap objects.

- class spot::numbered_state_heap

  Keep track of a large quantity of indexed states.

- class spot::numbered_state_heap_factory

  Abstract factory for numbered_state_heap.

- class spot::numbered_state_heap_hash_map

  A straightforward implementation of numbered_state_heap with a hash map.

- class spot::numbered_state_heap_hash_map_factory

  Factory for numbered_state_heap_hash_map.

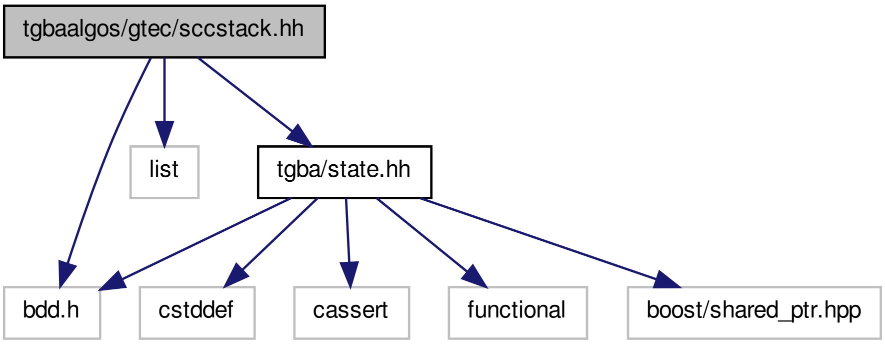
Namespaces

- namespace spot

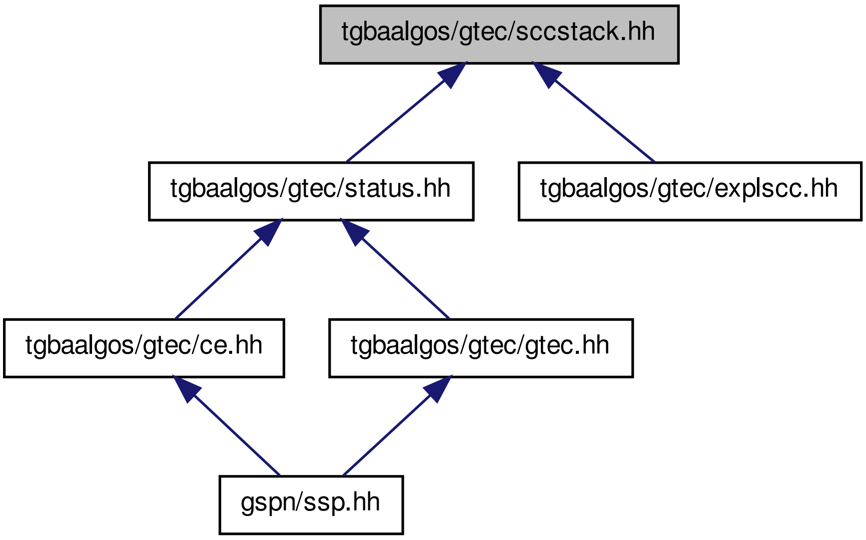
8.132 tgbaalgos/gtec/sccstack.hh File Reference

```
#include <bdd.h>
#include <list>
#include <tgba/state.hh>
```

Include dependency graph for sccstack.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::scc_stack
- struct spot::scc_stack::connected_component

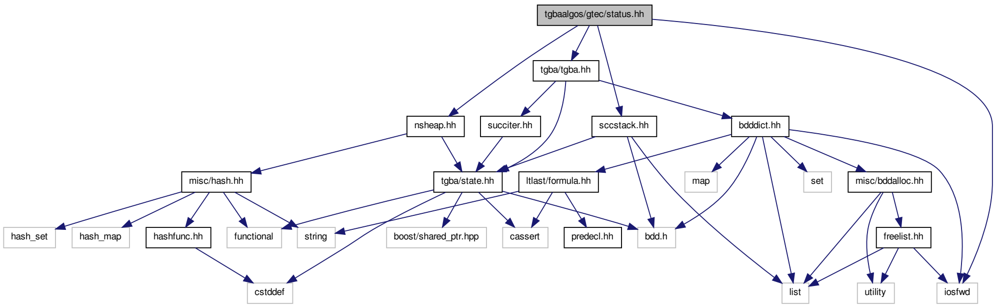
Namespaces

- namespace spot

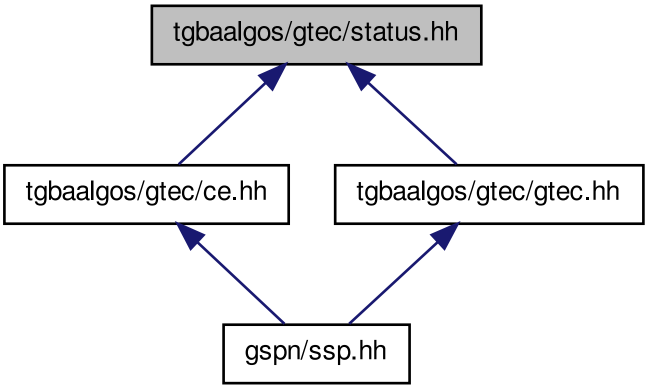
8.133 tgbaalgos/gtec/status.hh File Reference

```
#include "sccstack.hh"
#include "nsheap.hh"
#include "tgba/tgba.hh"
#include <iosfwd>
```

Include dependency graph for status.hh:



This graph shows which files directly or indirectly include this file:



Classes

- class spot::couvreur99_check_status

  The status of the emptiness-check on success.

