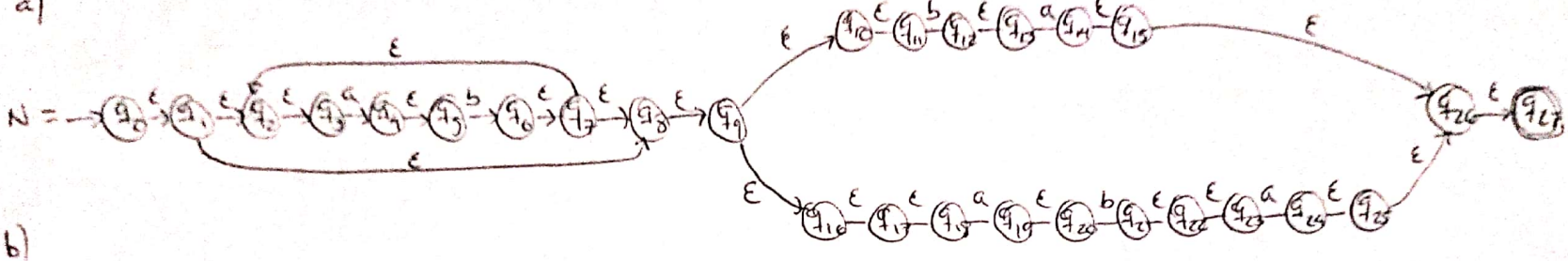
1. $(ab)^*(ba+aba)$

a)



b)

$\varepsilon(q_0) = \{q_0, q_1, q_2, q_3, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_1) = \{q_1, q_2, q_3, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_2) = \{q_2, q_3\}$

$\varepsilon(q_3) = \{q_3\}$

$\varepsilon(q_4) = \{q_4, q_5\}$

$\varepsilon(q_5) = \{q_5\}$

$\varepsilon(q_6) = \{q_6, q_7, q_2, q_3, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_7) = \{q_7, q_2, q_3, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_8) = \{q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_9) = \{q_9, q_{10}, q_{16}, q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_{10}) = \{q_{10}, q_{11}\}$

