

TRABAJO PRÁCTICO N° 2: AUTÓMATAS DE ESTADOS FINITOS Y MÁQUINAS DE TURING

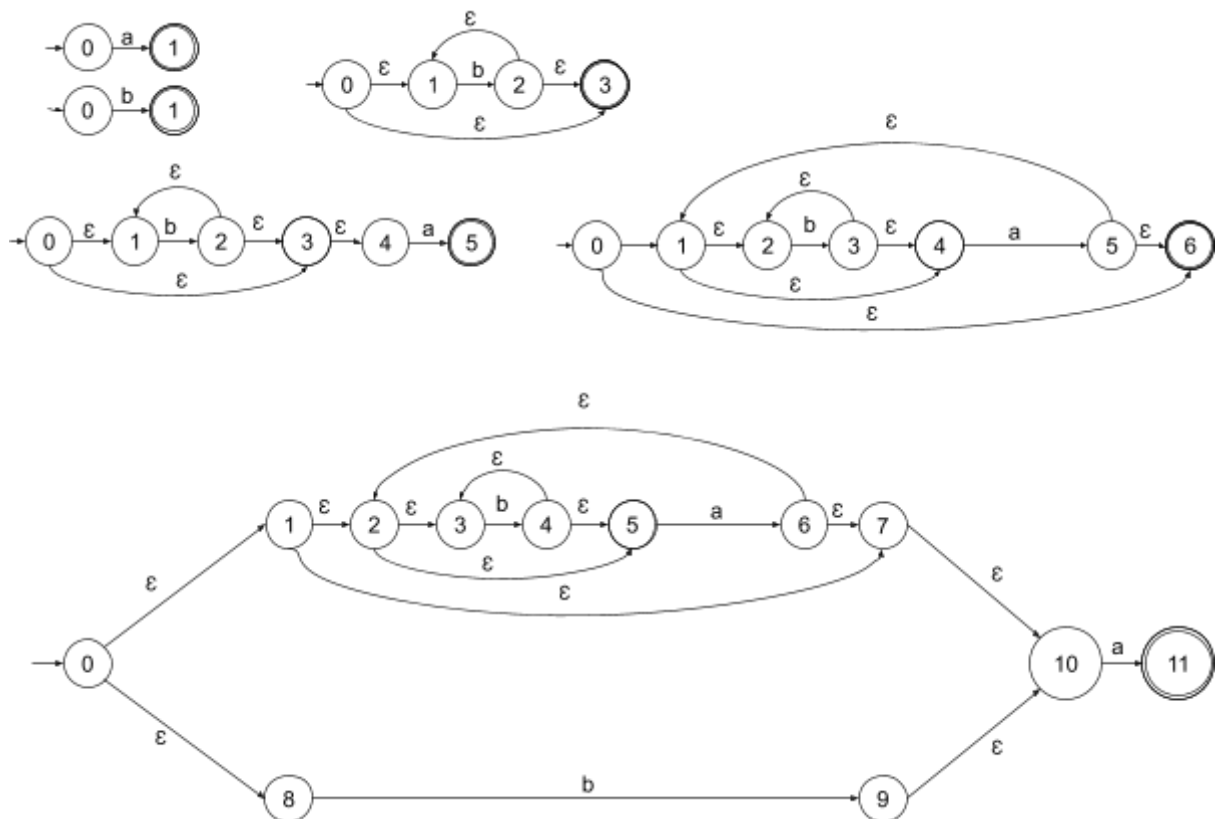
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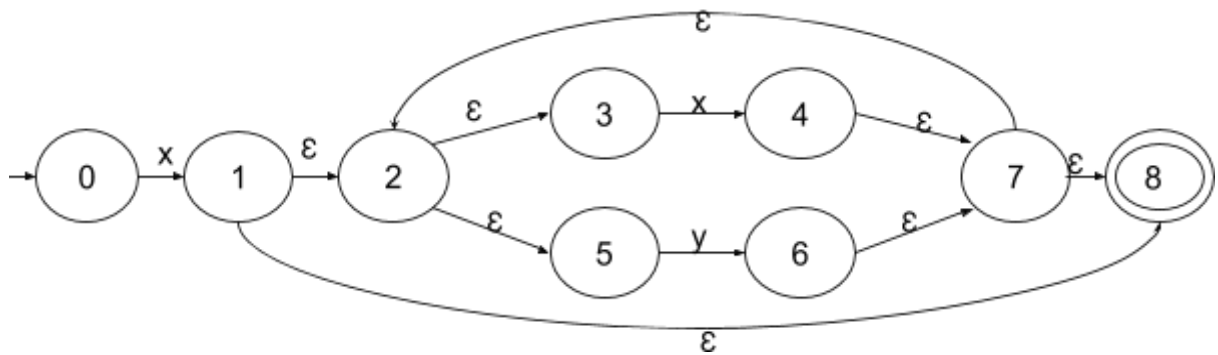