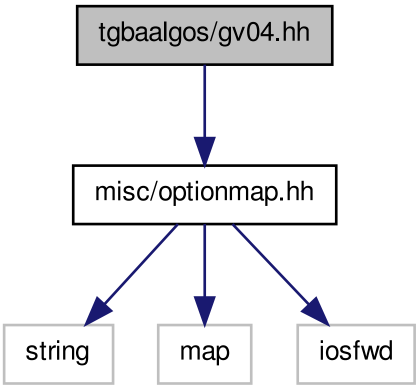
Namespaces

- namespace spot

8.134 tgbaalgos/gv04.hh File Reference

```
#include "misc/optionmap.hh"
```

Include dependency graph for gv04.hh:



Namespaces

- namespace spot

Functions

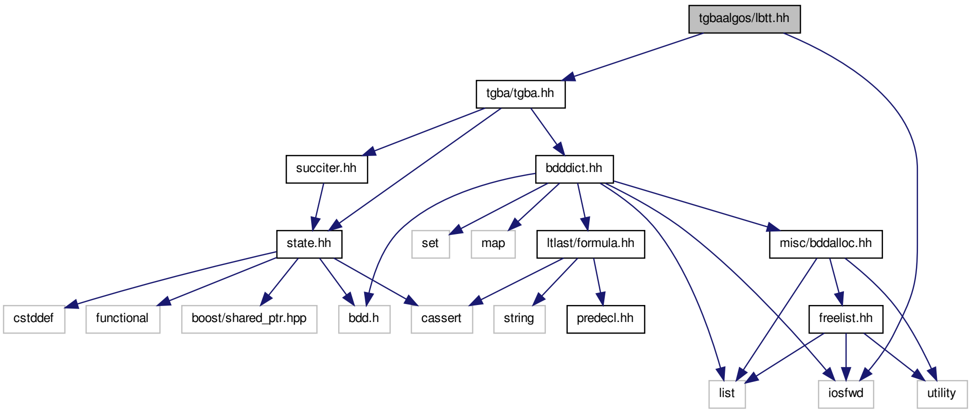
- emptiness_check ∗ spot::explicit_gv04_check (const tgba ∗a, option_map o=option_map())

  Emptiness check based on Geldenhuys and Valmari's TACAS'04 paper.

8.135 tgbaalgos/lbtt.hh File Reference

```
#include "tgba/tgba.hh"
#include <iosfwd>
```

Include dependency graph for lbtt.hh:



Namespaces

- namespace spot

Functions

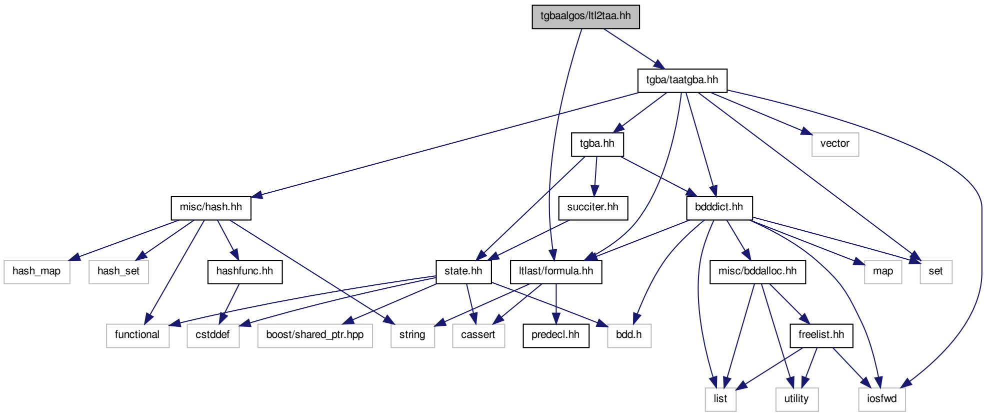
- std::ostream & spot::lbtt_reachable (std::ostream &os, const tgba ∗g)

  Print reachable states in LBTT format.

8.136 tgbaalgos/ltl2taa.hh File Reference

```
#include "ltlast/formula.hh"
#include "tgba/taatgba.hh"
```

Include dependency graph for ltl2taa.hh:



Namespaces

- namespace spot

Functions

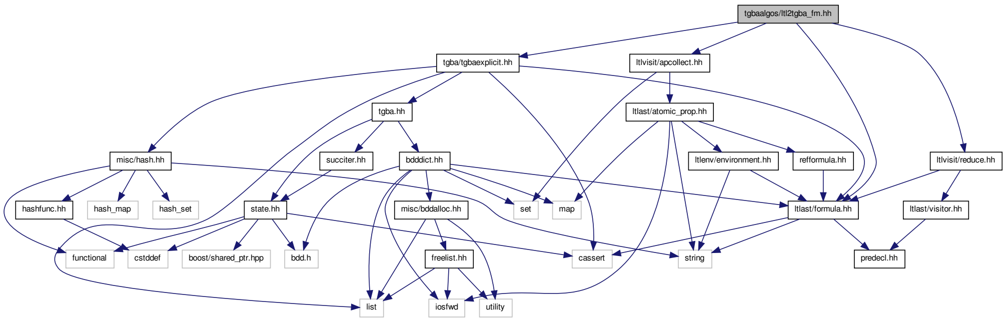
- taa_tgba ∗ spot::ltl_to_taa (const ltl::formula ∗f, bdd_dict ∗dict, bool refined_rules=false)

  Build a spot::taa∗ from an LTL formula.
  This is based on the following.

