

① EJERCICIO 2.- CALDERA - BICASA

La información que le llega al automata viene en una tripleta

→ **ENTRADA**: (E, T, FC)
• El primer elemento E representa el estado de la estufa pudiendo ser:

ON = Encendido

OFF = Apagado

• El segundo elemento es la información de la temperatura.
T. cuyos valores pueden ser:

$$(T < VALOR_ENCENDIDO) = 0$$

$$(T > VALOR_ENCENDIDO) = 1$$

$$(T < VALOR_CALENTAR) = 2$$

$$(T = VALOR_CALENTAR) = 3$$

$$(T > VALOR_CALENTAR) = 4$$

• El tercer elemento será la frecuencia de apertura de combustible

FC

$$(FC = NULA) = 0$$

$$FC < FRECUENCIA_ENCENDIDO = 1$$

$$(FC = FREC. EN CENDIDO) = 2$$

$$(FC < MAXIMA_FRECUENCIA_CALENTAR) = 3$$

$$FC > MAXIMA_FRECUENCIA_CALENTAR = 4$$

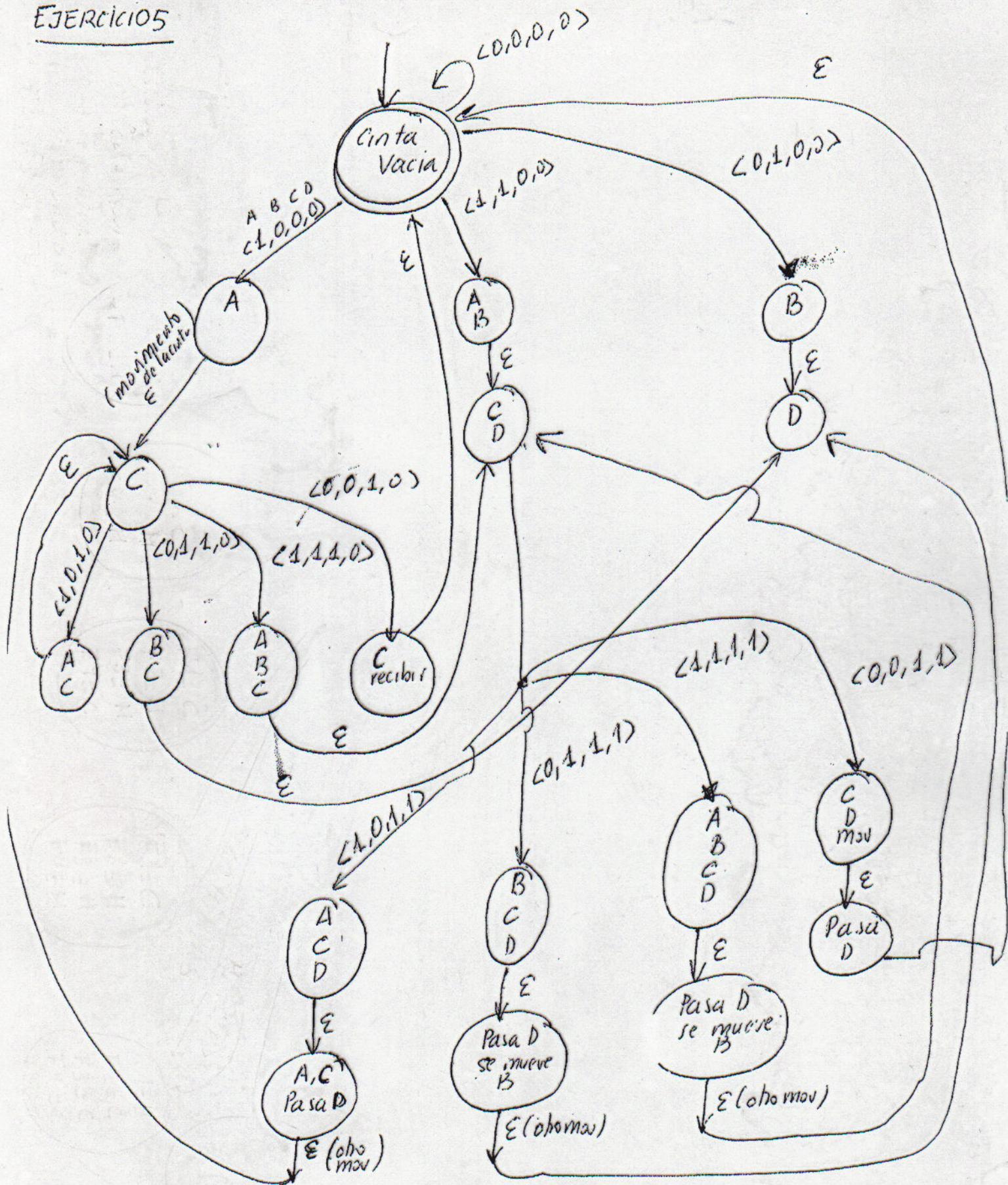
Los mecanismos sobre los que actúa el automato son:

→ **SALIDA**:

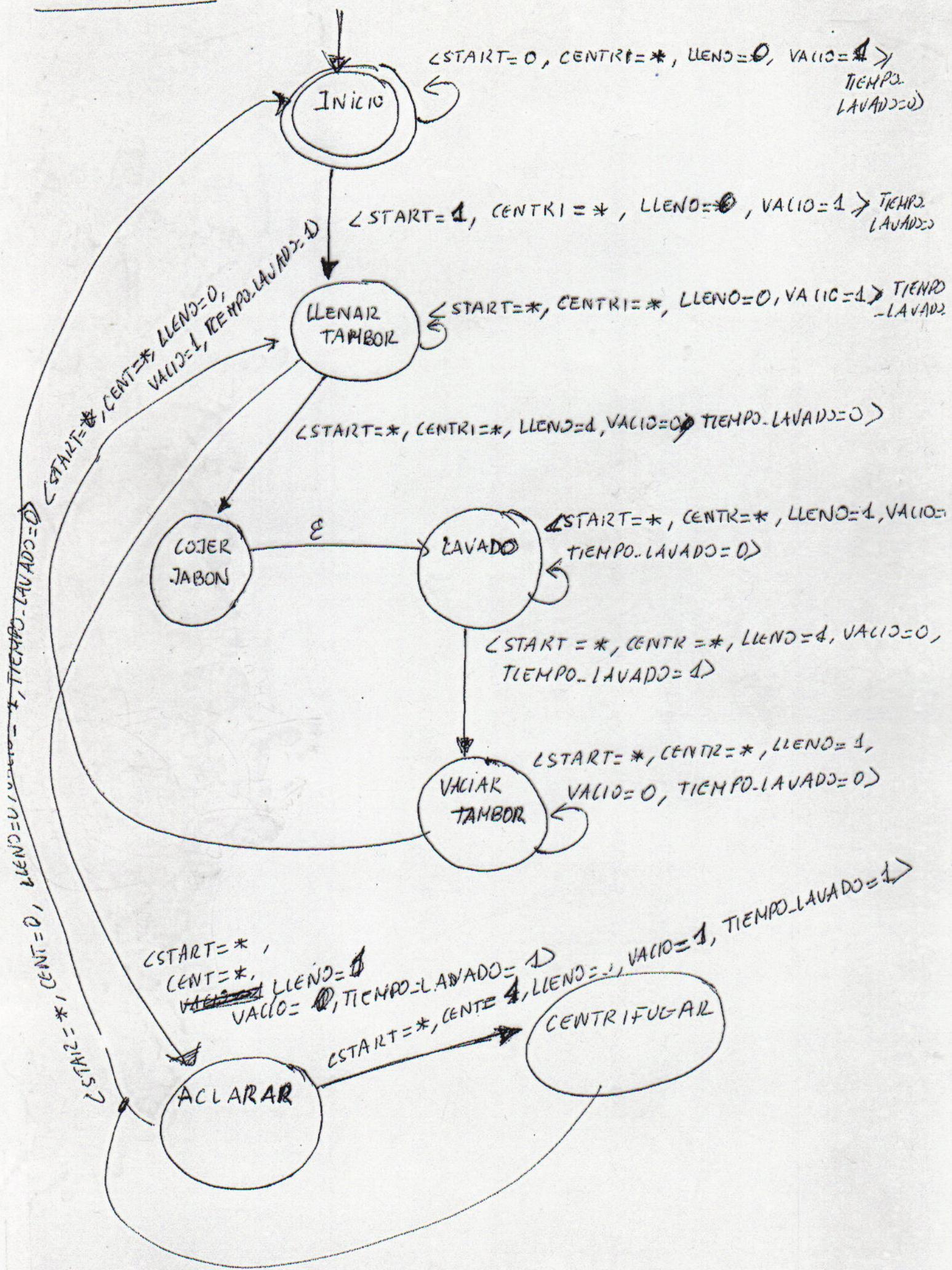
- **RESISTENCIA**: que puede apagar o encender
- **PUERTA de COMBUSTIBLE**: que puede cerrar o incrementar o decrementar a la $\frac{frec.}{salida}$ del combustible.
- **VENTILADOR**: que puede apagar o encender

q_0 : será el estado inicial en el que la caldera está apagada.
y también será final.

