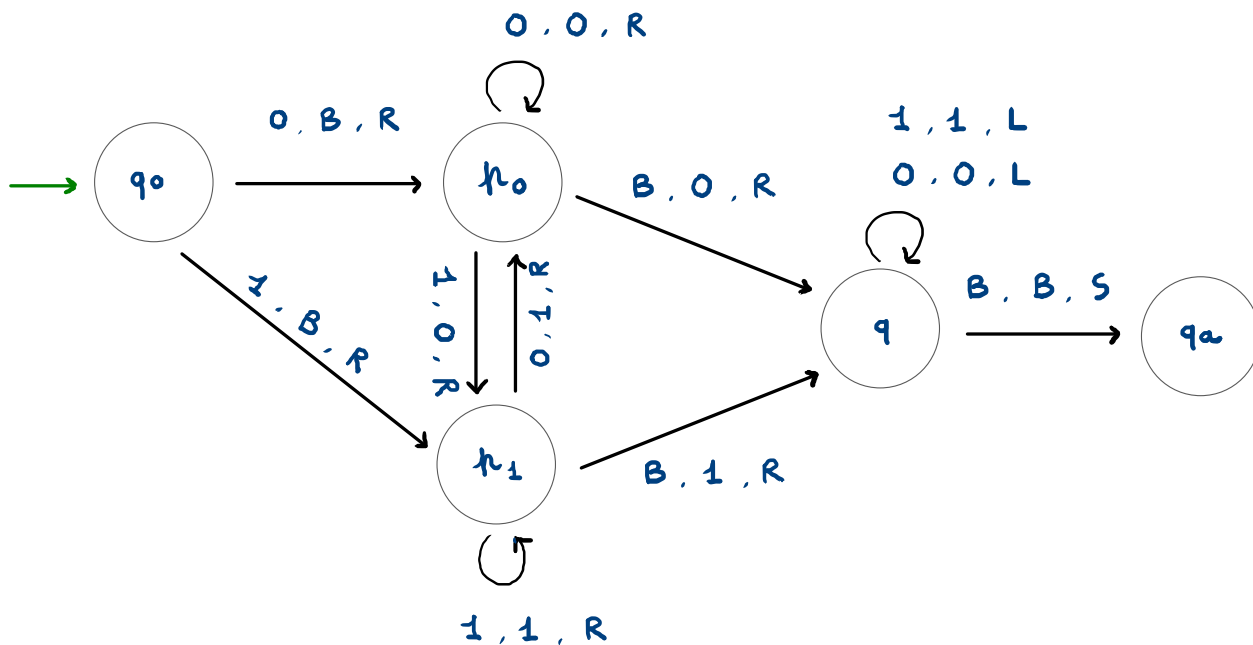


n° 1.1



n° 1 . 3

$x_{-2} \quad x_{-1} \quad x_0 \quad x_1 \quad x_2$
 \uparrow
 q

becomes

$\perp \quad \begin{matrix} x_0 & x_1 \\ x_{-1} & x_{-2} \end{matrix} \dots$
 \uparrow
 q^+

positive universe
negative universe
 \perp end of tape

$\Gamma' = \Gamma^2 \cup \{ \perp \}$ 2 sub. cells per cells

$Q' = Q^+ \cup Q^- \cup \{ q_a \}$ two copies of Q

if $\delta(q, x) = (q', y, L)$ then $\forall \alpha \in \Gamma$

$$\delta'(q_+, \frac{x}{\alpha}) = (q'_+, \frac{y}{\alpha}, L)$$

$$\delta'(q_-, \frac{x}{\alpha}) = (q'_-, \frac{y}{\alpha}, R)$$

reversed in the
negative world

$$\cdot \quad \forall q \in Q / \{q_a\}$$

$$\delta'(q_+, \perp) = (q_-, \perp, R)$$

$$\delta'(q_-, \perp) = (q_+, \perp, R)$$

$$\cdot \quad \delta'(q_a^+, \cdot) = (q_a, \cdot, S)$$

$$\delta'(q_a^-, \cdot) = (q_a, \cdot, S)$$

$$\cdot \quad q'_0 = q_0^+$$

switch worlds

only one final state