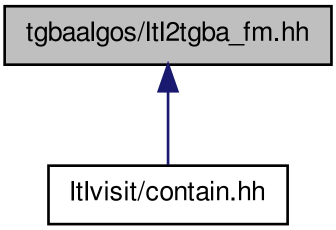
8.137 tgbaalgos/ltl2tgba_fm.hh File Reference

```
#include "ltlast/formula.hh"
#include "tgba/tgbaexplicit.hh"
#include "ltlvisit/apcollect.hh"
#include "ltlvisit/reduce.hh"
```

Include dependency graph for ltl2tgba_fm.hh:



This graph shows which files directly or indirectly include this file:



Namespaces

- namespace spot

Functions

- tgba_explicit ∗ spot::ltl_to_tgba_fm (const ltl::formula ∗f, bdd_dict ∗dict, bool exprop=false, bool symb_merge=true, bool branching_postponement=false, bool fair_loop_approx=false, const ltl::atomic_prop_set ∗unobs=0, int reduce_ltl=ltl::Reduce_None)

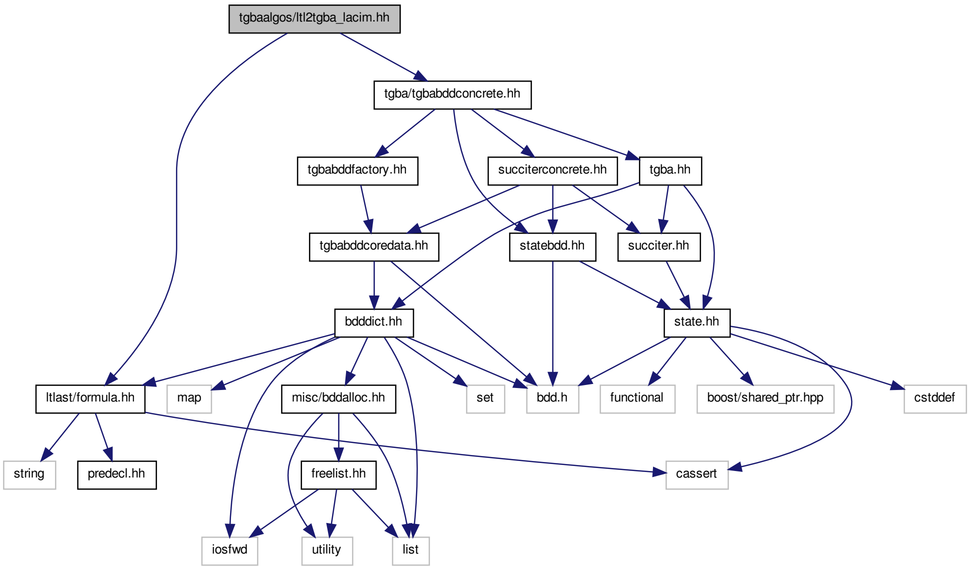
  Build a spot::tgba_explicit∗ from an LTL formula.
  This is based on the following paper.

8.138 tgbaalgos/ltl2tgba_lacim.hh File Reference

`#include "ltlast/formula.hh"`

`#include "tgba/tgbabddconcrete.hh"`

Include dependency graph for ltl2tgba_lacim.hh:



Namespaces

- namespace spot

Functions

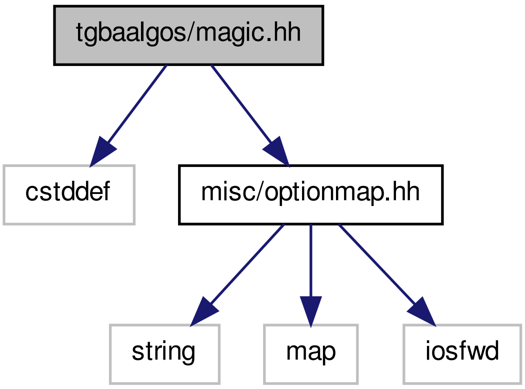
- tgba_bdd_concrete ∗ spot::ltl_to_tgba_lacim (const ltl::formula ∗f, bdd_dict ∗dict)

  Build a spot::tgba_bdd_concrete from an LTL formula.
  This is based on the following paper.

8.139 tgbaalgos/magic.hh File Reference

```
#include <cstddef>
#include "misc/optionmap.hh"
```

Include dependency graph for magic.hh:



Namespaces

- namespace spot

Functions

- emptiness_check ∗ spot::explicit_magic_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ spot::bit_state_hashing_magic_search (const tgba ∗a, size_t size, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

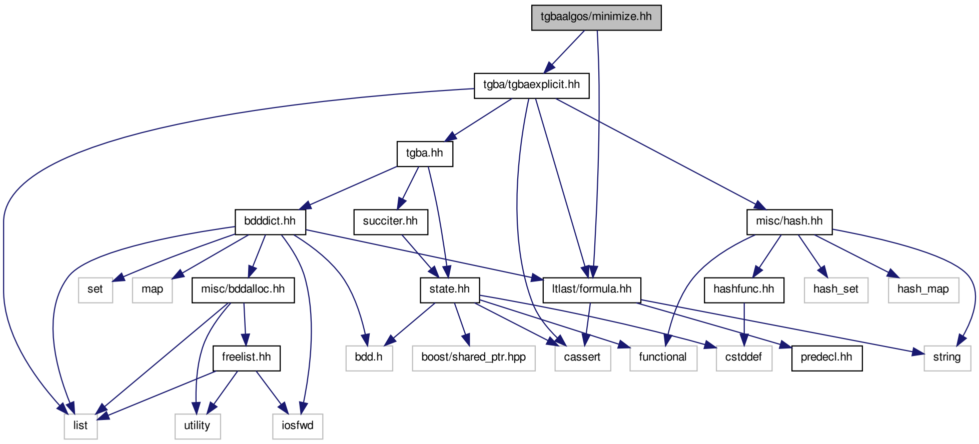
- emptiness_check ∗ spot::magic_search (const tgba ∗a, option_map o=option_map())

  Wrapper for the two magic_search implementations.