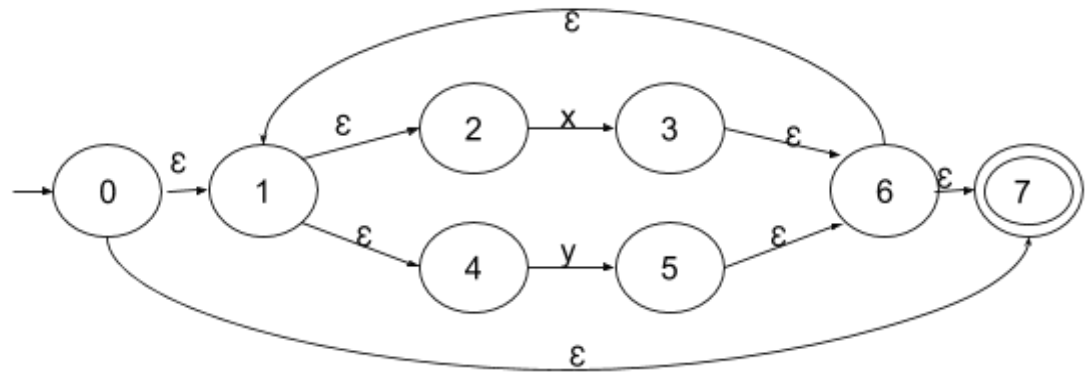
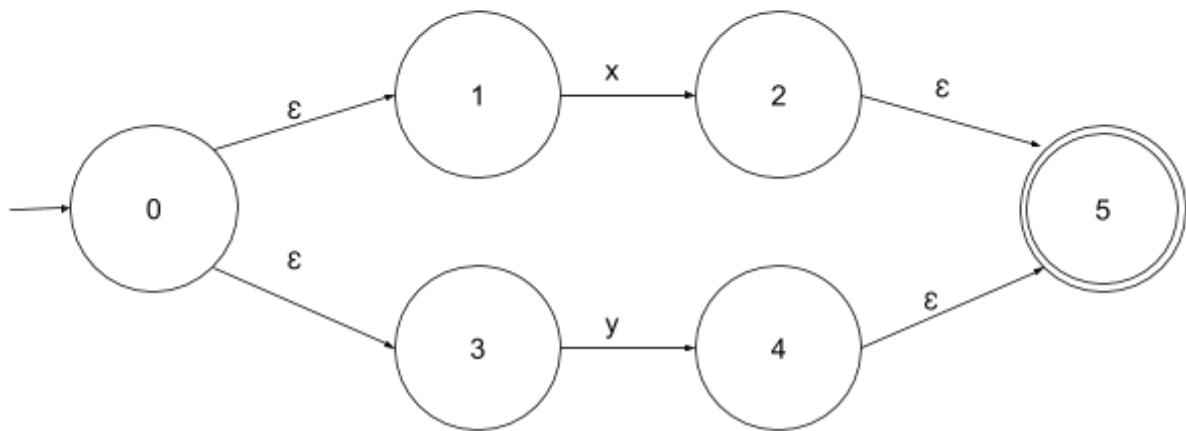
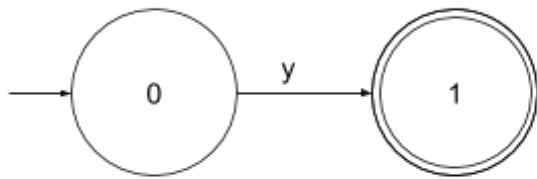
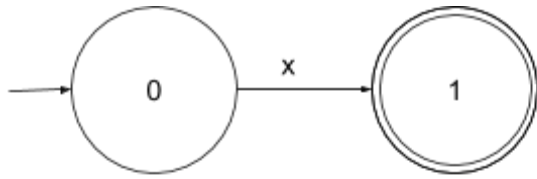
PARTE A: AUTÓMATAS DE ESTADOS FINITOS