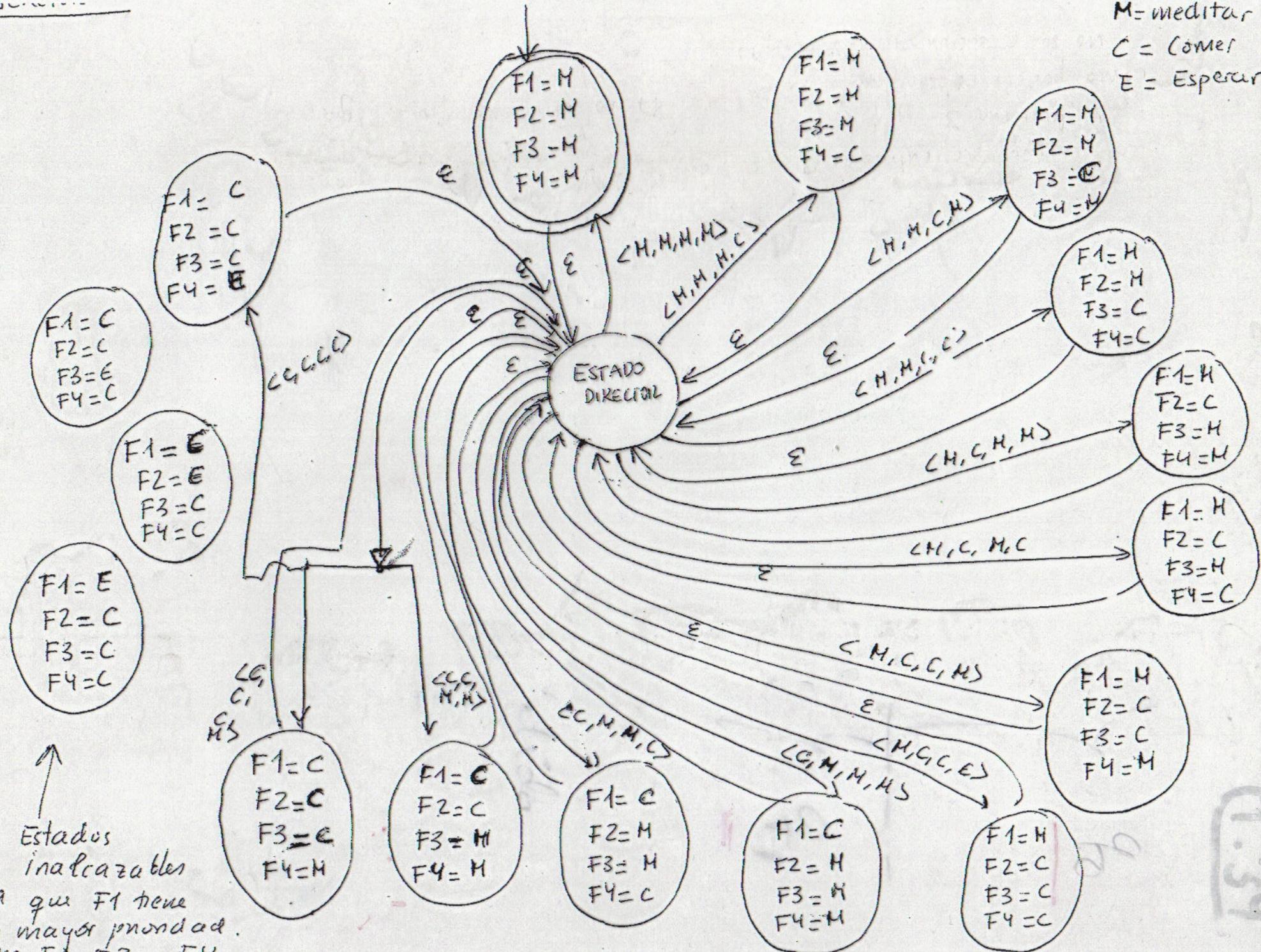
EJERCICIO 5

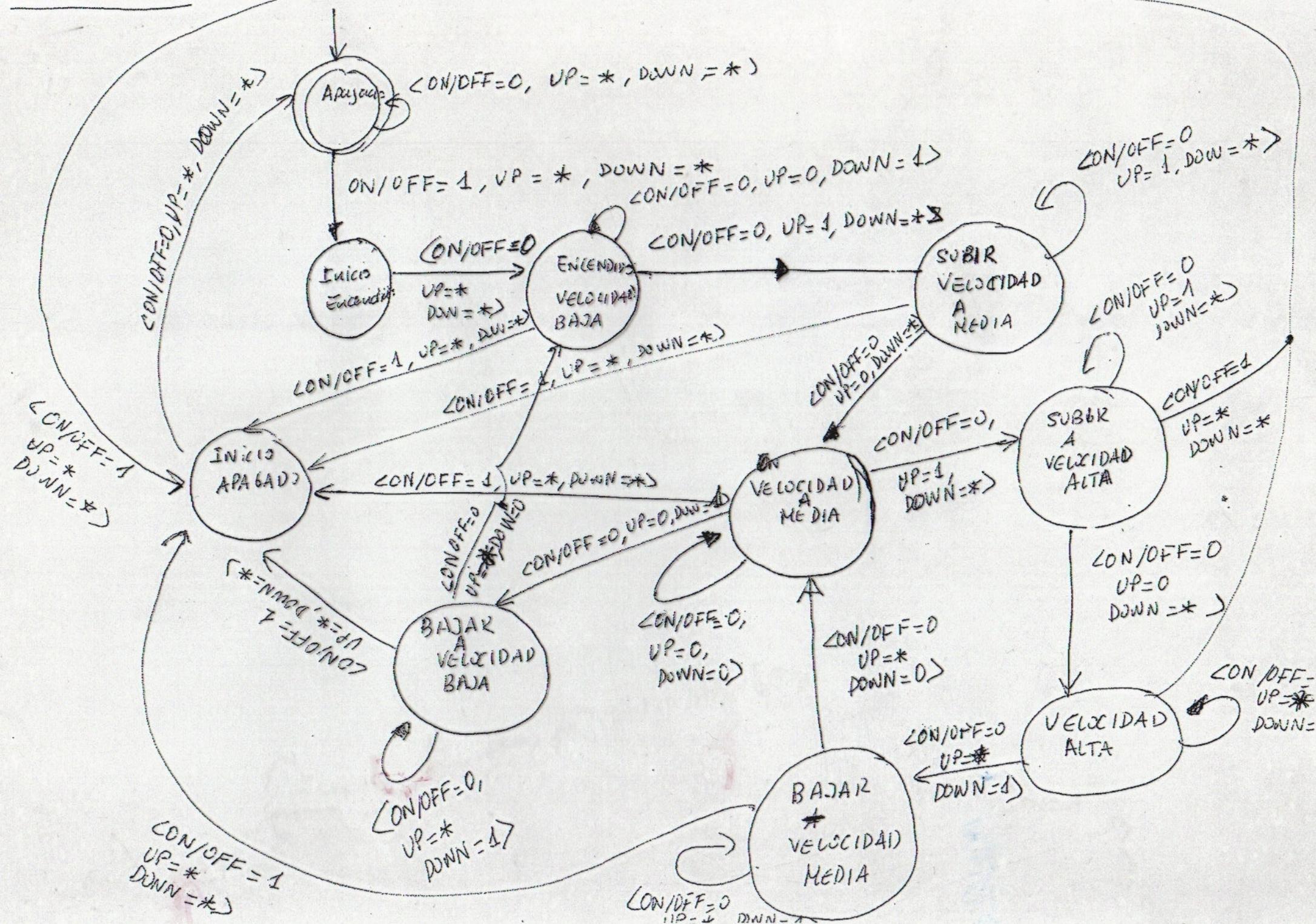


EJERCICIO L

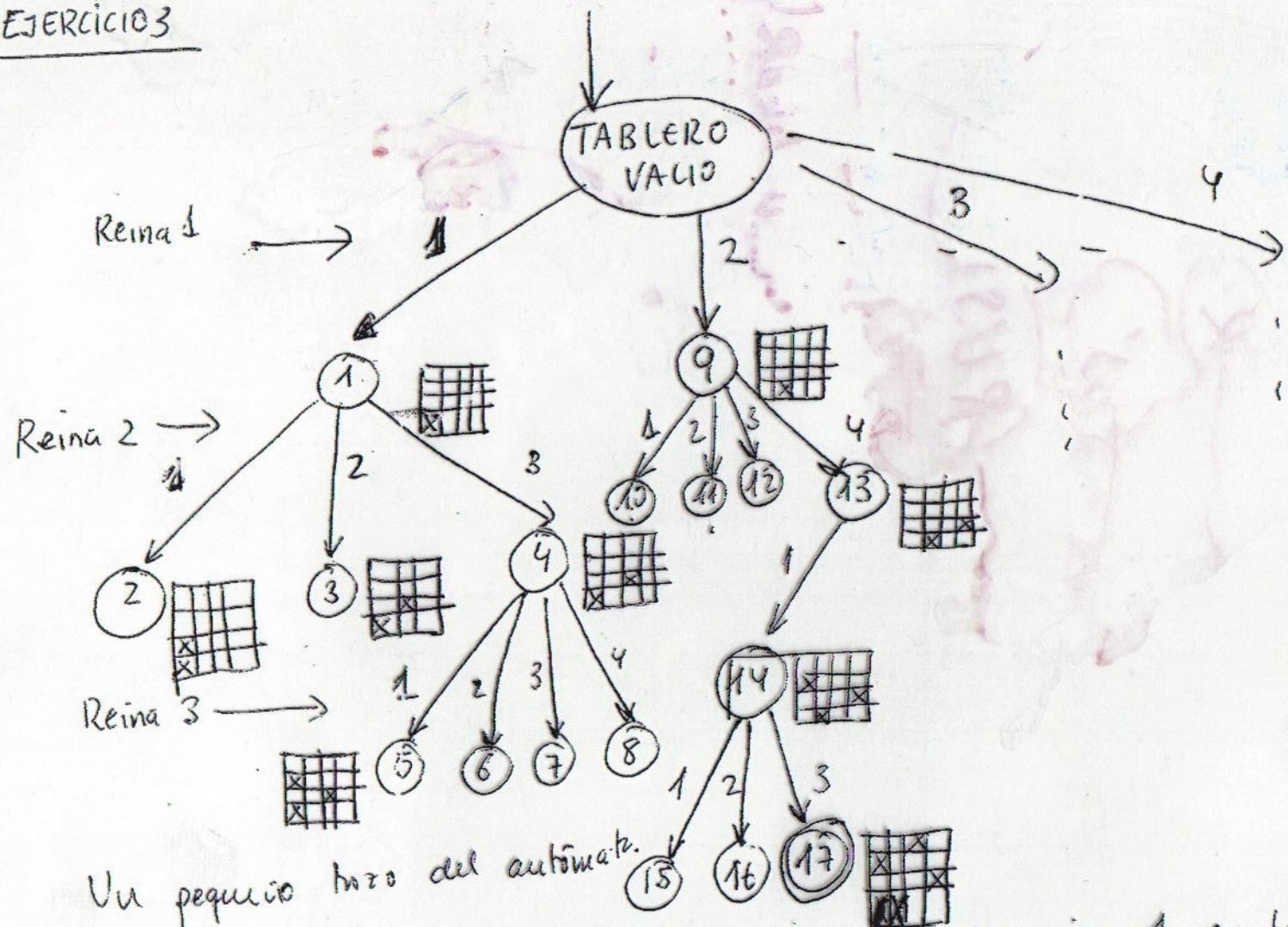


M = meditar
 C = comer
 E = esperar





EJERCICIOS



Un pequeño trazo del automata.

En el nivel de entradas 1 se coloca la reina 1 en la fila 1 se puede probar sobre cuatro casillas.

En el nivel de entradas 2 se coloca reina 2 en la fila 2, así para la reina 3 y 4 respect.

Como podéis observar la el estado 17 es un ~~en~~ final ya que no se atacan las reinas

Problema Punto 8.-

Obtener MAQUINA para decodificar donde la codificación se realiza siguiendo el código:

$$N(6) = 2^n \begin{cases} a \rightarrow 0 \\ b \rightarrow 1 \end{cases}$$

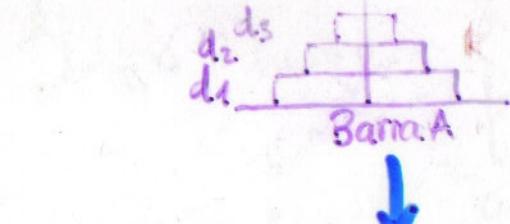
$$N(6) = 2^{n+1} \begin{cases} a \rightarrow 1 \\ b \rightarrow 0 \end{cases}$$

Mensaje Original: a b b a b

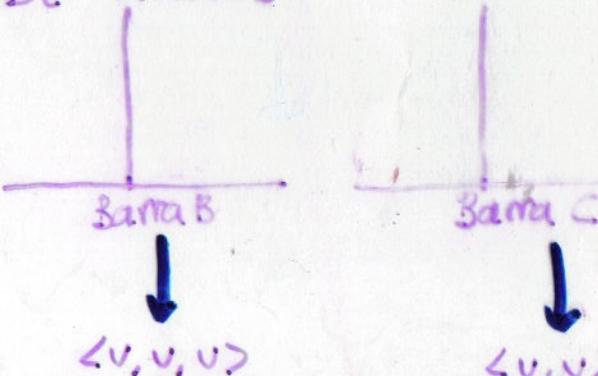
↓ ↓ ↓ ↓ ↓

Mensaje Codificado: 0 1 0 0 1

PROBLEMA 1: TORRES DE HANOI

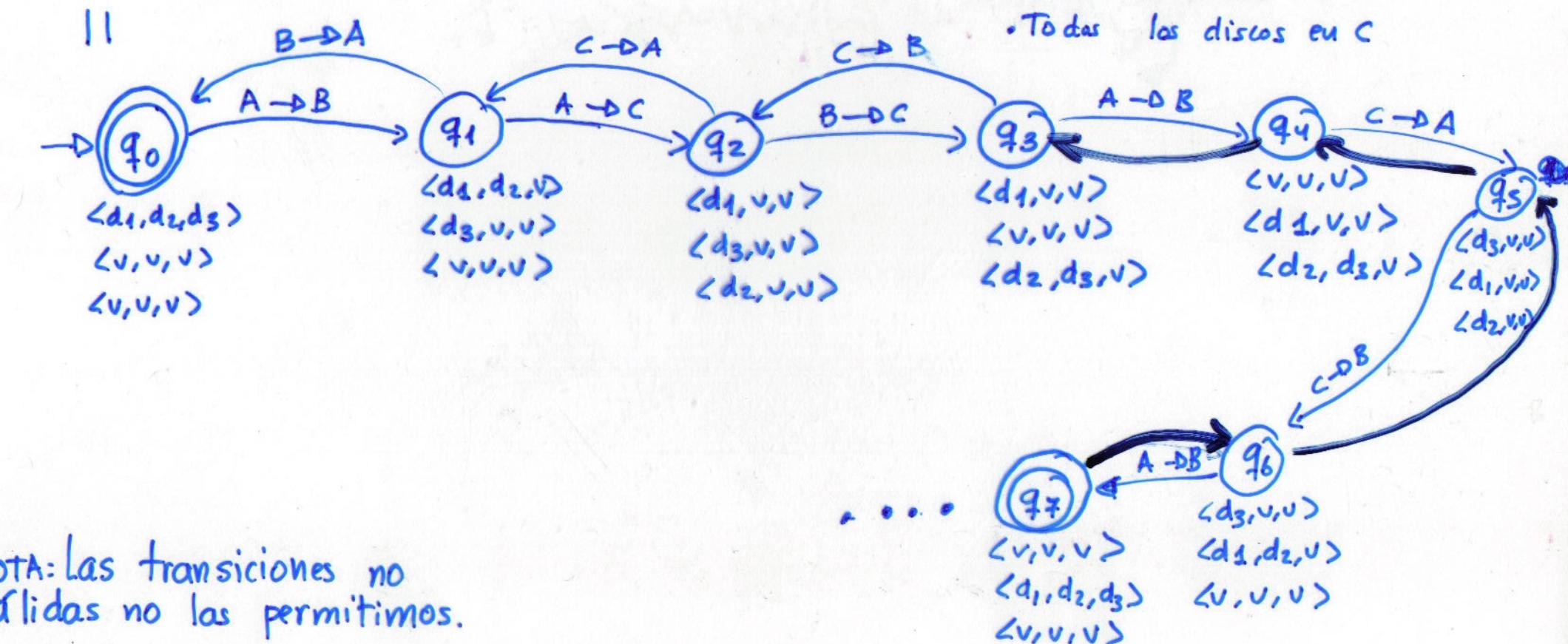


CONFIGURACION $\langle d_1, d_2, d_3 \rangle$



$\langle v, v, v \rangle$

$\langle v, v, v \rangle$



NOTA: Las transiciones no válidas no las permitimos.