8.140 tgbaalgos/minimize.hh File Reference

```
#include "tgba/tgbaexplicit.hh"
#include "ltlast/formula.hh"
```

Include dependency graph for minimize.hh:



Namespaces

- namespace spot

Functions

- tgba_explicit_number ∗ spot::minimize_monitor (const tgba ∗a)

  Construct a minimal deterministic monitor.

- tgba_explicit_number ∗ spot::minimize_wdba (const tgba ∗a)

  Minimize a Büchi automaton in the WDBA class.

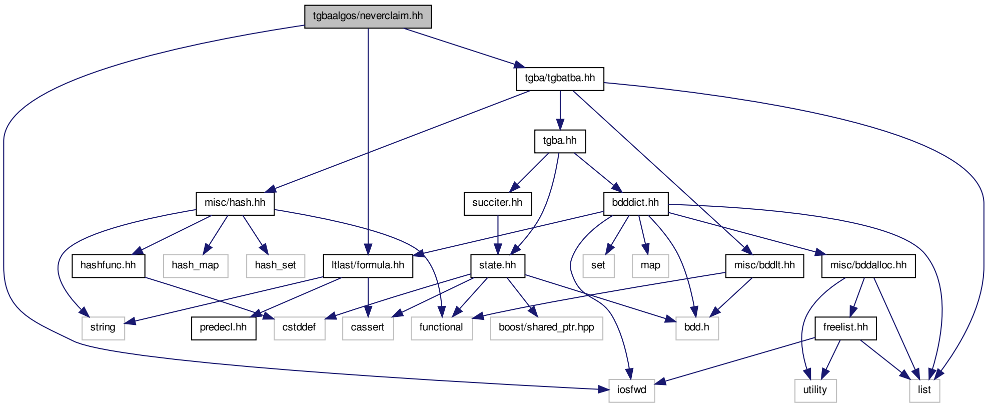
- const tgba ∗ spot::minimize_obligation (const tgba ∗aut_f, const ltl::formula ∗f=0, const tgba ∗aut_neg_f=0)

  Minimize an automaton if it represents an obligation property.

8.141 tgbaalgos/neverclaim.hh File Reference

```
#include <iosfwd>
#include "ltlast/formula.hh"
#include "tgba/tgbatba.hh"
```

Include dependency graph for neverclaim.hh:



Namespaces

- namespace spot

Functions

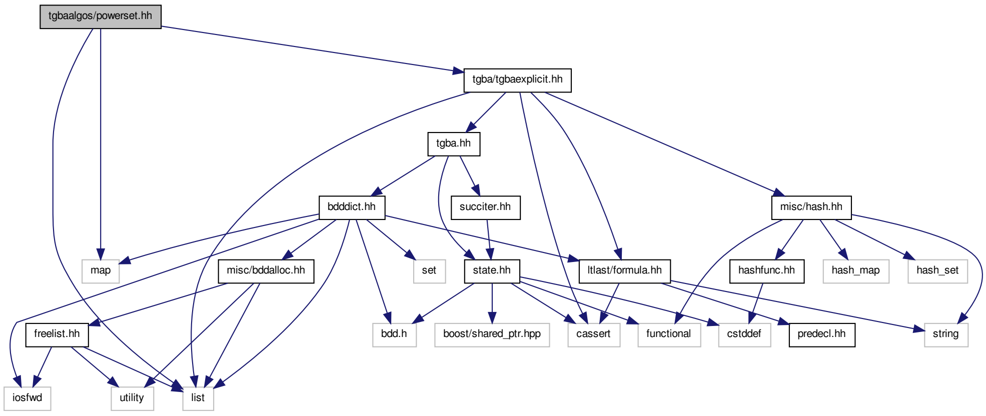
- std::ostream & spot::never_claim_reachable (std::ostream &os, const tgba_sba_proxy ∗g, const ltl::formula ∗f=0, bool comments=false)

  Print reachable states in Spin never claim format.

8.142 tgbaalgos/powerset.hh File Reference

```
#include <list>
#include <map>
#include "tgba/tgbaexplicit.hh"
```

Include dependency graph for powerset.hh:



Classes

- struct spot::power_map

Namespaces

- namespace spot

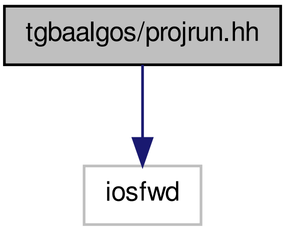
Functions

- tgba_explicit_number ∗ spot::tgba_powerset (const tgba ∗aut, power_map &pm)
  Build a deterministic automaton, ignoring acceptance conditions.
  This create a deterministic automaton that recognizes the same language as aut would if its acceptance conditions were ignored. This is the classical powerset algorithm.
- tgba_explicit_number ∗ spot::tgba_powerset (const tgba ∗aut)