Ejercicio 1:

A. Que reconozca la expresión regular $r'(b|(b^*a)^*)a'$



B. Que reconozca la expresión regular $r'(x|y)^*$



Ejercicio 2:

A. $(b \mid (b^* a)^*)a$

ε -cerradura($\{0\}$) = $\{0, 1, 2, 7, 3, 5, 10, 8\} = A$

Transiciones:

$T(A,a)$:

- 0 - \varnothing
- 1 - \varnothing
- 2 - \varnothing
- 7 - \varnothing
- 3 - \varnothing
- 5 - 6
- 10 - 11
- 8 - \varnothing

ε -cerradura($\{6\}$) = $\{6, 7, 10, 2, 3, 5\}$

ε -cerradura($\{11\}$) = $\{11\}$

$B = \{6, 7, 10, 2, 3, 5, 11\}$

$A \xrightarrow{a} B$

$T(A,b)$:

- 0 - \varnothing
- 1 - \varnothing
- 2 - \varnothing
- 7 - \varnothing
- 3 - 4
- 5 - \varnothing
- 10 - \varnothing
- 8 - 9

ε -cerradura($\{4\}$) = $\{4, 5, 3\}$

ε -cerradura($\{9\}$) = $\{9, 10\}$

$C = \{4, 5, 3, 9, 10\}$

$A \xrightarrow{b} C$

$T(B,a)$:

- 6 - \varnothing
- 7 - \varnothing
- 10 - 11
- 2 - \varnothing
- 3 - \varnothing

- 5 - 6
- 11 - \varnothing

$$\varepsilon\text{-cerradura}(\{11\}) = \{11\}$$

$$\varepsilon\text{-cerradura}(\{6\}) = \{6, 7, 10, 2, 3, 5\}$$

$B \xrightarrow{a} B$ (vuelve a sí mismo)

$T(B,b)$:

- 6 - \varnothing
- 7 - \varnothing
- 10 - \varnothing
- 2 - \varnothing
- 3 - 4
- 5 - \varnothing
- 11 - \varnothing

$$\varepsilon\text{-cerradura}(\{4\}) = \{4, 5, 3\}$$

$B \xrightarrow{b} C$

$T(C,a)$:

- 4 - \varnothing
- 5 - 6
- 3 - \varnothing
- 9 - \varnothing
- 10 - 11

$$\varepsilon\text{-cerradura}(\{6\}) = \{6, 7, 10, 2, 3, 5\}$$

$$\varepsilon\text{-cerradura}(\{11\}) = \{11\}$$

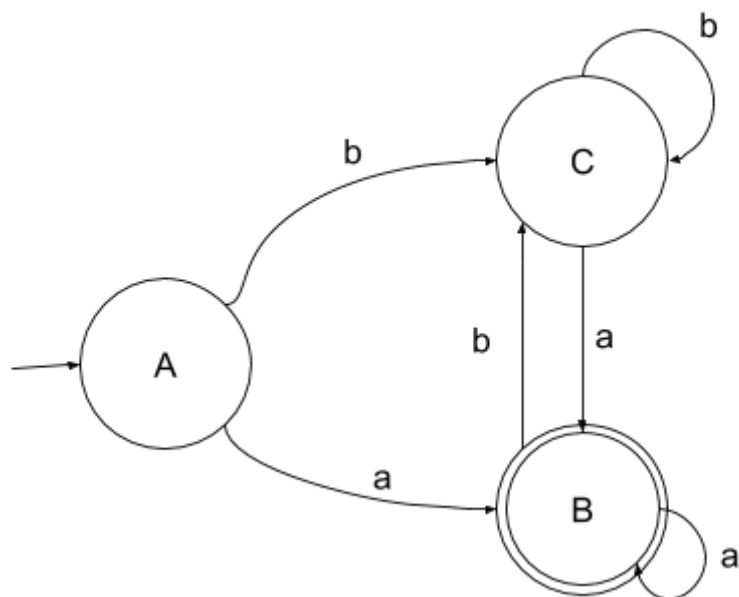
$C \xrightarrow{a} B$

$T(C,b)$:

- 4 - \varnothing
- 5 - \varnothing
- 3 - 4
- 9 - \varnothing
- 10 - \varnothing

$$\varepsilon\text{-cerradura}(\{4\}) = \{4, 5, 3\}$$

$C \xrightarrow{b} C$ (vuelve a sí mismo)



B. $x(x|y)^*$

$\varepsilon\text{-cerradura}(\{0\}) = \{0\} = 0$

Transiciones:

$T(0,x)$:

- 0 - 1

$\varepsilon\text{-cerradura}(\{1\}) = \{1, 2, 8, 3, 5\} = A$

$0 \xrightarrow{x} A$

$T(0,y)$:

- 0 - \varnothing

$T(A,x)$:

- 1 - \varnothing
- 2 - \varnothing
- 8 - \varnothing
- 3 - 4
- 5 - \varnothing

$\varepsilon\text{-cerradura}(\{4\}) = \{4, 7, 2, 8, 3, 5\} = B$

$A \xrightarrow{x} B$

$T(A,y):$

- 1 - \varnothing
- 2 - \varnothing
- 8 - \varnothing
- 3 - \varnothing
- 5 - 6

$\varepsilon\text{-cerradura}(\{6\}) = \{6, 7, 8, 2, 3, 5\} = C$

$A \xrightarrow{y} C$

$T(B,x):$

- 4 - \varnothing
- 7 - \varnothing
- 2 - \varnothing
- 8 - \varnothing
- 3 - 4
- 5 - \varnothing

$\varepsilon\text{-cerradura}(\{4\}) = \{4, 7, 2, 8, 3, 5\} = B$

$B \xrightarrow{x} B$

$T(B,y):$

- 4 - \varnothing
- 7 - \varnothing
- 2 - \varnothing
- 8 - \varnothing
- 3 - \varnothing
- 5 - 6

$\varepsilon\text{-cerradura}(\{6\}) = \{6, 7, 8, 2, 3, 5\} = C$

$B \xrightarrow{y} C$

$T(C,x):$

- 6 - \varnothing
- 7 - \varnothing
- 8 - \varnothing
- 2 - \varnothing
- 3 - 4
- 5 - \varnothing