Transición no válida es poner un disco de radio r_1 sobre otro disco de radio r_2 y $r_1 > r_2$

Discos = $\{d_1, d_2, d_3\}$
BARRAS = $\{A, B, C\}$

Estados Finales

- Todos los discos en A \leftarrow Estado Inicial
- Todos los discos en B
- Todos los discos en C

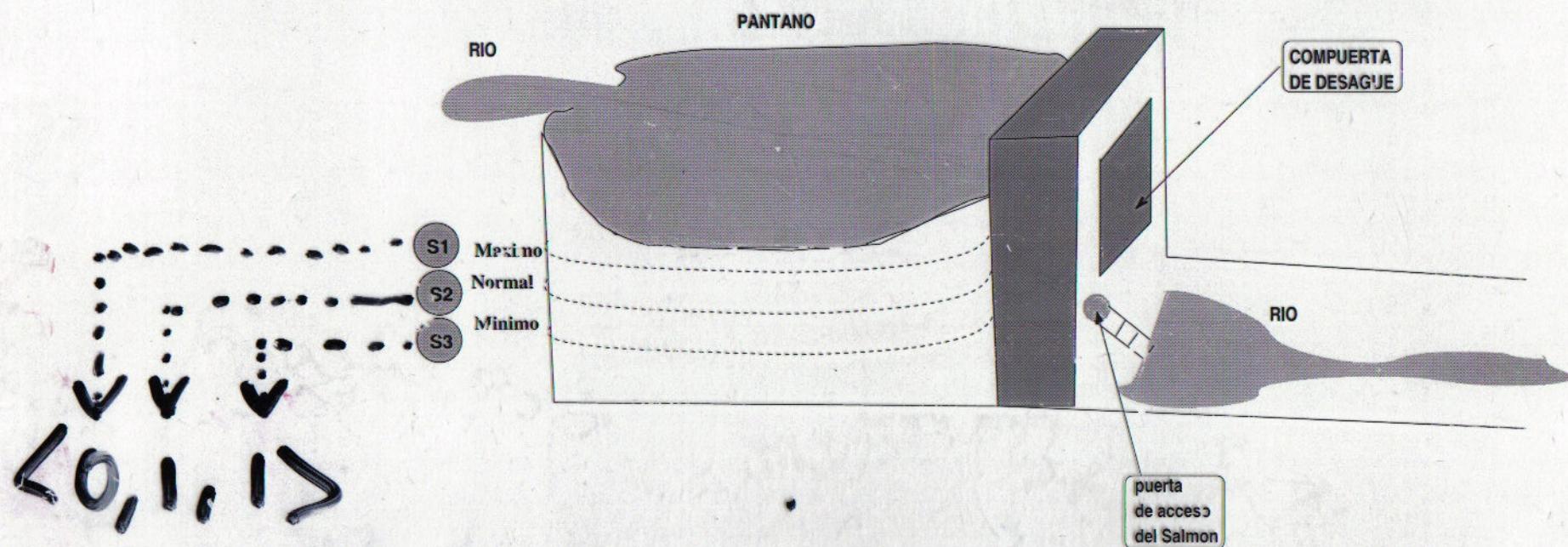
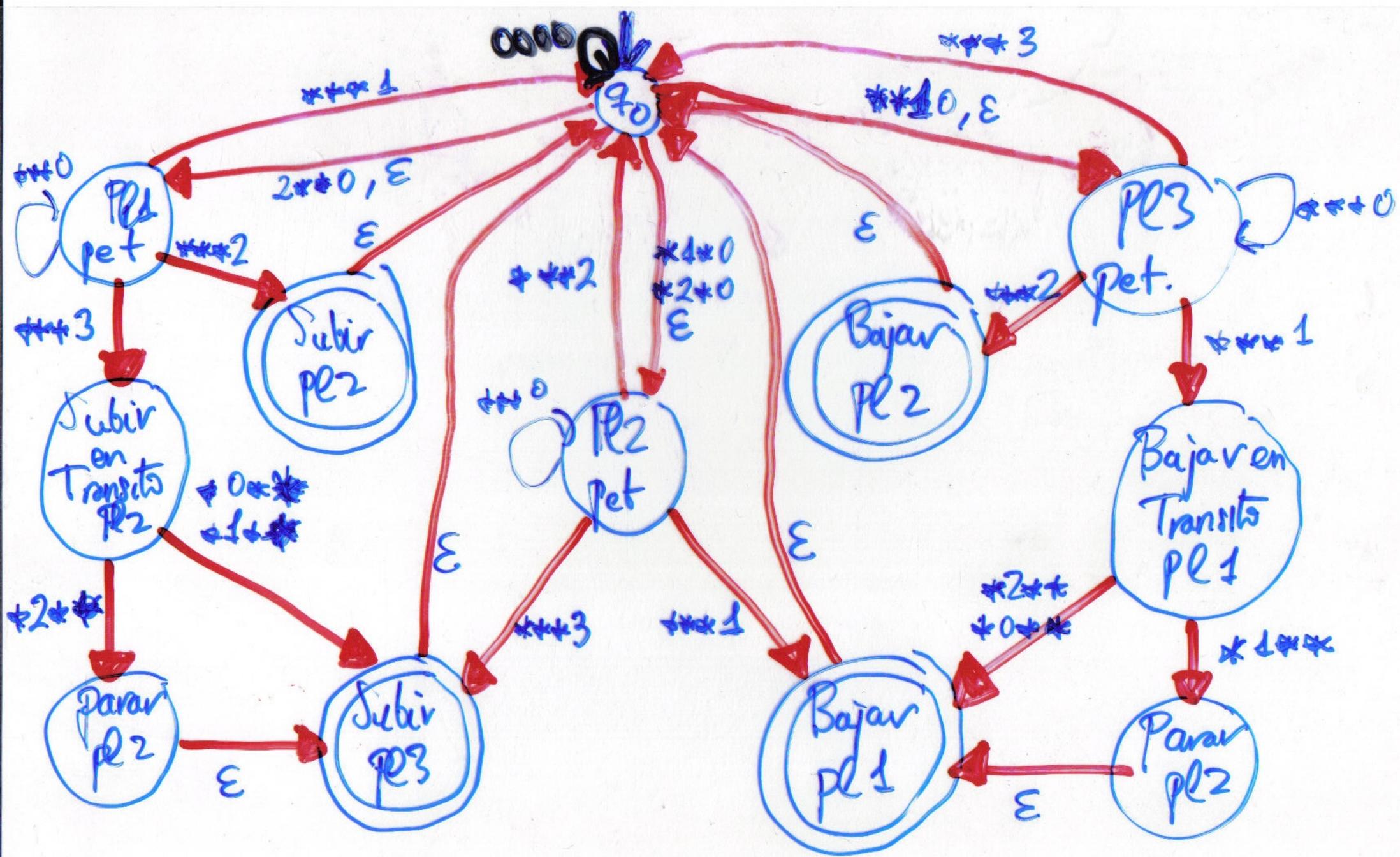


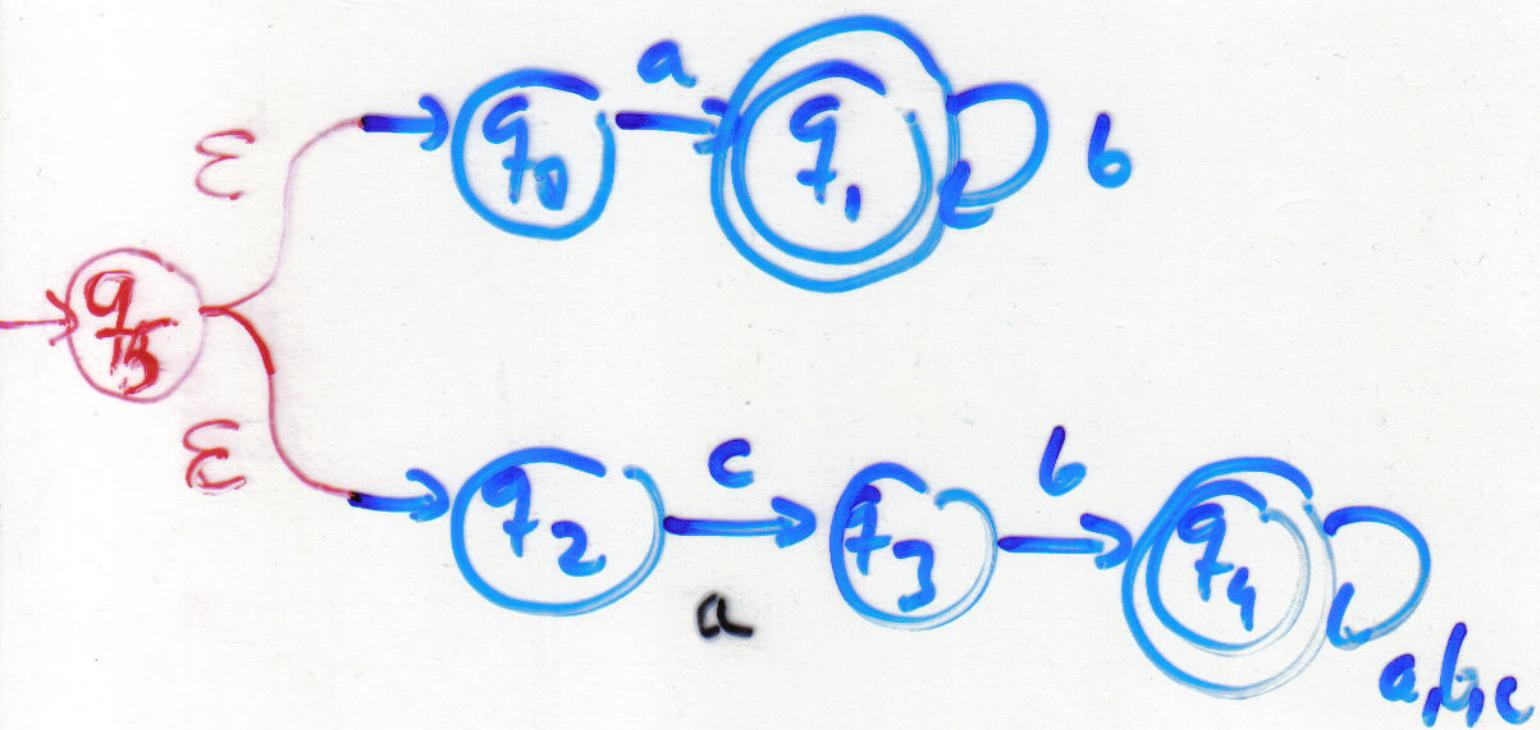
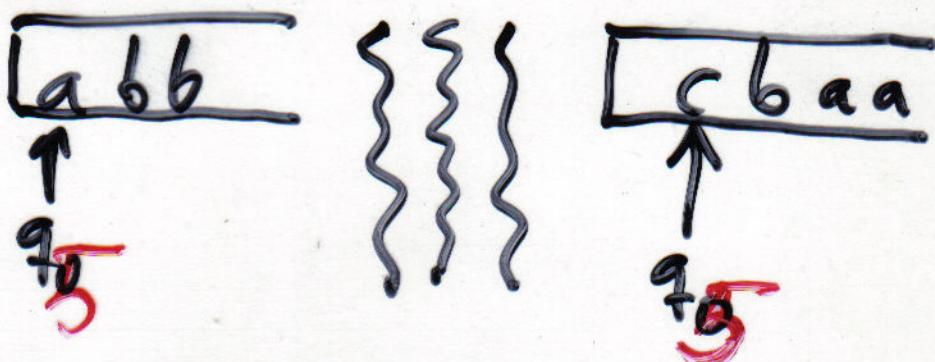
Figure 2: Pantano

<0, 1, 1> | <0, 1, 1> | <1, 1, 1> |



T. 21

$$L_2 = \{ ab^i / i \geq 0 \} \cup \{ cbu / u \in \{a, b, c\}^* \}$$

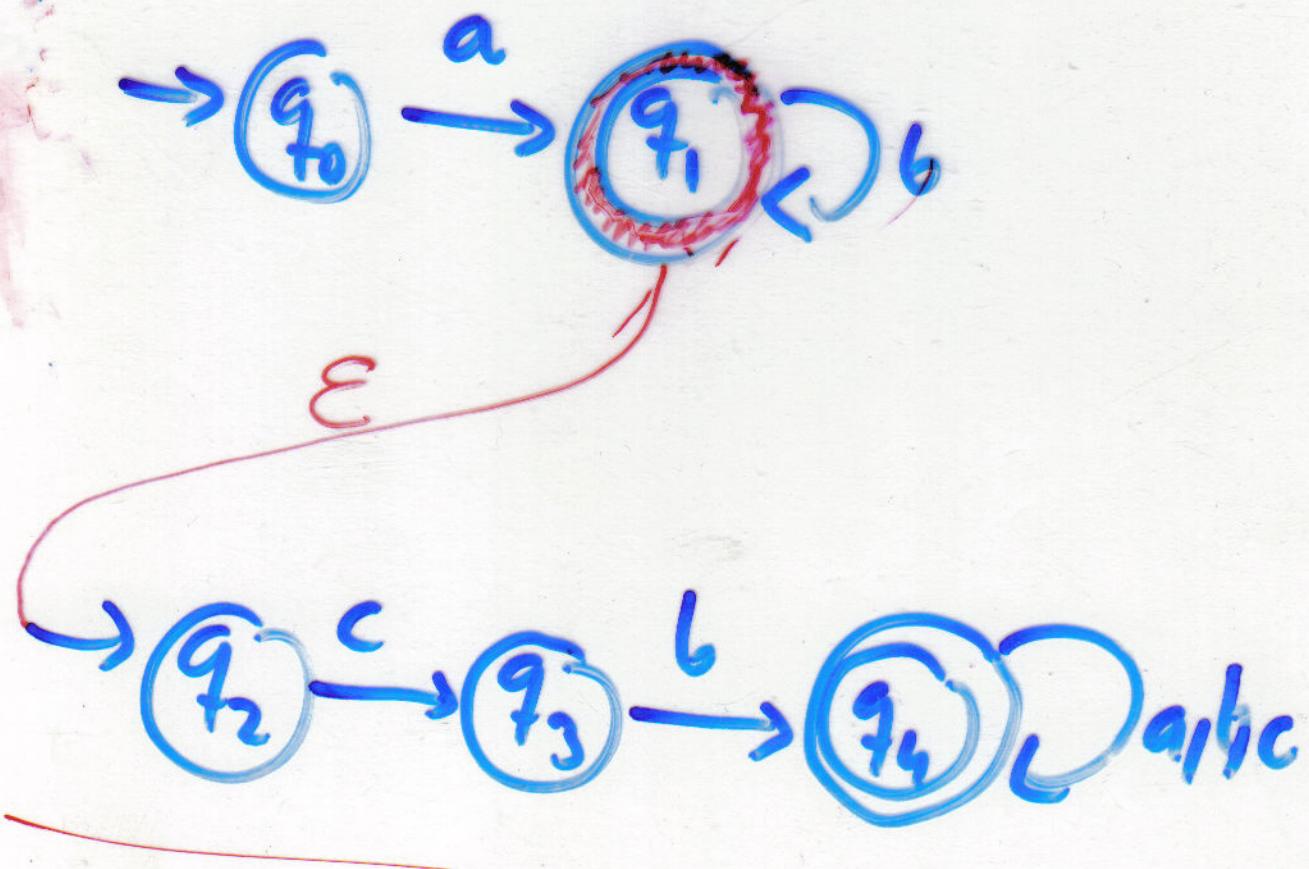
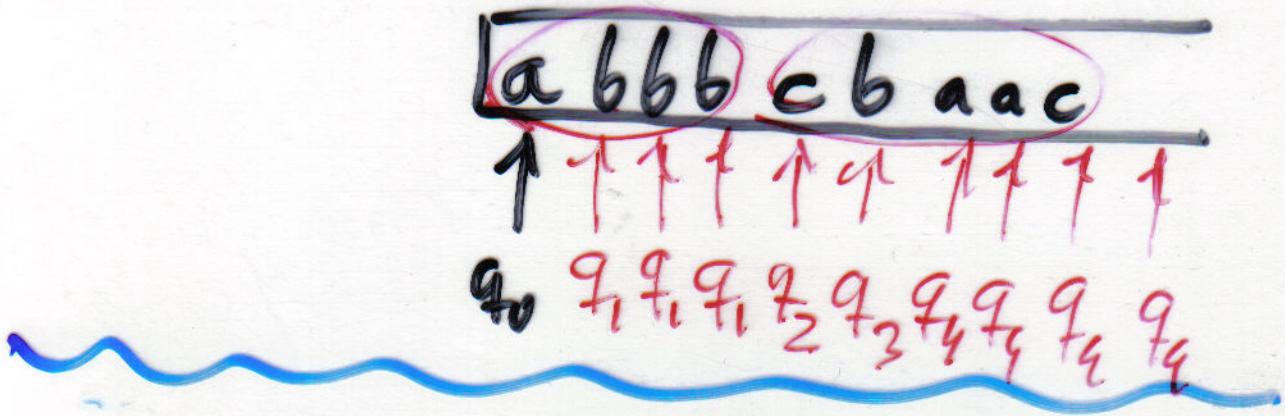