8.143 tgbaalgos/projrun.hh File Reference

`#include <iosfwd>`

Include dependency graph for projrun.hh:



Namespaces

- namespace spot

Functions

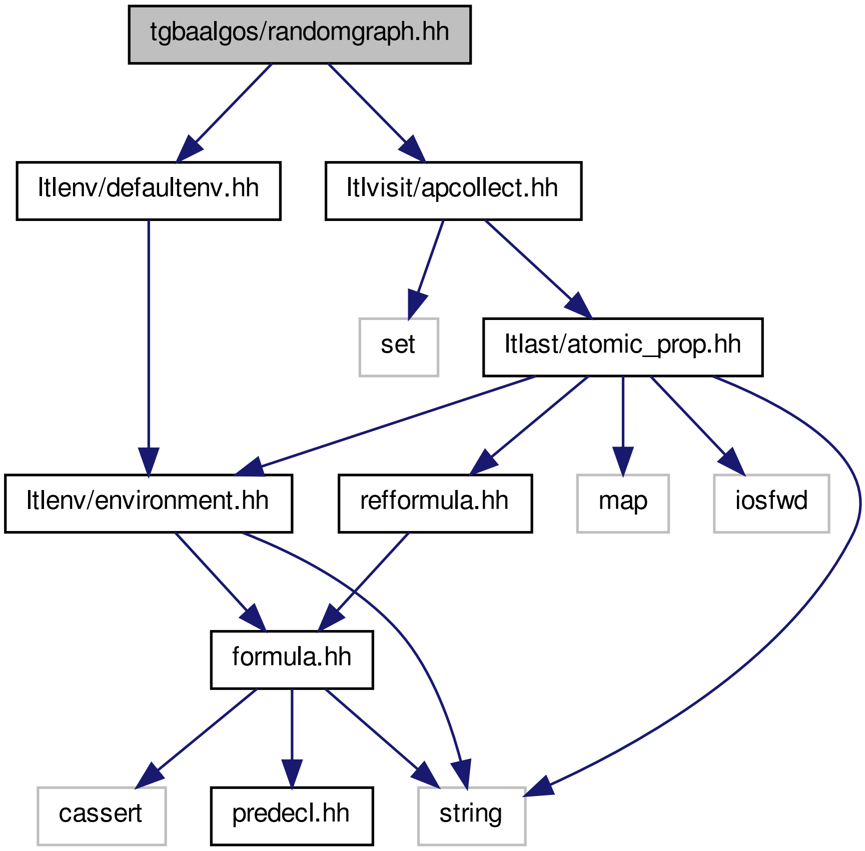
- tgba_run ∗ spot::project_tgba_run (const tgba ∗a_run, const tgba ∗a_proj, const tgba_run ∗run)

  Project a tgba_run on a tgba.
  If a tgba_run has been generated on a product, or any other on-the-fly algorithm with tgba operands,.

8.144 tgbaalgos/randomgraph.hh File Reference

```
#include "ltlvisit/apcollect.hh"
#include "ltlenv/defaultenv.hh"
```

Include dependency graph for randomgraph.hh:



Namespaces

- namespace spot

Functions

- tgba ∗ spot::random_graph (int n, float d, const ltl::atomic_prop_set ∗ap, bdd_dict ∗dict, int n_acc=0, float a=0.1, float t=0.5, ltl::environment ∗env=&ltl::default_environment::instance())

  Construct a tgba randomly.

8.145 tgbaalgos/reducerun.hh File Reference

Namespaces

- namespace spot

Functions

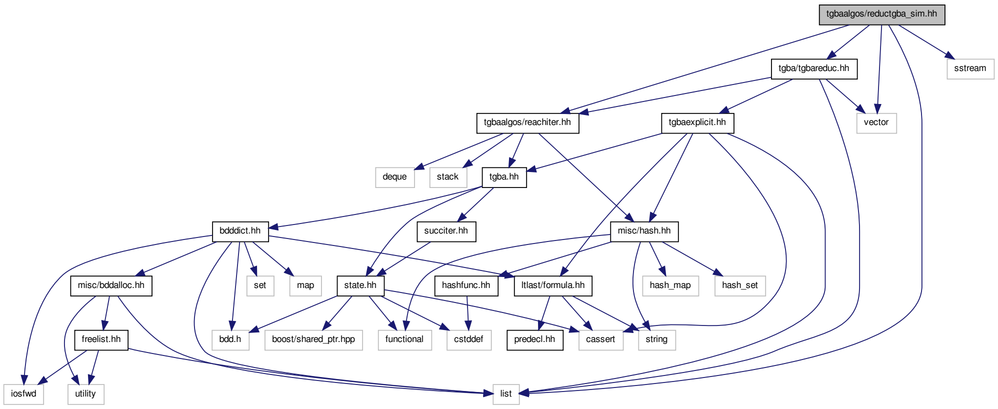
- tgba_run ∗ spot::reduce_run (const tgba ∗a, const tgba_run ∗org)

  Reduce an accepting run.
  Return a run which is accepting for and that is no longer that org.

8.146 tgbaalgos/reductgba_sim.hh File Reference

```
#include "tgba/tgbareduc.hh"
#include "tgbaalgos/reachiter.hh"
#include <vector>
#include <list>
#include <sstream>
```

Include dependency graph for reductgba_sim.hh:



Classes

- class spot::parity_game_graph

  Parity game graph which compute a simulation relation.