$\varepsilon(q_{11}) = \{q_{11}\}$

$\varepsilon(q_{12}) = \{q_{12}, q_{13}\}$

$\varepsilon(q_{13}) = \{q_{13}\}$

$\varepsilon(q_{14}) = \{q_{14}, q_{15}, q_{26}, q_{27}\}$

$\varepsilon(q_{15}) = \{q_{15}, q_{26}, q_{27}\}$

$\varepsilon(q_{16}) = \{q_{16}, q_{17}, q_{18}\}$

$\varepsilon(q_{17}) = \{q_{17}, q_{18}\}$

$\varepsilon(q_{18}) = \{q_{18}\}$

$\varepsilon(q_{19}) = \{q_{19}, q_{20}\}$

$\varepsilon(q_{20}) = \{q_{20}\}$

$\varepsilon(q_{21}) = \{q_{21}, q_{22}, q_{23}\}$

$\varepsilon(q_{22}) = \{q_{22}, q_{23}\}$

$\varepsilon(q_{23}) = \{q_{23}\}$

$\varepsilon(q_{24}) = \{q_{24}, q_{25}, q_{26}, q_{27}\}$

$\varepsilon(q_{25}) = \{q_{25}, q_{26}, q_{27}\}$

$\varepsilon(q_{26}) = \{q_{26}, q_{27}\}$

$\varepsilon(q_{27}) = \{q_{27}\}$

$\delta_M(q_0,a) = \{q_4, q_5, q_{19}, q_{20}\}$

$\delta_M(q_1,a) = \{q_4, q_5, q_{19}, q_{20}\}$

$\delta_M(q_2,a) = \{q_4, q_5\}$

$\delta_M(q_3,a) = \{q_4, q_5\}$

$\delta_M(q_4,a) = \emptyset$

$\delta_M(q_5,a) = \emptyset$

$\delta_M(q_6,a) = \{q_4, q_5, q_{19}, q_{20}\}$

$\delta_M(q_7,a) = \{q_4, q_5, q_{19}, q_{20}\}$

$\delta_M(q_8,a) = \{q_{19}, q_{20}\}$

$\delta_M(q_9,a) = \{q_{19}, q_{20}\}$

$\delta_M(q_{10},a) = \emptyset$

$\delta_M(q_{11},a) = \emptyset$

$\delta_M(q_{12},a) = \{q_{14}, q_{15}, q_{26}, q_{27}\}$

$\delta_M(q_{13},a) = \{q_{14}, q_{15}, q_{26}, q_{27}\}$

$\delta_M(q_{14},a) = \emptyset$

$\delta_M(q_{15},a) = \emptyset$

$\delta_M(q_{16},a) = \{q_{19}, q_{20}\}$

$\delta_M(q_{17},a) = \{q_{19}, q_{20}\}$

$\delta_M(q_{18},a) = \{q_{19}, q_{20}\}$

$\delta_M(q_{19},a) = \emptyset$

$\delta_M(q_{20},a) = \emptyset$

$\delta_M(q_{21},a) = \{q_{24}, q_{25}, q_{26}, q_{27}\}$

$\delta_M(q_{22},a) = \{q_{24}, q_{25}, q_{26}, q_{27}\}$

$\delta_M(q_{23},a) = \{q_{24}, q_{25}, q_{26}, q_{27}\}$

$\delta_M(q_{24},a) = \emptyset$

$\delta_M(q_{25},a) = \emptyset$

$\delta_M(q_{26},a) = \emptyset$

$\delta_M(q_{27},a) = \emptyset$

$\delta_M(q_0,b) = \{q_{12}, q_{13}\}$

$\delta_M(q_1,b) = \{q_{12}, q_{13}\}$

$\delta_M(q_2,b) = \emptyset$

$\delta_M(q_3,b) = \emptyset$

$\delta_M(q_4,b) = \{q_6, q_7, q_2, q_3, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\delta_M(q_5,b) = \{q_6, q_7, q_2, q_3, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\}$