A.F.N.D.

con

transiciones Nulas

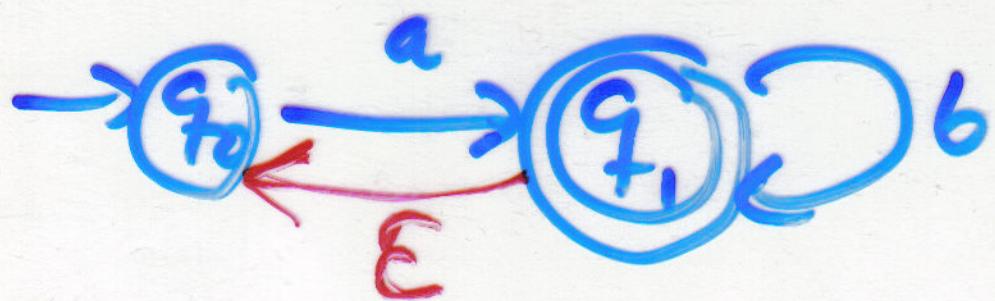
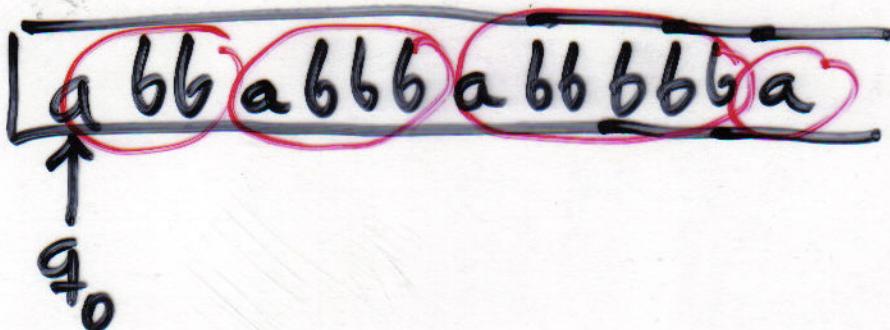
$L_1 = \{a^i b^i / i \geq 0\} \subset L(u/a, b, \{c\})$



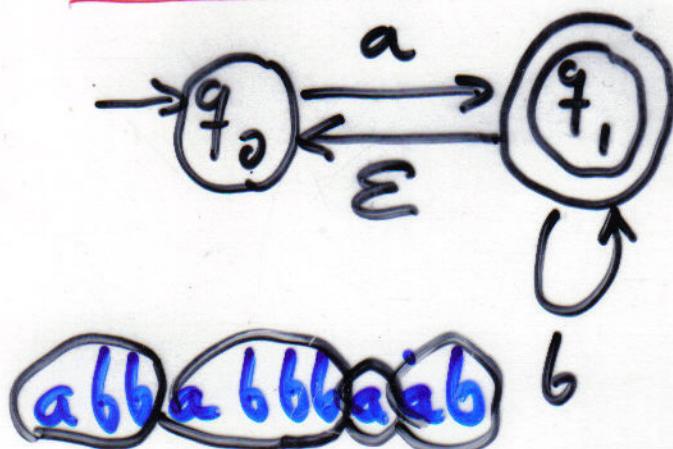
A.F.N.D. con transiciones Nulas

T. 23

$L_3 = \{ u_i u_{i+1} \dots u_j / u_i \in \{ab^i\}_{i \geq 0} \}$

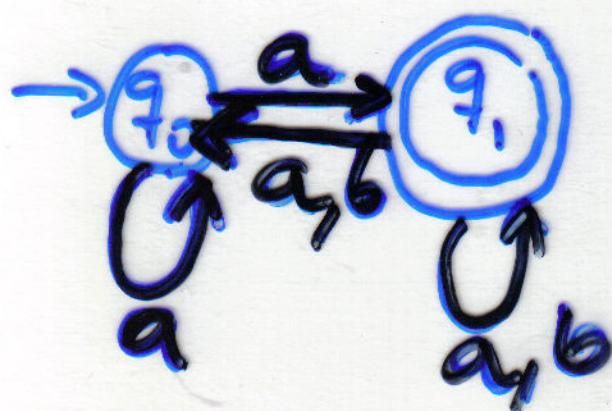


$L_3 = \{ u_1 u_2 \dots u_j / u_i \in \{ab^i\}_{i \geq 0} \}$

A.F.N.D. con Transiciones Nulas

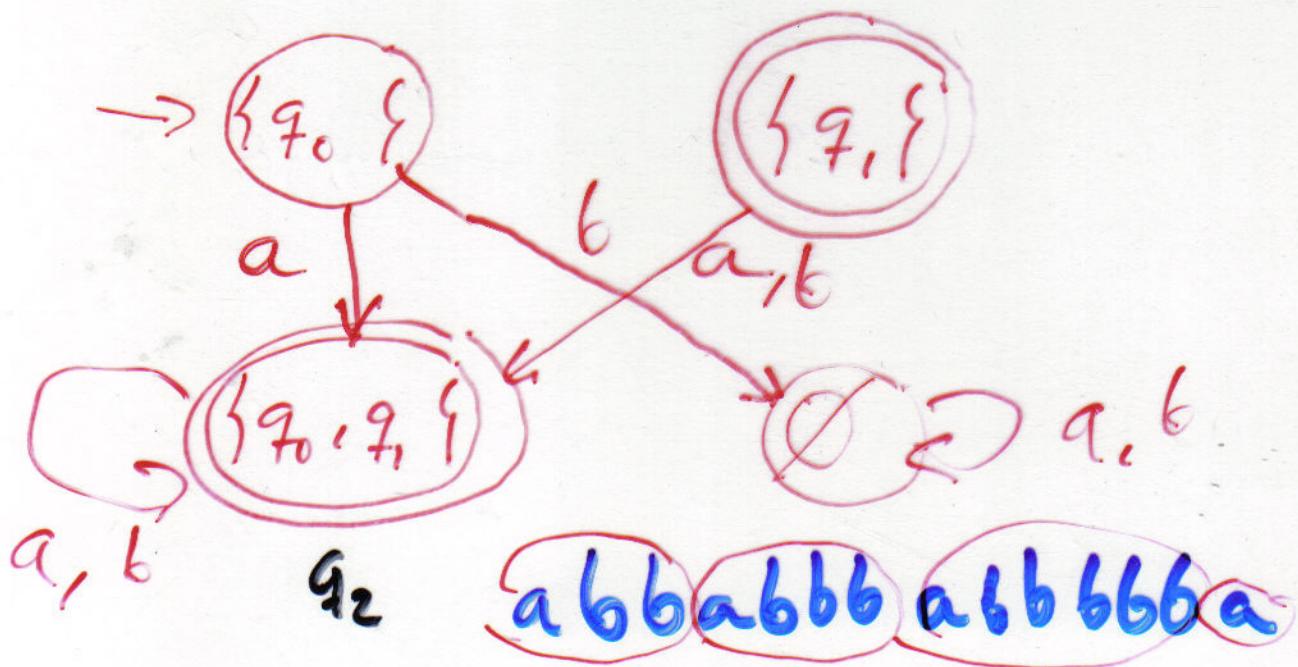
$q_0 \xrightarrow{a} q_1, q_0$
 $q_0 \xrightarrow{b} \emptyset$
 $q_1 \xrightarrow{a} q_1, q_0$
 $q_1 \xrightarrow{b} q_1, q_0$

\hookrightarrow A.F.N.D.



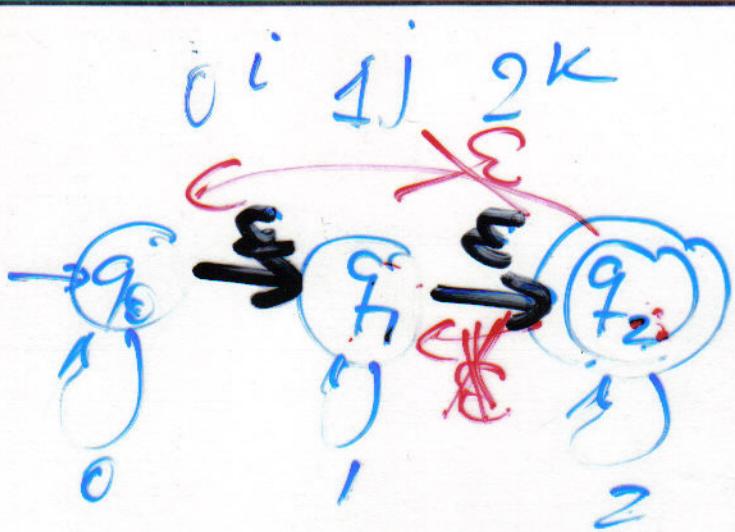
$\{q_0, q_1\} \xrightarrow{a} \{q_0, q_1\}$
 $\{q_0, q_1\} \xrightarrow{b} \{q_0, q_1\}$

\hookrightarrow A.F.D.