- class spot::spoiler_node

  Spoiler node of parity game graph.

- class spot::duplicator_node

  Duplicator node of parity game graph.

- class spot::parity_game_graph_direct

    Parity game graph which compute the direct simulation relation.

- class spot::spoiler_node_delayed

    Spoiler node of parity game graph for delayed simulation.

- class spot::duplicator_node_delayed

    Duplicator node of parity game graph for delayed simulation.

- class spot::parity_game_graph_delayed

Namespaces

- namespace spot

Typedefs

- typedef std::vector< spoiler_node ∗ > spot::sn_v
- typedef std::vector< duplicator_node ∗ > spot::dn_v
- typedef std::vector< const state ∗ > spot::s_v

Enumerations

- enum spot::reduce_tgba_options {

    spot::Reduce_None = 0, spot::Reduce_quotient_Dir_Sim = 1, spot::Reduce_transition_Dir_Sim = 2, spot::Reduce_quotient_Del_Sim = 4,

    spot::Reduce_transition_Del_Sim = 8, spot::Reduce_Scc = 16, spot::Reduce_All = -1U }

    Options for reduce.

Functions

- const tgba ∗ spot::reduc_tgba_sim (const tgba ∗a, int opt=Reduce_All)

    Remove some node of the automata using a simulation relation.

- direct_simulation_relation ∗ spot::get_direct_relation_simulation (const tgba ∗a, std::ostream &os, int opt=-1)

    Compute a direct simulation relation on state of tgba f.

- delayed_simulation_relation ∗ spot::get_delayed_relation_simulation (const tgba ∗a, std::ostream &os, int opt=-1)
- void spot::free_relation_simulation (direct_simulation_relation ∗rel)

    To free a simulation relation.

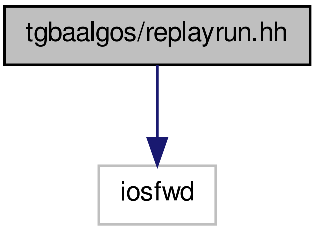
- void spot::free_relation_simulation (delayed_simulation_relation ∗rel)

    To free a simulation relation.

8.147 tgbaalgos/replayrun.hh File Reference

`#include <iosfwd>`

Include dependency graph for replayrun.hh:



Namespaces

- namespace spot

Functions

- bool spot::replay_tgba_run (std::ostream &os, const tgba ∗a, const tgba_run ∗run, bool debug=false)

  Replay a tgba_run on a tgba.
  This is similar to print_tgba_run(), except that the run is actually replayed on the automaton while it is printed. Doing so makes it possible to display transition annotations (returned by spot::tgba::transition_annotation()). The output will stop if the run cannot be completed.

8.148 tgbaalgos/rundotdec.hh File Reference

`#include <map>`

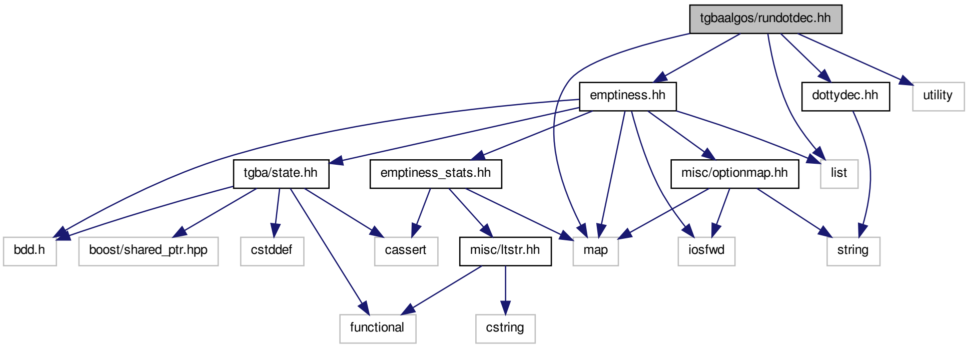
`#include <utility>`

`#include <list>`

`#include "dottydec.hh"`

`#include "emptiness.hh"`

Include dependency graph for rundotdec.hh:



Classes

- class spot::tgba_run_dotty_decorator

  Highlight a spot::tgba_run on a spot::tgba.
  An instance of this class can be passed to spot::dotty_reachable.

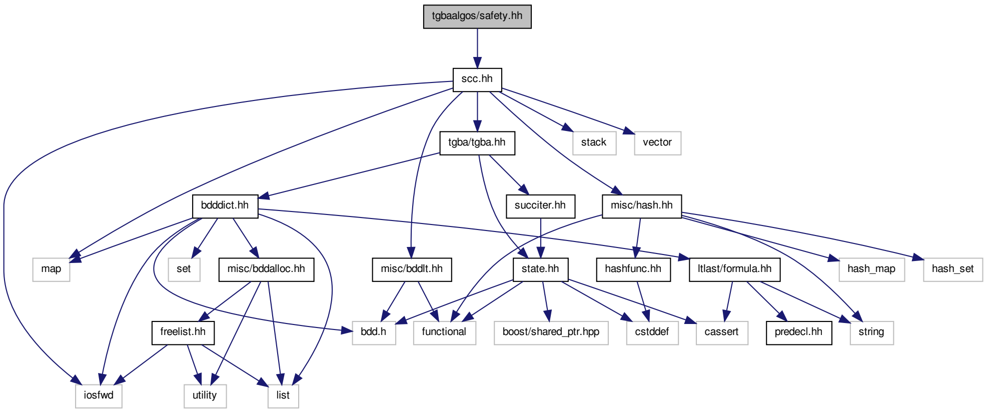
Namespaces

- namespace spot

8.149 tgbaalgos/safety.hh File Reference

`#include "scc.hh"`

Include dependency graph for safety.hh:



Namespaces

- namespace spot

Functions

- bool spot::is_guarantee_automaton (const tgba ∗aut, const scc_map ∗sm=0)

  Whether an automaton represents a guarantee property.