$\delta_M(q_6,b) = \{q_{12}, q_{13}\}$

$\delta_M(q_7,b) = \{q_{12}, q_{13}\}$

$\delta_M(q_8,b) = \{q_{12}, q_{13}\}$

$\delta_M(q_9,b) = \{q_{12}, q_{13}\}$

$\delta_M(q_{10},b) = \{q_{12}, q_{13}\}$

$\delta_M(q_{11},b) = \{q_{12}, q_{13}\}$

$\delta_M(q_{12},b) = \emptyset$

$\delta_M(q_{13},b) = \emptyset$

$\delta_M(q_{14},b) = \emptyset$

$\delta_M(q_{15},b) = \emptyset$

$\delta_M(q_{16},b) = \emptyset$

$\delta_M(q_{17},b) = \emptyset$

$\delta_M(q_{18},b) = \emptyset$

$\delta_M(q_{19},b) = \{q_{21}, q_{22}, q_{23}\}$

$\delta_M(q_{20},b) = \{q_{21}, q_{22}, q_{23}\}$

$\delta_M(q_{21},b) = \emptyset$

$\delta_M(q_{22},b) = \emptyset$

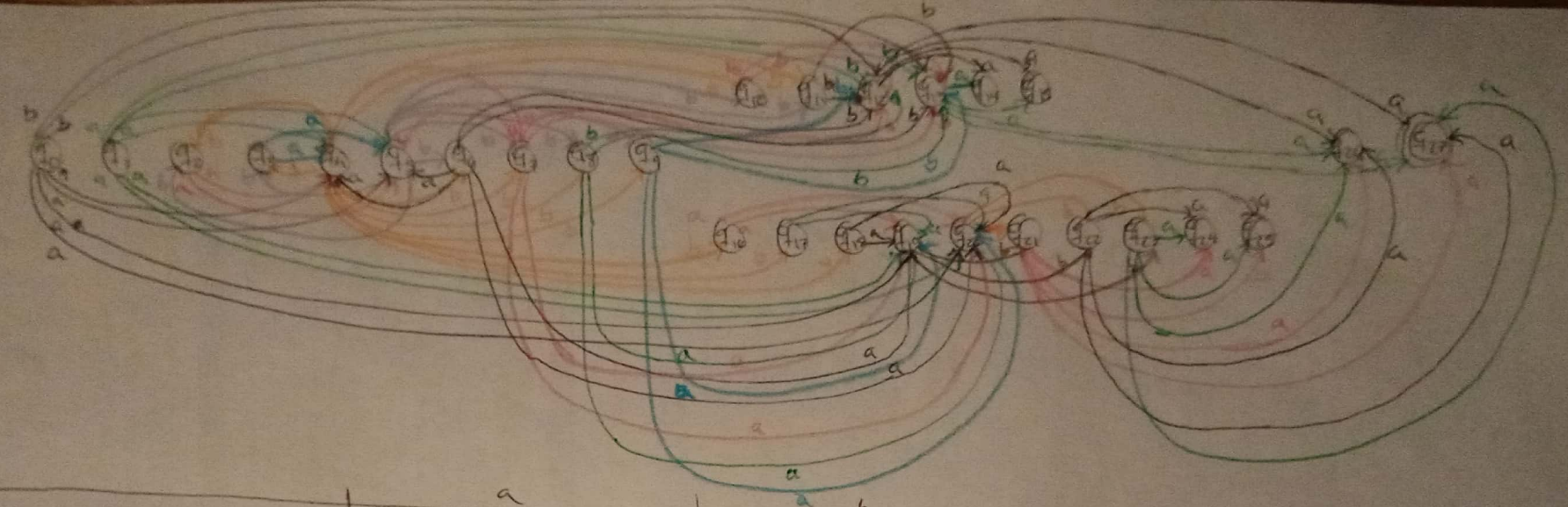
$\delta_M(q_{23},b) = \emptyset$

$\delta_M(q_{24},b) = \emptyset$

$\delta_M(q_{25},b) = \emptyset$

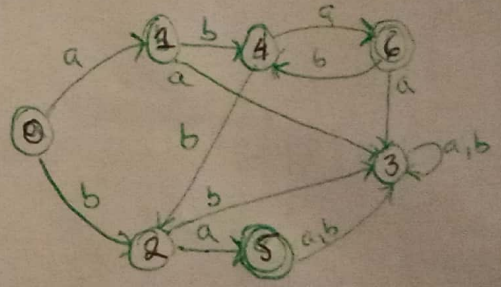
$\delta_M(q_{26},b) = \emptyset$

$\delta_M(q_{27},b) = \emptyset$

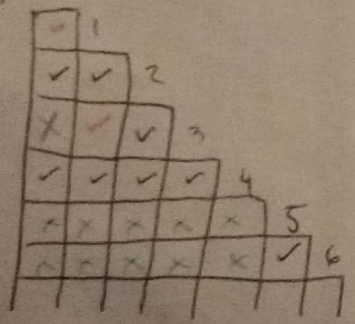


c)

	a	b
→ q_0	$\{q_4, q_5, q_{19}, q_{20}\}$ 1	$\{q_{12}, q_{13}\}$ 2
$\{q_4, q_5, q_{19}, q_{20}\}$	$\emptyset$ 3	$\{q_2, q_3, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}\{q_{21}, q_{22}, q_{23}\}$ 4
$\{q_{12}, q_{13}\}$	$\{q_{14}, q_{15}, q_{26}, q_{27}\}$ 5	$\emptyset$
$\{q_2, q_3, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}, q_{21}, q_{22}, q_{23}\}$	$\{q_4, q_5, q_{19}, q_{20}, q_{24}, q_{25}, q_{26}, q_{27}\}$ 6	$\{q_{12}, q_{13}\}$ 7
F $\{q_{14}, q_{15}, q_{26}, q_{27}\}$	$\emptyset$	$\emptyset$
F $\{q_4, q_5, q_{19}, q_{20}, q_{24}, q_{25}, q_{26}, q_{27}\}$	$\emptyset$	$\{q_2, q_3, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{16}, q_{17}, q_{18}, q_{21}, q_{22}, q_{23}\}$
$\emptyset$	$\emptyset$	$\emptyset$



d)



El autómata no se puede reducir.