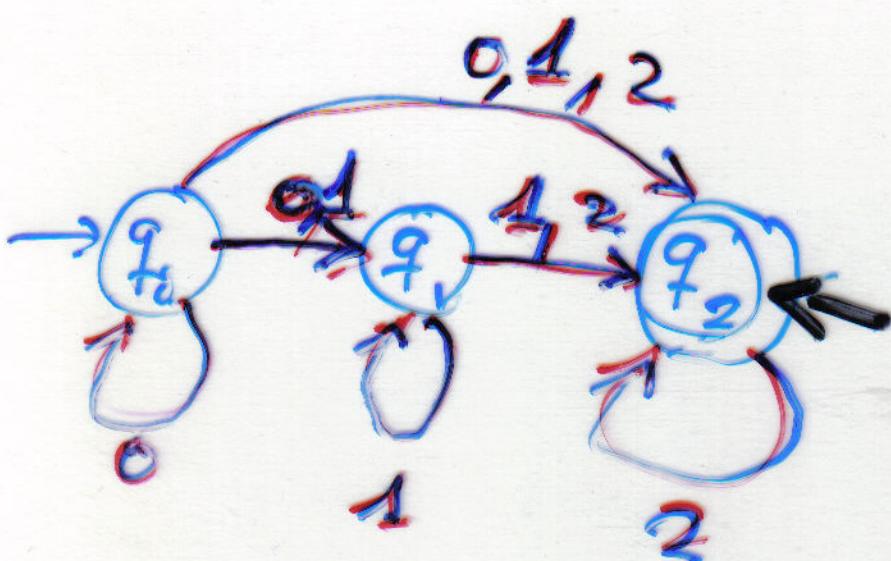


$$L = \{ a^u \mid u \in \{a, b\}^* \}$$

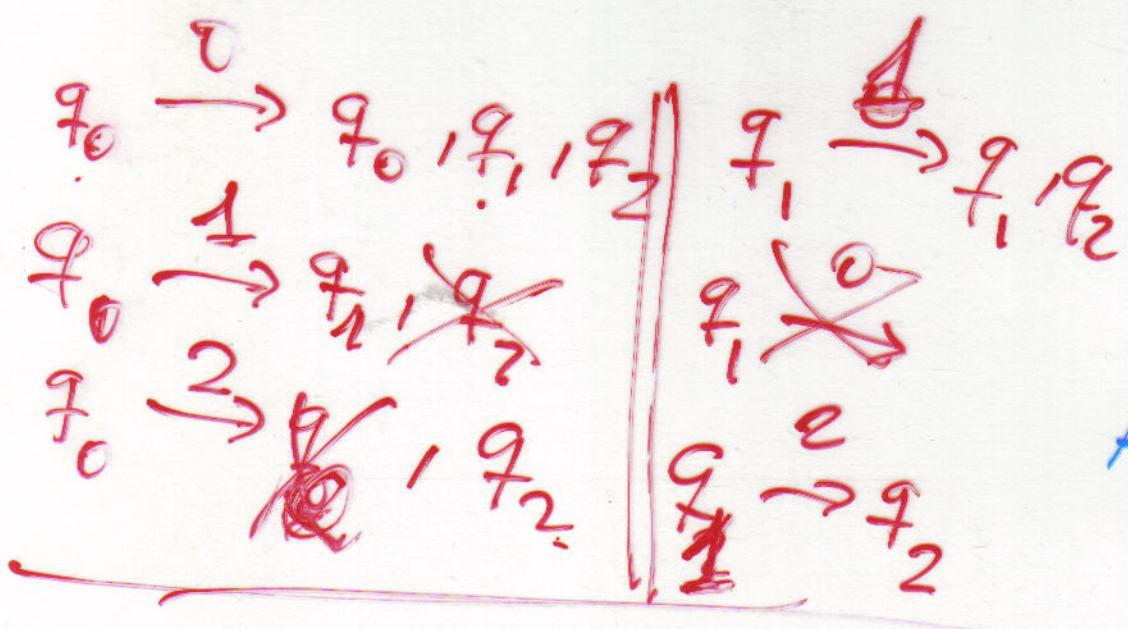
T.25



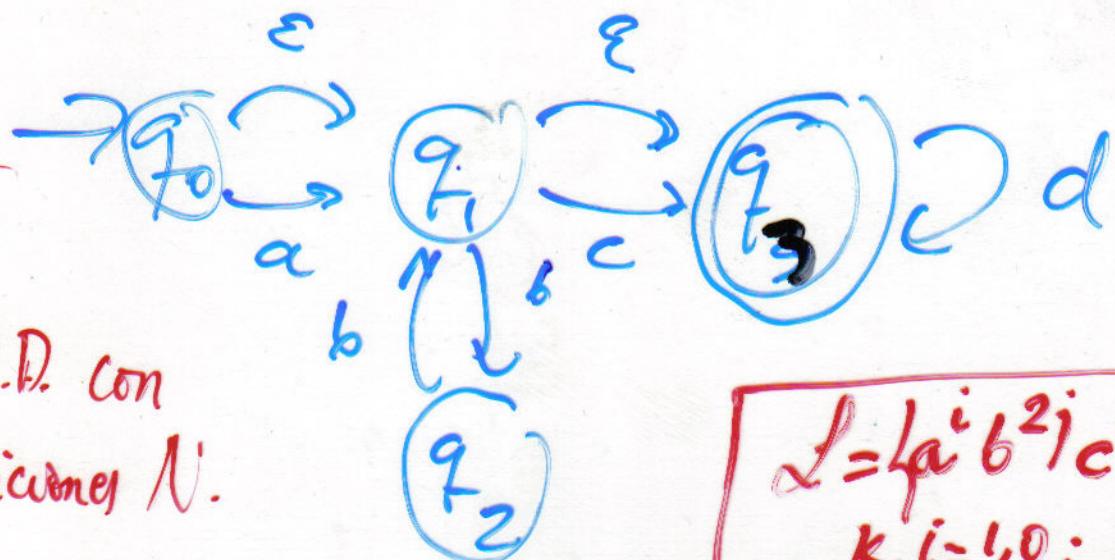
A.F.N.D.
con T.U.



A.F.N.D.

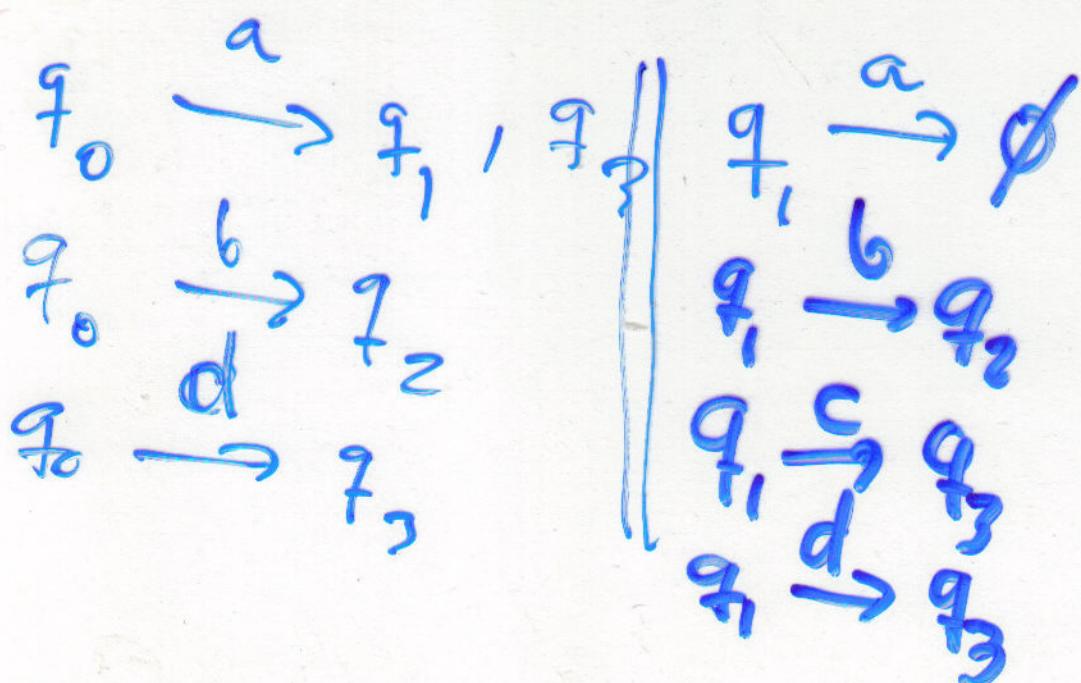
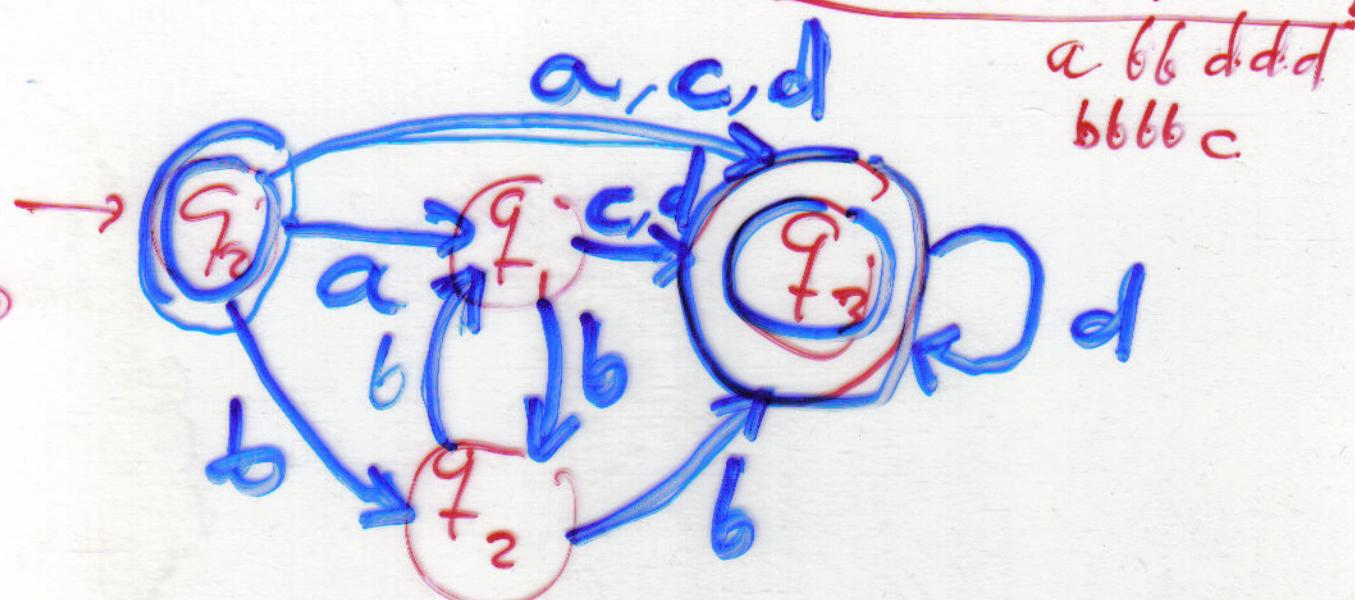


T.26



A.F.N.D. con
transiciones N.

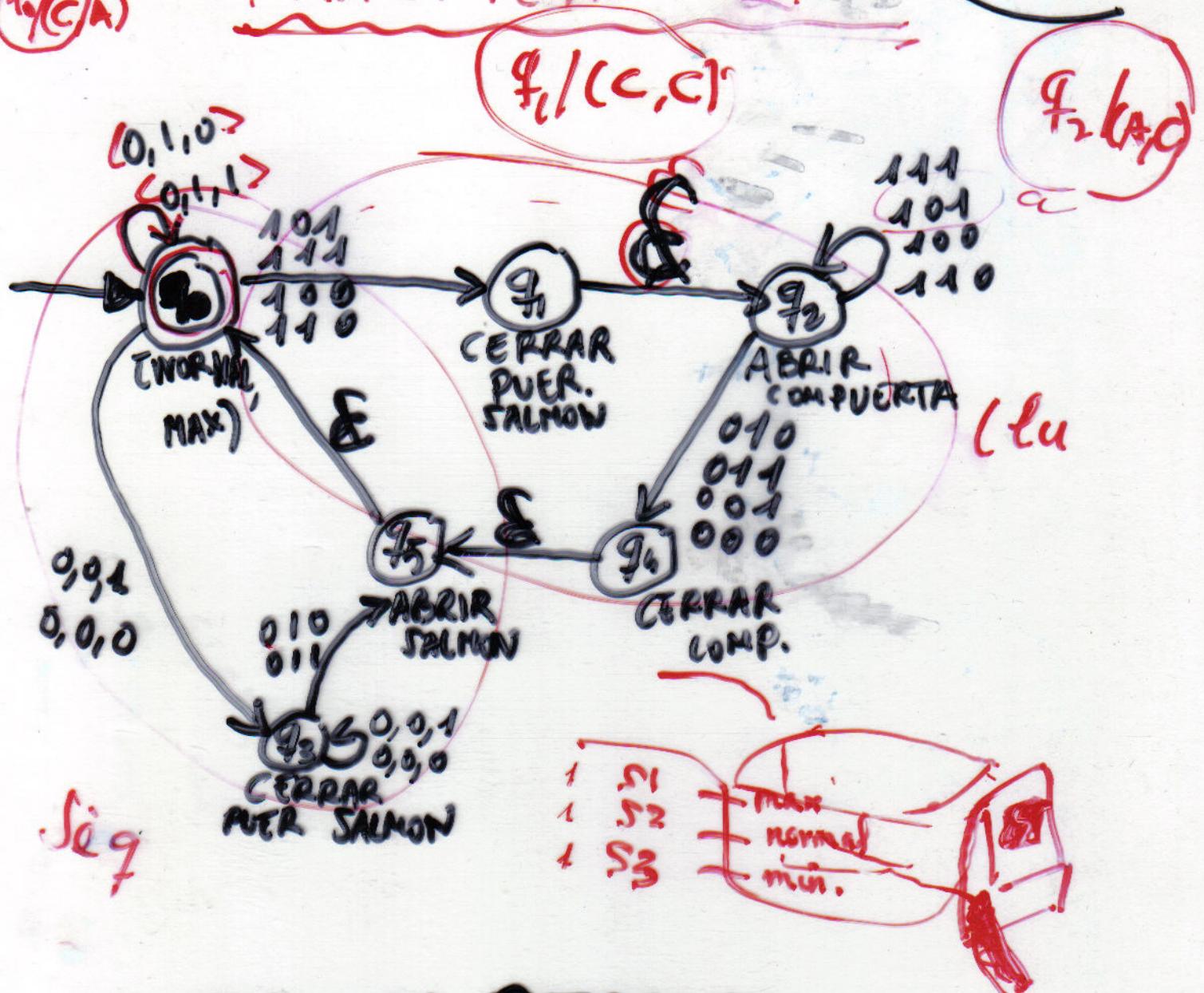
$$L = \{a^i b^j c^k d^l \mid i, l \geq 0; j, k \geq 0\}$$



PRACTICA

PRACTICA

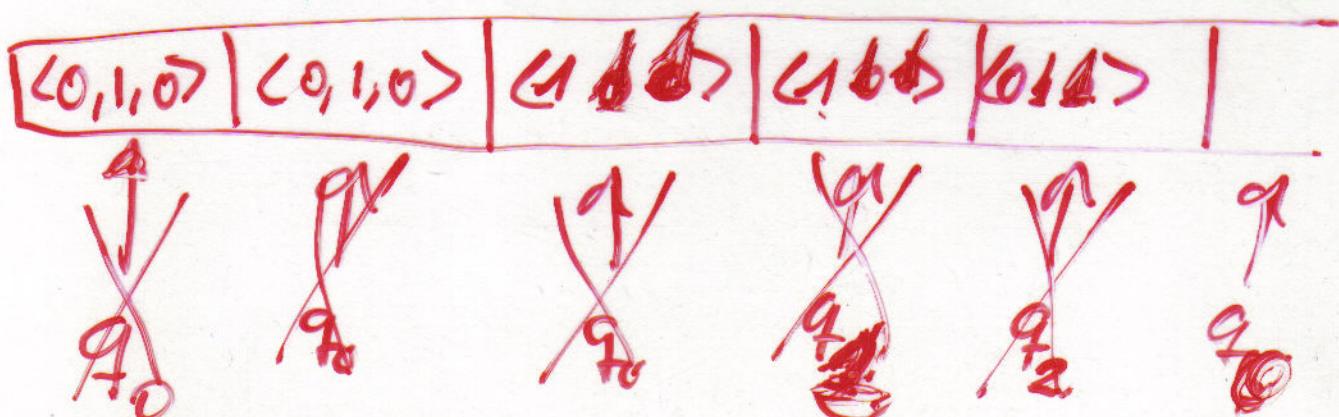
(T. 27)



q_0 : COMPUERTA CERRADA

S_1 : si por defecto max

S_2 : 0 si por encima



$(0,1,0) | (0,1,0) | (001) | (000) | (010)$

T. 29(bij 1)

$$0 \cdot 1^* + 1 \cdot 1^*$$
$$\{0 \cdot 1^* \cup 1 \cdot 1^*\}$$

$$0 \cdot 1^i / i \geq 0 \cup \{1\}$$

$$\{0 \cdot 1^i / i \geq 0 \cup \{1\}\}$$

$$\{1, 0 \cdot 1^i / i \geq 0\}$$

$$\{0^j 1^i \mid j=i; i \geq 0\}$$

$$0 \xrightarrow{\quad} (0 + 1)^* \xleftarrow{\quad} 11_n$$

$$\{01\} \cdot (\{01\} \cup \{11\})^* \cdot 111 \cdot 111$$

$$\{01 \cdot \{u / u \in \{01\}^*\}\} \cdot 111$$

↓

$$\{0 \cdot u \cdot 11 / \underbrace{u \in \{0,1\}^*}_{u = a_1 a_2 \dots a_n; a_i \in \{0,1\}; n \geq 0}\}$$

$$(ab^*)^*$$

↓

$$(\{a\} \cup \{b\}^*)^*$$

↓

$$(\{a\} \cup \{b^i / i \geq 0\})^*$$

$$\{ab^i / i \geq 0\}^*$$

↓

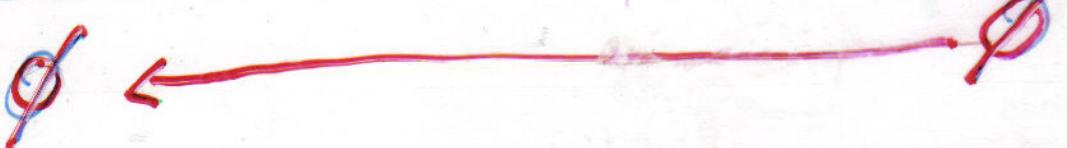
$$\{u_1 u_2 \dots u_n / u_i \in \{ab^i / i \geq 0\}; n \geq 0\}$$