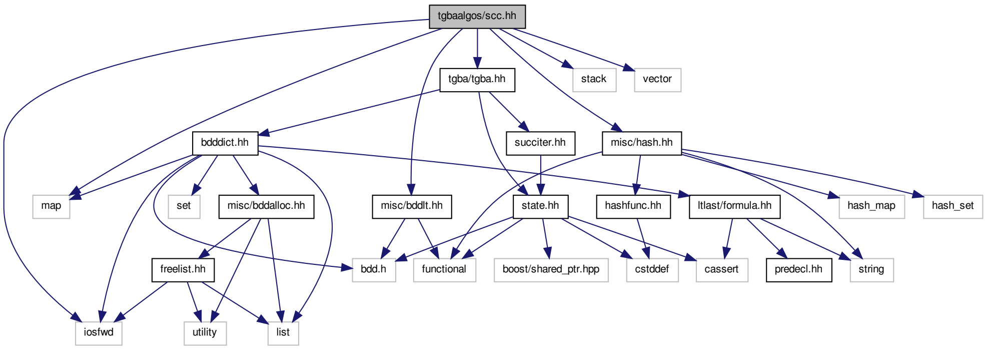
- bool spot::is_safety_mwdba (const tgba ∗aut)

  Whether a minimized WDBA represents a safety property.

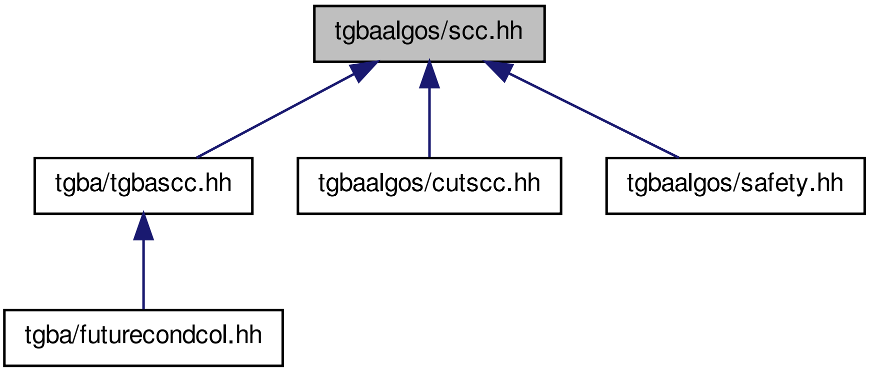
8.150 tgbaalgos/scc.hh File Reference

```
#include <map>
#include <stack>
#include <vector>
#include "tgba/tgba.hh"
#include <iosfwd>
#include "misc/hash.hh"
#include "misc/bddlt.hh"
```

Include dependency graph for scc.hh:



This graph shows which files directly or indirectly include this file:



Classes

- struct spot::scc_stats
- class spot::scc_map

  Build a map of Strongly Connected components in in a TGBA.

- struct spot::scc_map::scc

Namespaces

- namespace spot

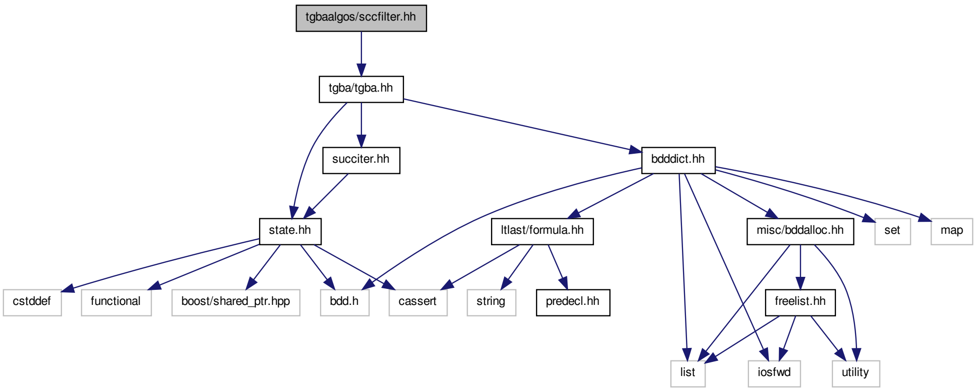
Functions

- scc_stats spot::build_scc_stats (const tgba ∗a)
- scc_stats spot::build_scc_stats (const scc_map &m)
- std::ostream & spot::dump_scc_dot (const tgba ∗a, std::ostream &out, bool verbose=false)
- std::ostream & spot::dump_scc_dot (const scc_map &m, std::ostream &out, bool verbose=false)

8.151 tgbaalgos/sccfilter.hh File Reference

```
#include "tgba/tgba.hh"
```

Include dependency graph for sccfilter.hh:



Namespaces

- namespace spot

Functions

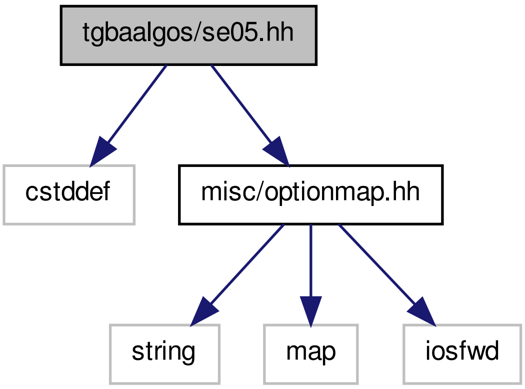
- tgba ∗ spot::scc_filter (const tgba ∗aut, bool remove_all_useless=false)

  Prune unaccepting SCCs and remove superfluous acceptance conditions.