$\varepsilon\text{-cerradura}(\{4\}) = \{4, 7, 2, 8, 3, 5\} = B$

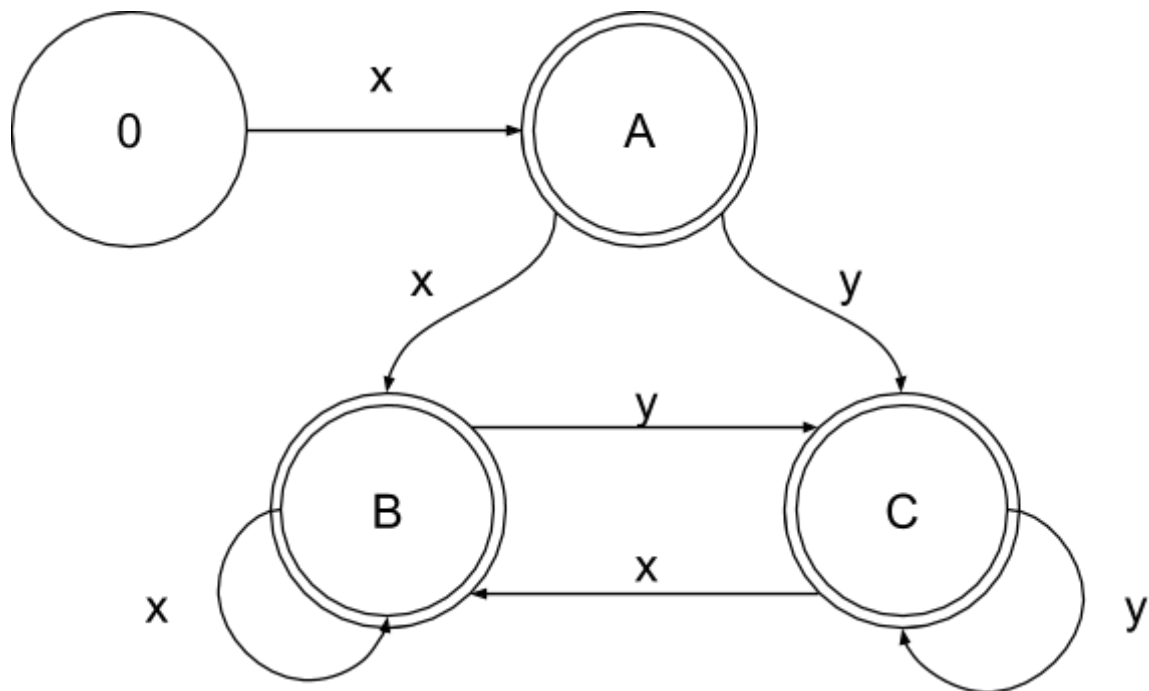
$C \xrightarrow{x} B$

$T(C, y)$:

- 6 - \varnothing
- 7 - \varnothing
- 8 - \varnothing
- 2 - \varnothing
- 3 - \varnothing
- 5 - 6

$\varepsilon\text{-cerradura}(\{6\}) = \{6, 7, 8, 2, 3, 5\} = C$

$C \xrightarrow{y} C$



PARTE B: MÁQUINAS DE TURING

Ejercicio 1:

A. $Q = \{q_1, q_2\}$

$\Sigma = \{a, b\}$

$\Gamma = \{a, b, \text{b}\}$

$s = q_1$

$F = \{q_2\}$

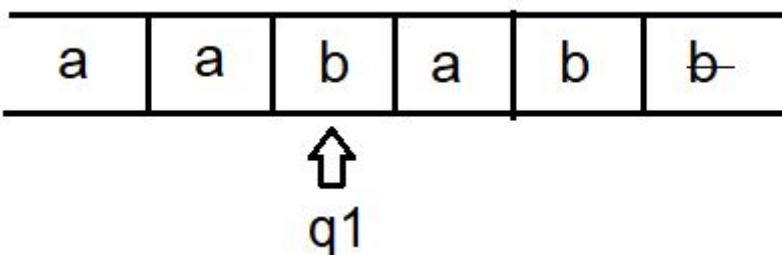
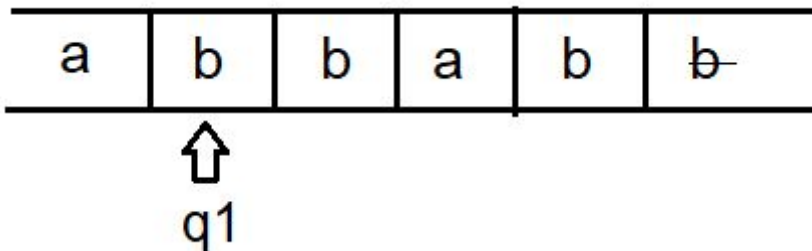
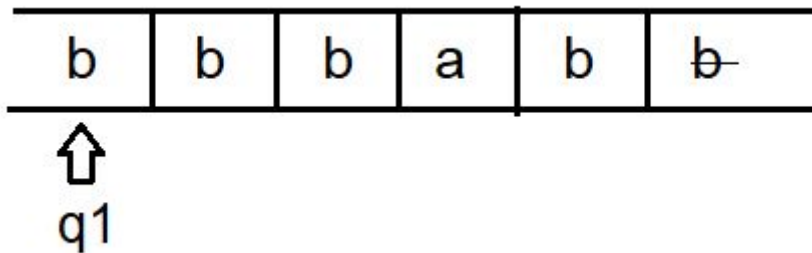
δ dado por:

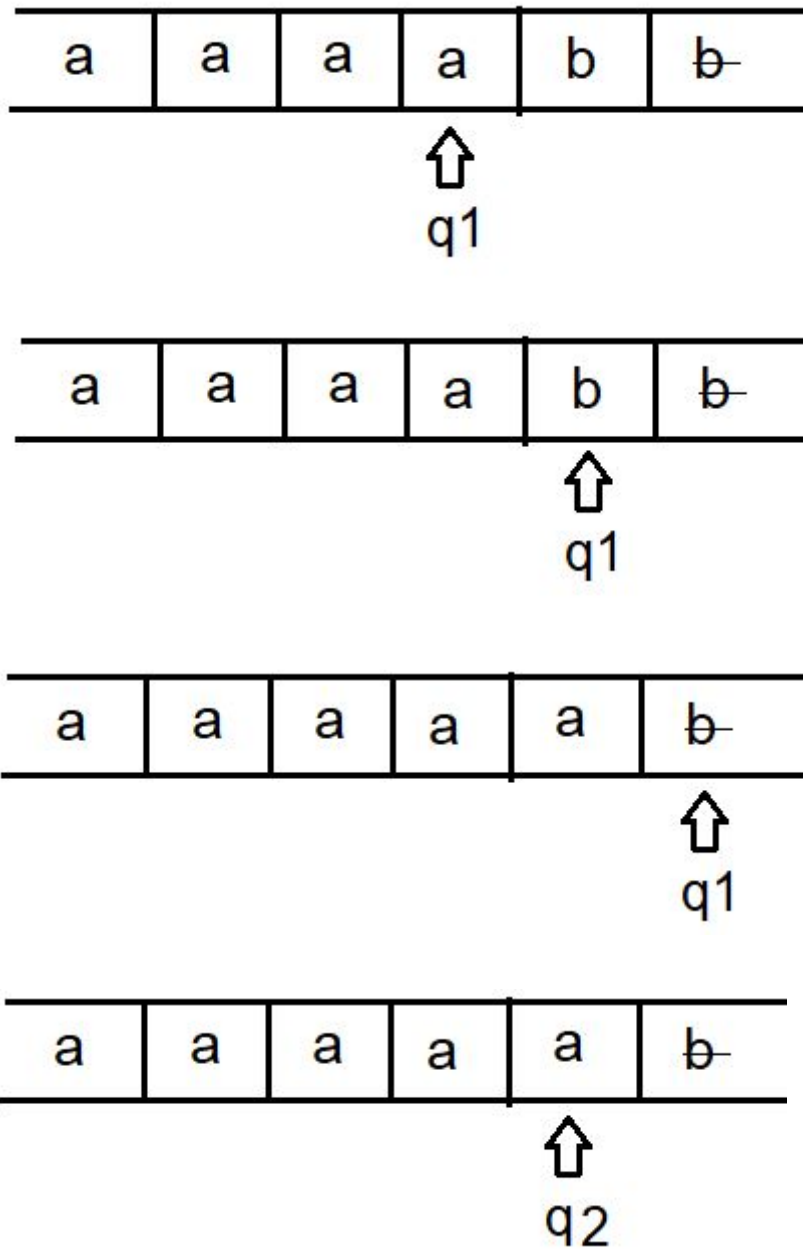
$\delta(q_1, a) = (q_1, a, R)$

$\delta(q_1, b) = (q_1, a, R)$

$\delta(q_1, \text{b}) = (q_2, \text{b}, L)$

$w = \text{bbbab}$





La máquina reconoce $w = bbbab$

B. $Q = \{q_0, q_1\}$

$\Sigma = \{0, 1\}$

$\Gamma = \{0, 1, B\}$

$s = q_0$

$F = \{q_1\}$

δ dado por:

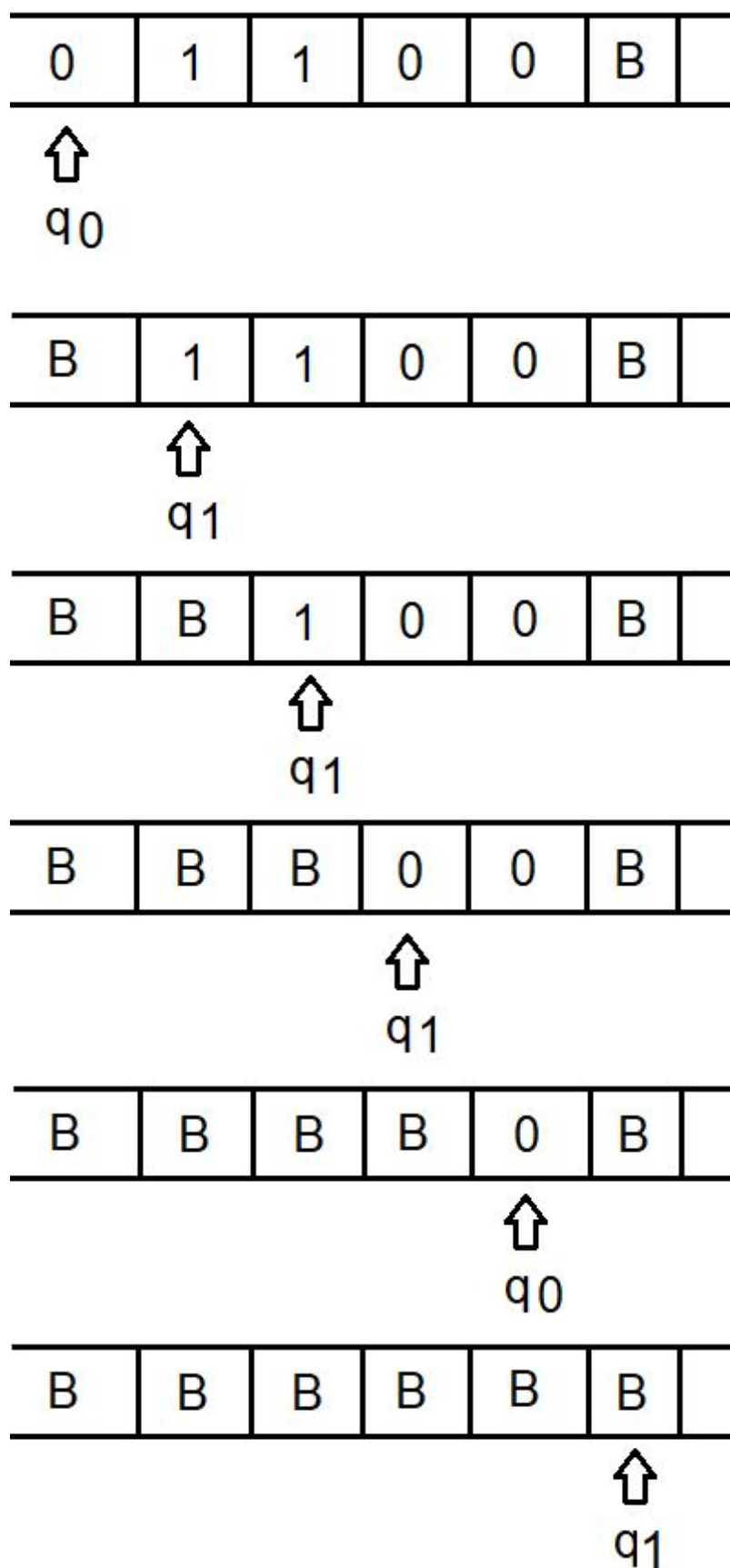
$\delta(q_0, 0) = (q_1, B, R)$

$\delta(q_0, 1) = (q_0, B, R)$

$\delta(q_1, 0) = (q_0, B, R)$

$\delta(q_1, 1) = (q_1, B, R)$

$w = 01100$



La máquina acepta $w = 01100$

Ejercicio 2:

A. $(b \mid (b^* a)^*)a$

$$Q = \{A, B, C\}$$

$$\Sigma = \{a, b\}$$

$$\Gamma = \{a, b, \emptyset\}$$

$$s = A$$

$$F = \{B\}$$

δ dado por:

$$\delta(A, a) = (B, a, R)$$

$$\delta(A, b) = (C, b, R)$$

$$\delta(B, a) = (B, a, R)$$

$$\delta(B, b) = (C, b, R)$$

$$\delta(C, a) = (B, a, R)$$

$$\delta(C, b) = (C, b, R)$$

$$\delta(B, \emptyset) = (B, \emptyset, L)$$

$$w = babaa$$

$$(A, \underline{b}abaa\emptyset) \vdash (C, b\underline{a}baa\emptyset) \vdash (B, bab\underline{a}a\emptyset) \vdash (C, baba\underline{a}\emptyset) \vdash (B, baba\underline{a}\emptyset) \vdash (B, baba\underline{a}\emptyset) \vdash (B, baba\underline{a}\emptyset)$$

La máquina acepta babaa

B. $x(x|y)^*$

$$Q = \{0, A, B, C\}$$

$$\Sigma = \{x, y\}$$

$$\Gamma = \{x, y, \emptyset\}$$