Expresiones Regulares

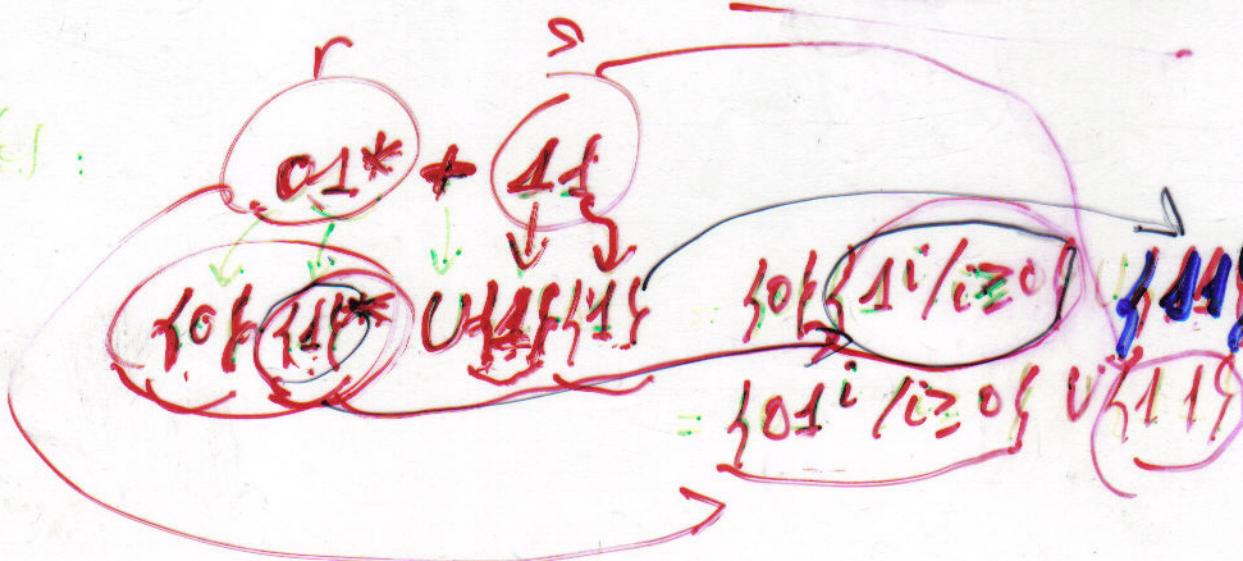
T.29

E. R.

Lenguaje Reg.



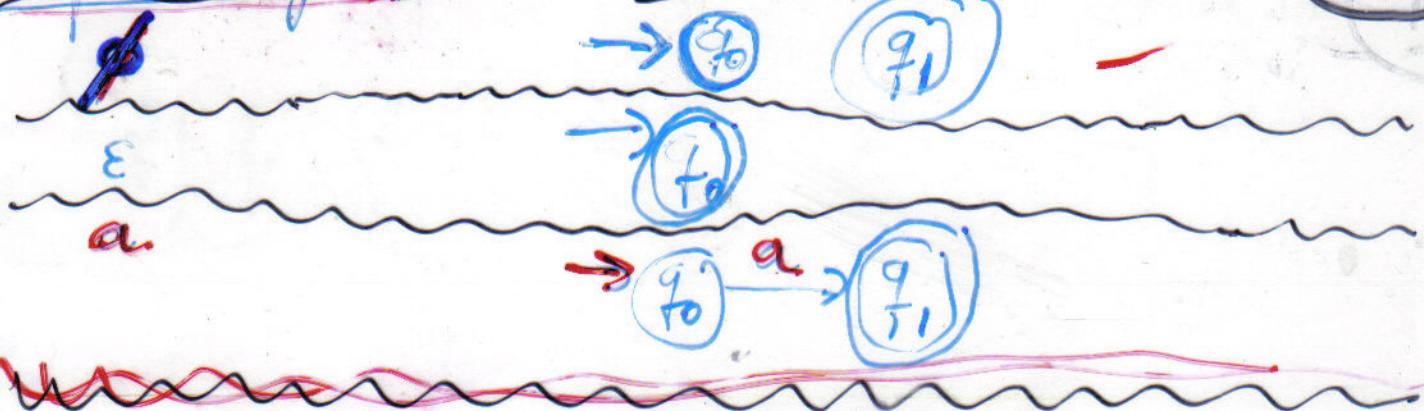
Ejemplos:



Expresión Regular

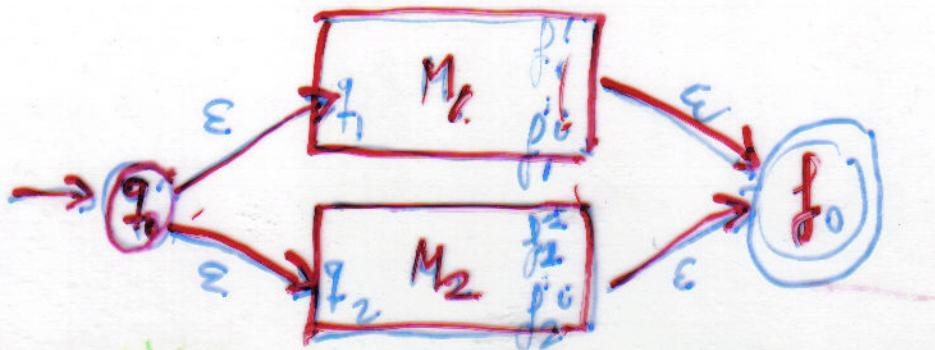
AFND con T.N.

(T.30)



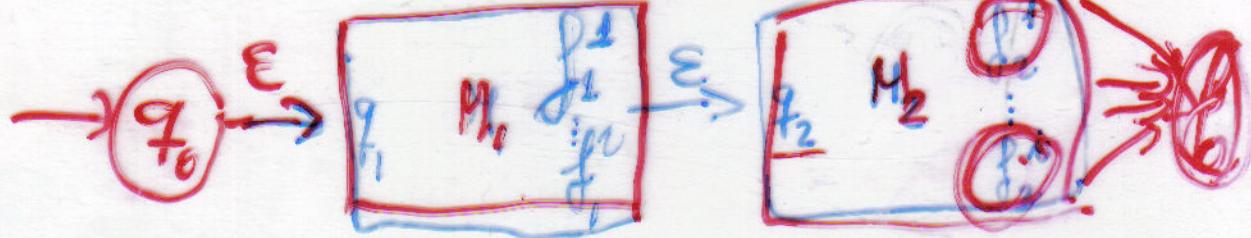
$r+s$

$RUS = \{a/a \in R, b \in S\}$



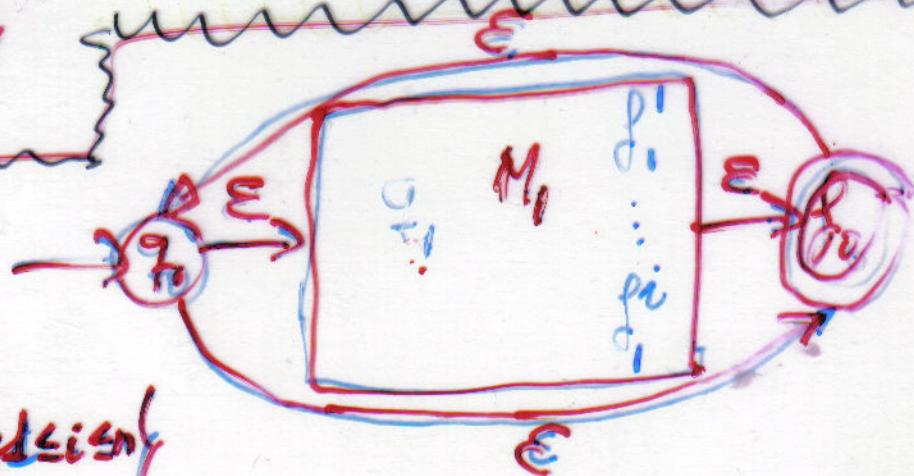
rs

$RS = \{a \in R; b \in S\}$



r^*

$R^* = \{u_i u_j \dots u_n / u_i \in R; i \leq n\}$
 $i \in N$

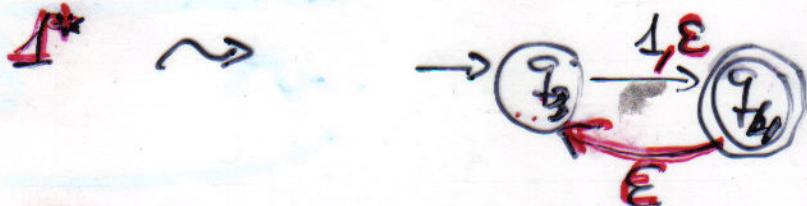


01* + 11 \rightarrow AFND in T.N. (T.31)

(1.)



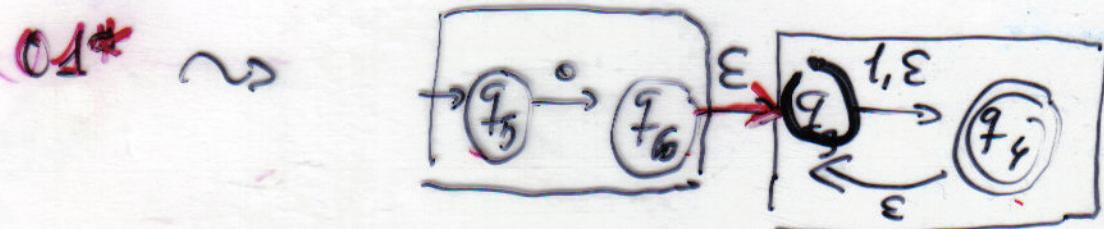
(2.)



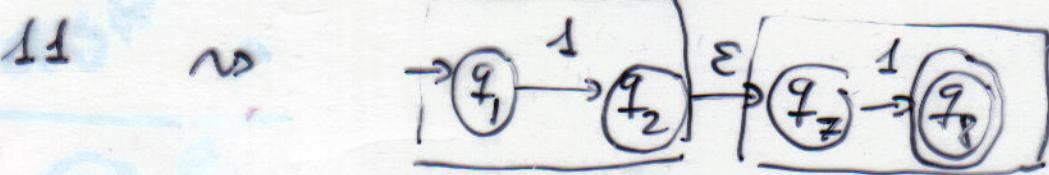
(3.)



(4.)

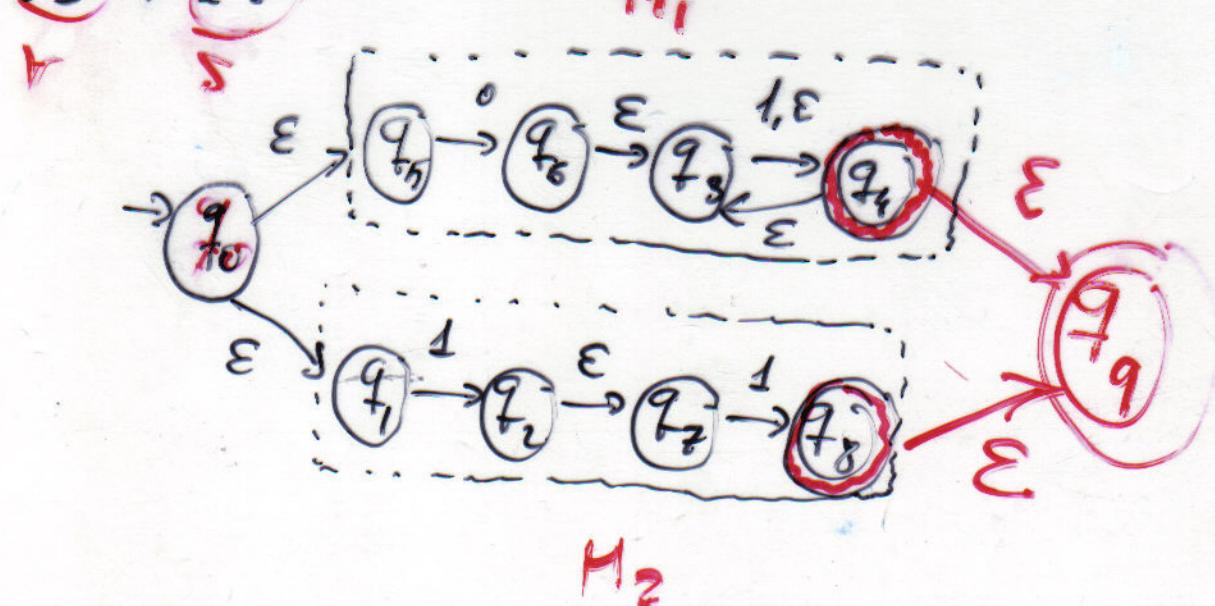


(5.)



(6.)