8.152 tgbaalgos/se05.hh File Reference

```
#include <cstddef>
#include "misc/optionmap.hh"
```

Include dependency graph for se05.hh:



Namespaces

- namespace spot

Functions

- emptiness_check ∗ spot::explicit_se05_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness check on the spot::tgba automaton a.

- emptiness_check ∗ spot::bit_state_hashing_se05_search (const tgba ∗a, size_t size, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

- emptiness_check ∗ spot::se05 (const tgba ∗a, option_map o)

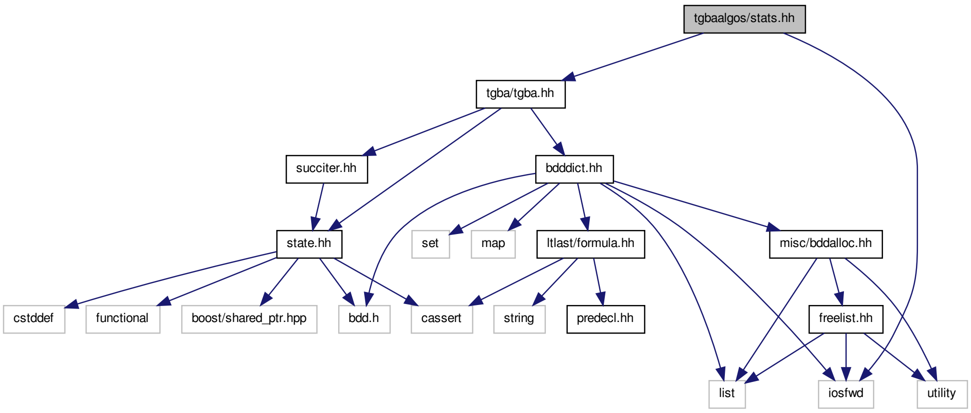
  Wrapper for the two se05 implementations.

8.153 tgbaalgos/stats.hh File Reference

`#include "tgba/tgba.hh"`

`#include <iosfwd>`

Include dependency graph for stats.hh:



Classes

- struct spot::tgba_statistics
- struct spot::tgba_sub_statistics

Namespaces

- namespace spot

Functions

- tgba_statistics spot::stats_reachable (const tgba ∗g)

    Compute statistics for an automaton.

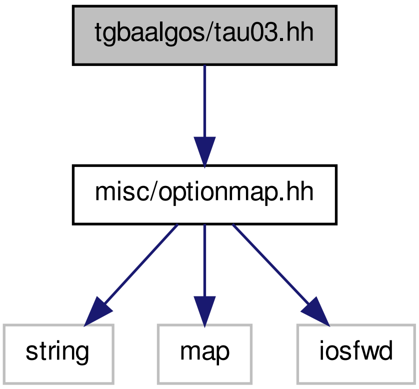
- tgba_sub_statistics spot::sub_stats_reachable (const tgba ∗g)

    Compute subended statistics for an automaton.

8.154 tgbaalgos/tau03.hh File Reference

```
#include "misc/optionmap.hh"
```

Include dependency graph for tau03.hh:



Namespaces

- namespace spot

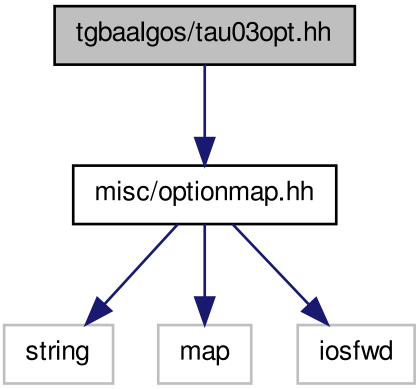
Functions

- emptiness_check ∗ spot::explicit_tau03_search (const tgba ∗a, option_map o=option_map())
  Returns an emptiness checker on the spot::tgba automaton a.

8.155 tgbaalgos/tau03opt.hh File Reference

```
#include "misc/optionmap.hh"
```

Include dependency graph for tau03opt.hh:



Namespaces

- namespace spot

Functions

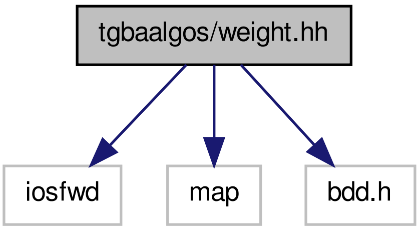
- emptiness_check ∗ spot::explicit_tau03_opt_search (const tgba ∗a, option_map o=option_map())

  Returns an emptiness checker on the spot::tgba automaton a.

8.156 tgbaalgos/weight.hh File Reference

```
#include <iosfwd>
#include <map>
#include <bdd.h>
```

Include dependency graph for weight.hh:



Classes

- class spot::weight

  Manage for a given automaton a vector of counter indexed by its acceptance condition.

Namespaces

- namespace spot

Index