$$s = 0$$

$$F = \{A, B, C\}$$

δ dado por:

$$\delta(0, x) = (A, x, R)$$

$$\delta(A, x) = (B, x, R)$$

$$\delta(A, y) = (C, y, R)$$

$$\delta(B, x) = (B, x, R)$$

$$\delta(B, y) = (C, y, R)$$

$$\delta(C, x) = (B, x, R)$$

$$\delta(C, y) = (C, y, R)$$

$$\delta(A, \emptyset) = (A, \emptyset, L)$$

$$\delta(B, \emptyset) = (B, \emptyset, L)$$

$$\delta(C, \emptyset) = (C, \emptyset, L)$$

$$w = xyxy$$

$(0, \underline{x}yxx\bar{y}) \vdash (A, x\underline{y}xx\bar{y}) \vdash (C, xy\underline{x}x\bar{y}) \vdash (B, xyx\underline{x}\bar{y}) \vdash (B, xyxx\underline{y}\bar{y}) \vdash (C, xyxx\bar{y}\underline{y}) \vdash (C, xyxx\bar{y}\underline{y})$
 $\vdash (C, xyxx\bar{y}\underline{y})$

Ejercicio 3:

Ejercicios de python en los archivos .py comprimidos juntos con este documento

Tablas de transiciones:

A. $(b \mid (b^* a)^*)a$

Estado	a	b	FDC
A	B	C	Error
B	B	C	Aceptación
C	B	C	Error

B. $x(x|y)^*$

Estado	x	y	FDC
0	A	Error	Error
A	B	C	Aceptación
B	B	C	Aceptación
C	B	C	Aceptación