$01^* + 11$



$O(1+O)^{*} 11$

1.- $0 \rightsquigarrow$



(T.32)

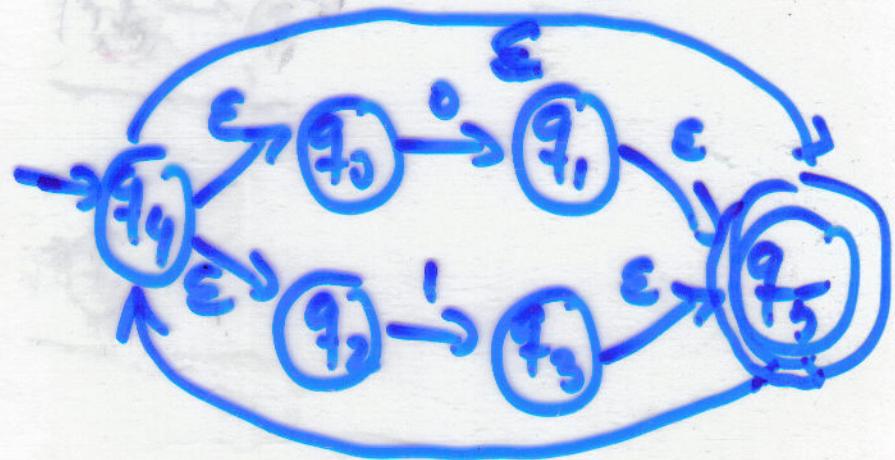
2.- $1 \rightsquigarrow$



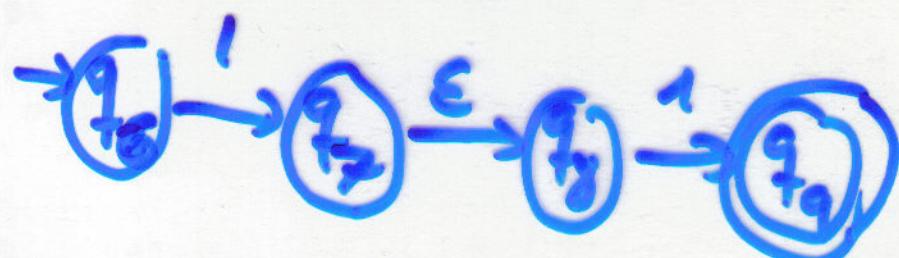
3.- $0+1 \rightsquigarrow$



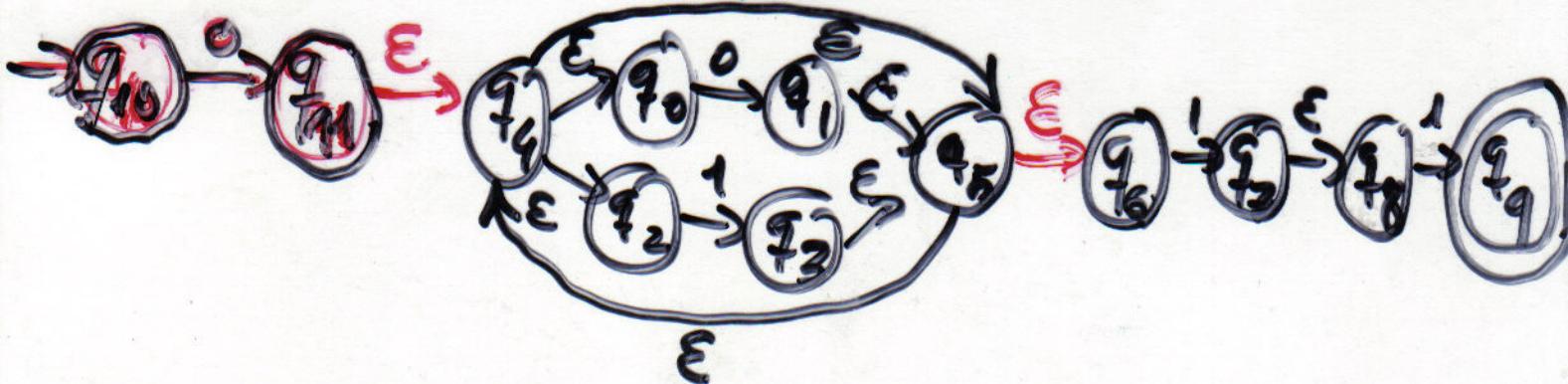
4.- $(0+1)^*$ \rightsquigarrow



5. $\rightsquigarrow 11$



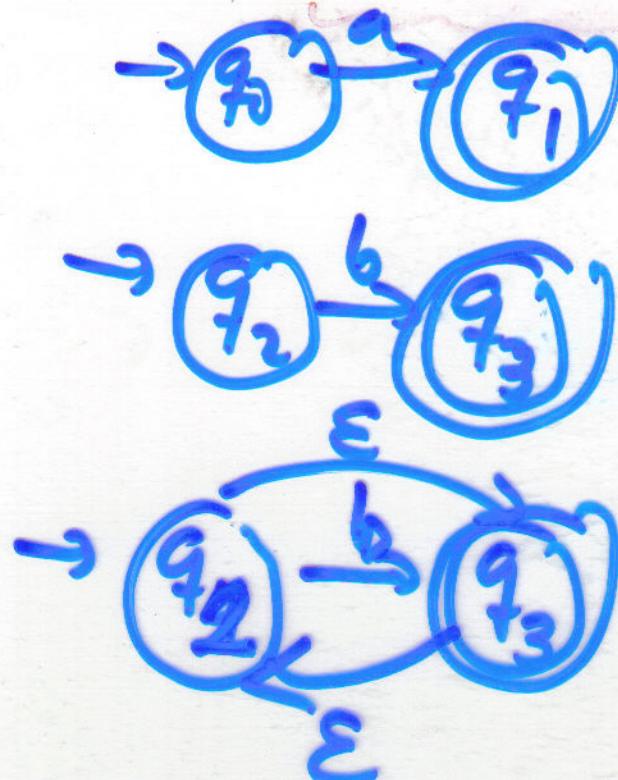
6.- $0(0+1)^* 11 \rightsquigarrow$



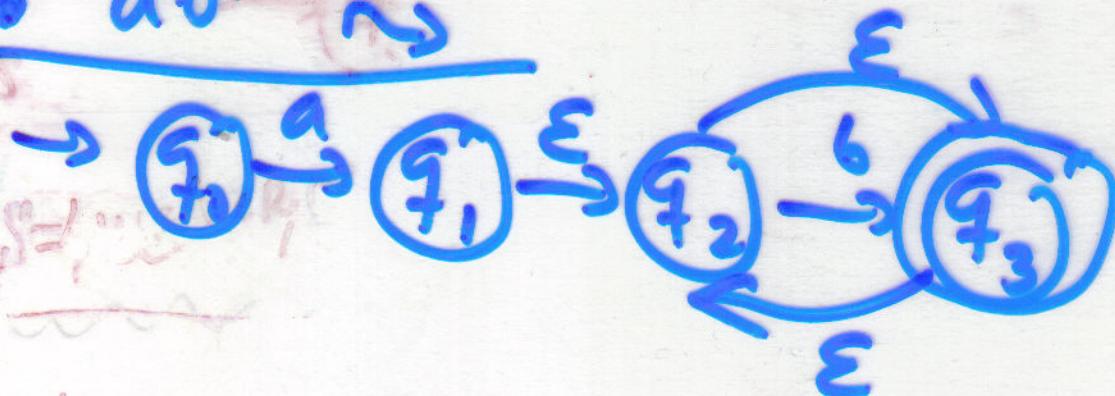
(a b*)*

(T.33)

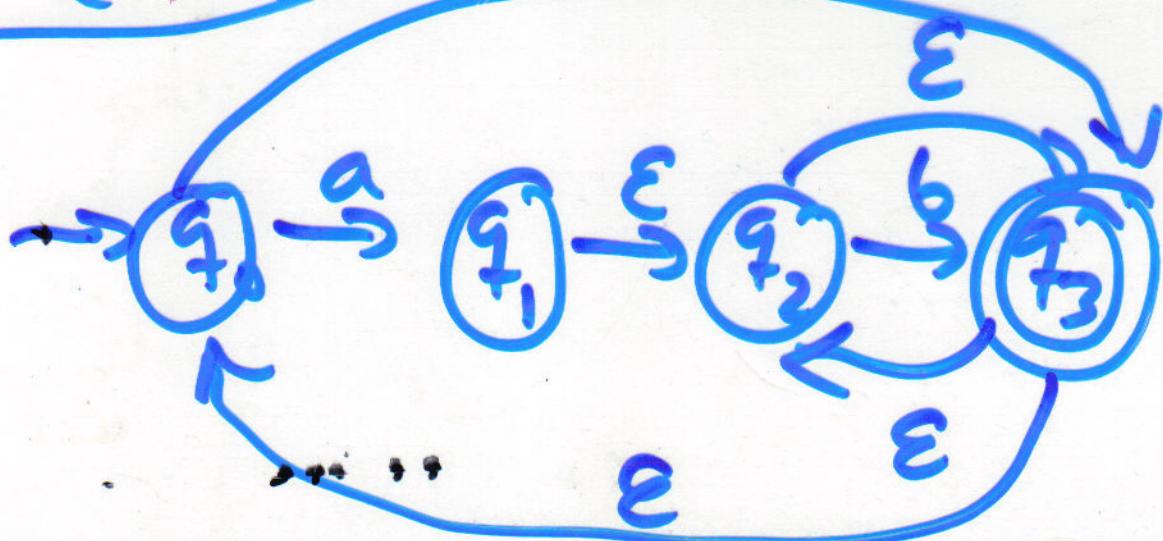
1. - a \rightsquigarrow
2. - b \rightsquigarrow
3. - b^* \rightsquigarrow



4. - ab*



5. - (a b*)*



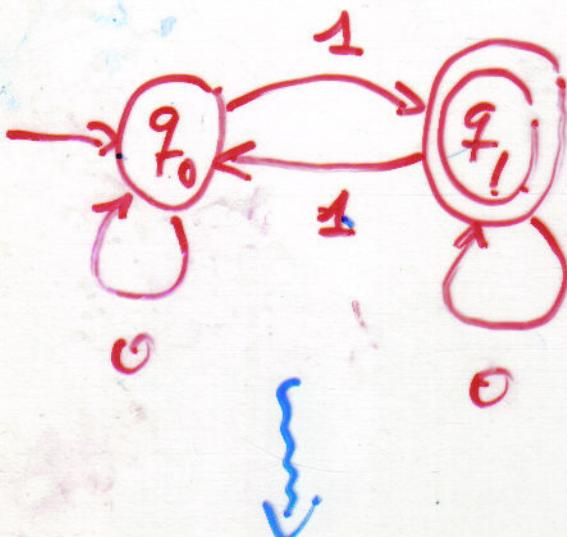
T. 34

Paso de

A.F.D.

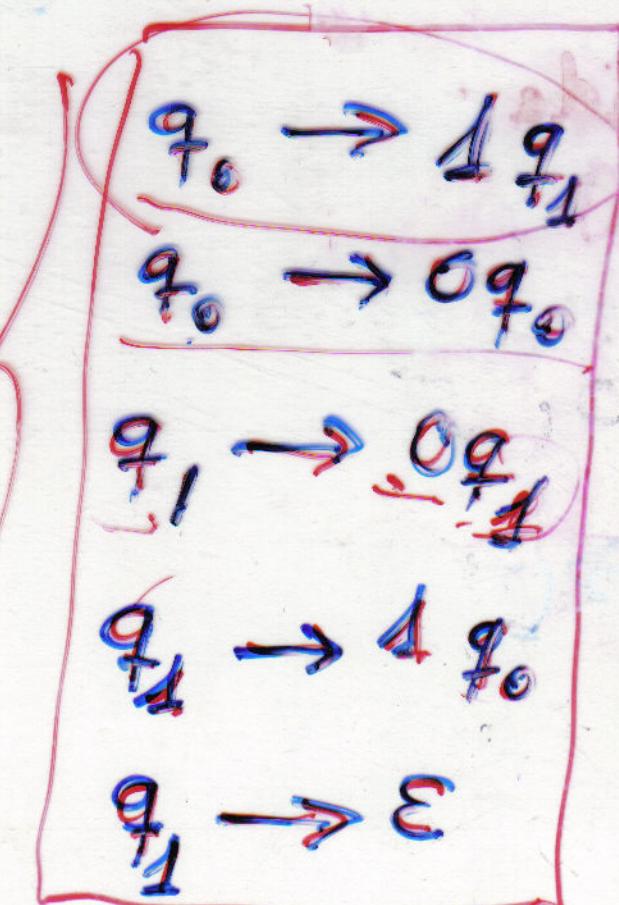
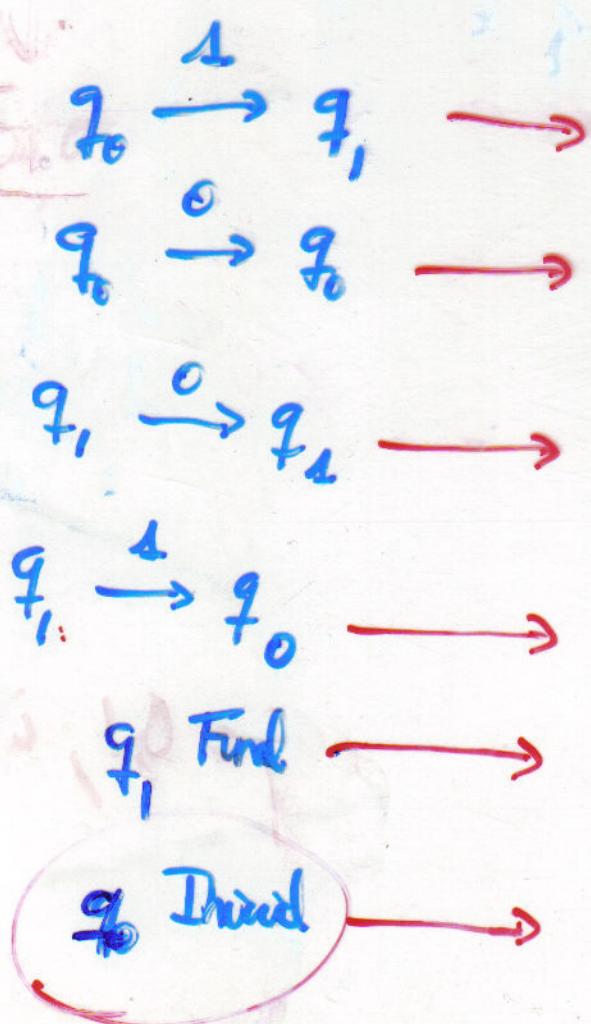


Gramática Regular



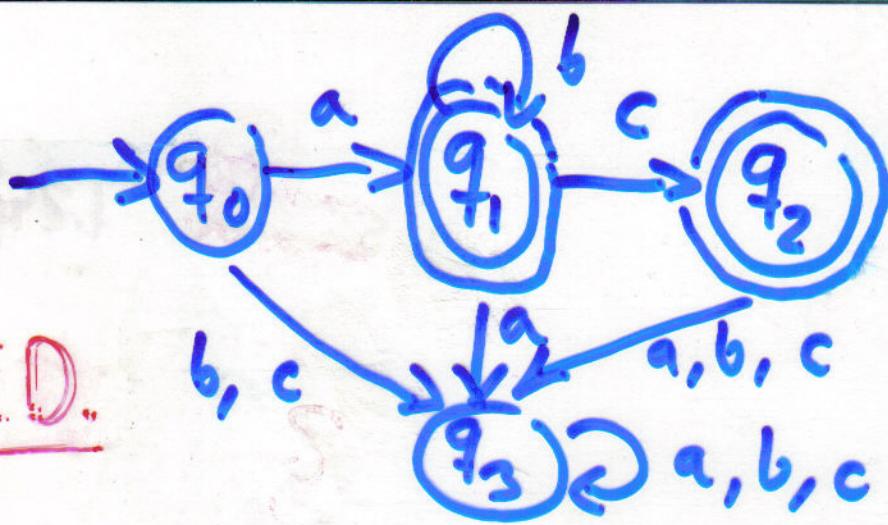
A.F.D.

Gramática Regular



q_0 Simb. Inicial

T.35



A.F.D.

$$L = \{ a b^i c^j \mid i \geq 0; j = 0, 1 \}$$

1. - Estado

Gram. Regular (Lineal por la Derecha)

$$\left\{ \begin{array}{l} q_0 \xrightarrow{a} q_1 \\ q_0 \xrightarrow{b} q_3 \\ q_0 \xrightarrow{c} q_3 \end{array} \right\}$$

$$\underline{q_0 \rightarrow a q_1, b q_3, c q_3}$$

$$\left\{ \begin{array}{l} q_1 \xrightarrow{a} q_1 \\ q_1 \xrightarrow{b} q_3 \\ q_1 \xrightarrow{c} q_2 \end{array} \right\}$$

$$\underline{q_1 \rightarrow a q_3, b q_1, c q_2}$$

$$\left\{ \begin{array}{l} q_2 \xrightarrow{a} q_3 \\ q_2 \xrightarrow{b} q_3 \\ q_2 \xrightarrow{c} q_3 \end{array} \right\}$$

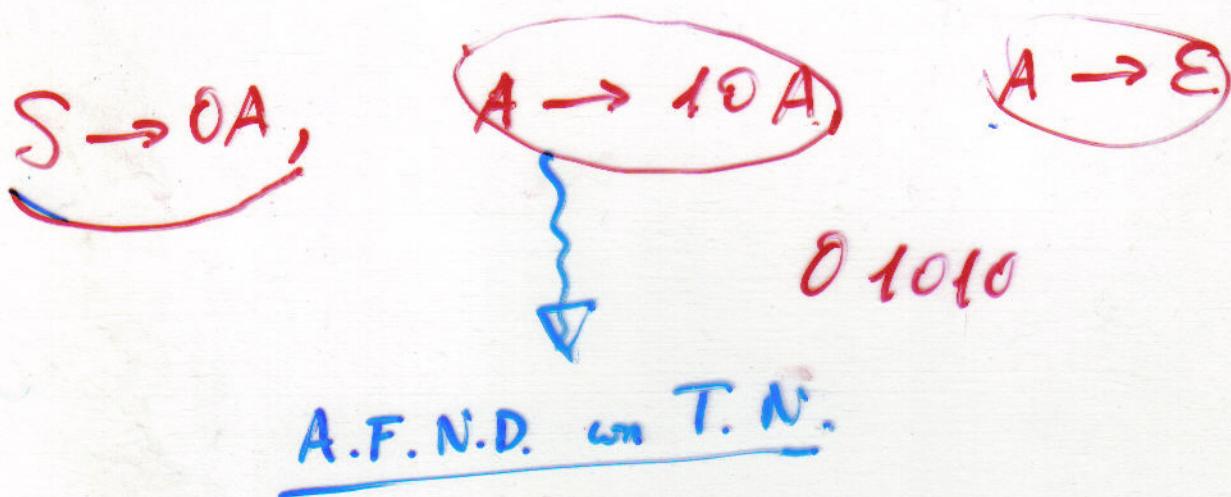
$$\underline{q_2 \rightarrow a q_3, b q_3, c q_3}$$

q_0 . Ini; q_1, q_2 Final

q_0 : Símbolo Inicial

PASO DE:

Gramática Regular \longrightarrow A.F.N.D. con T.U.



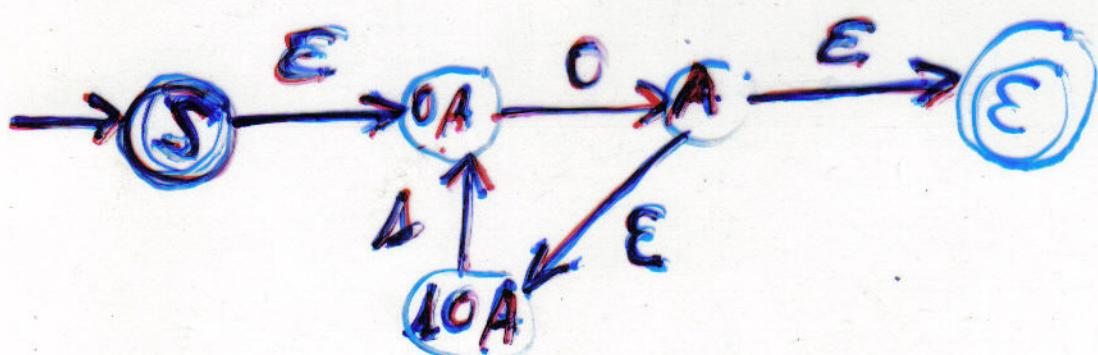
1.- Estados:

$$\overbrace{XA}^S \rightarrow \overbrace{0A}^0, \overbrace{A}^A$$

$$\overbrace{XXA}^{A \rightarrow 10A} \rightarrow 10A, \overbrace{0A}^0, \overbrace{A}^A$$

$$\overbrace{\epsilon}^A \rightarrow \epsilon$$

2.- Transiciones:

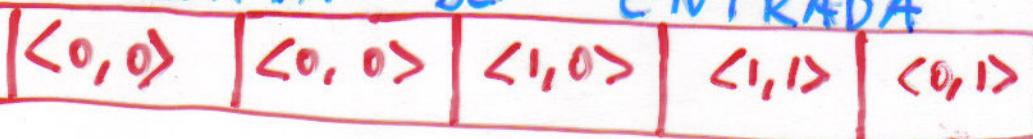


MAQUINA DE MEALY

(T.37)

$$\begin{array}{r}
 00110 \\
 +00011 \\
 \hline
 01001
 \end{array}$$

CINTA DE ENTRADA



Cabeza Lectora

Sumador Binario

Cabeza Escritora



Alfabeto Entrada

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

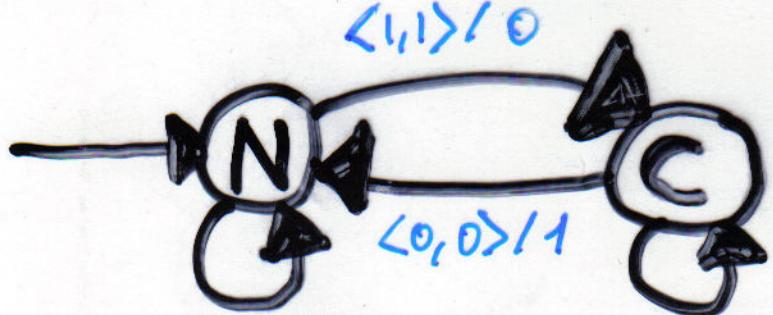
Alfabeto Salida

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

Interpretación:

N ≡ No se acarrea

C ≡ Si se acarrea

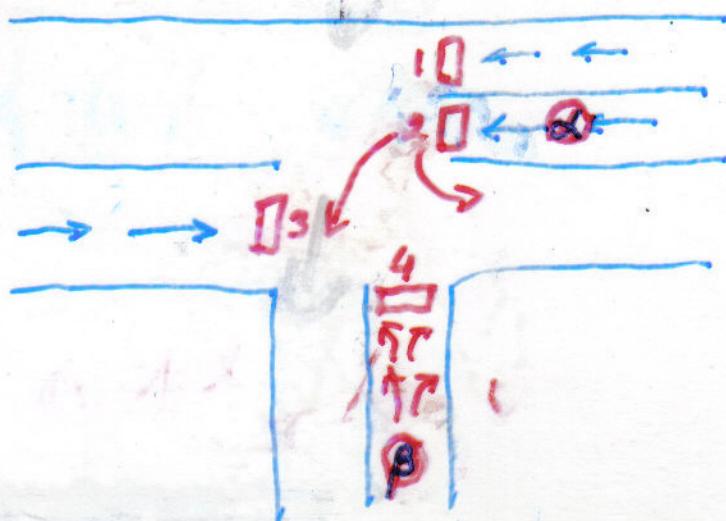


<0,0>/0
<1,0>/1
<0,1>/1

<0,1>/0
<1,0>/0
<1,1>/1

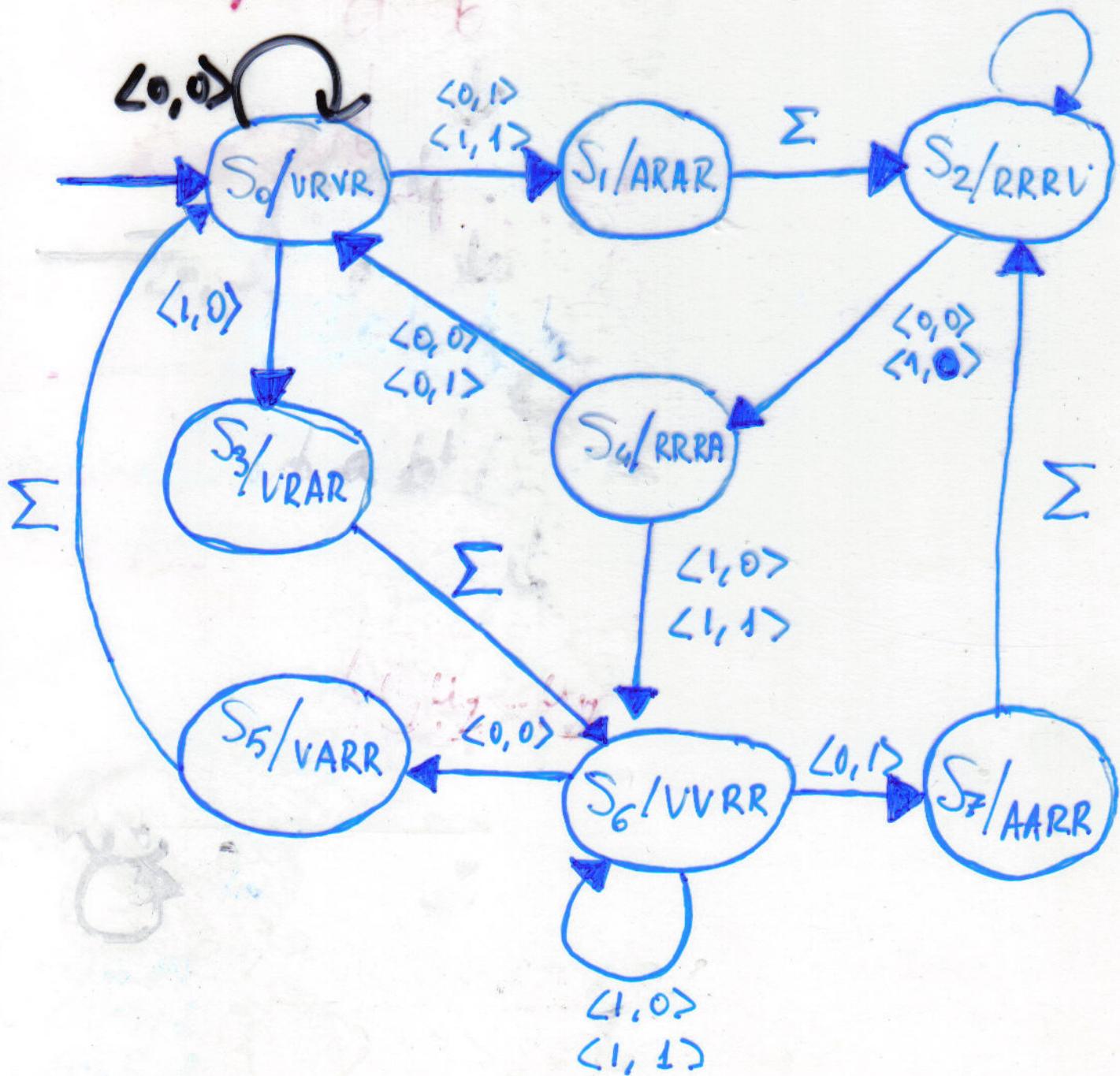
MAQUINA DE MOORE

T-38

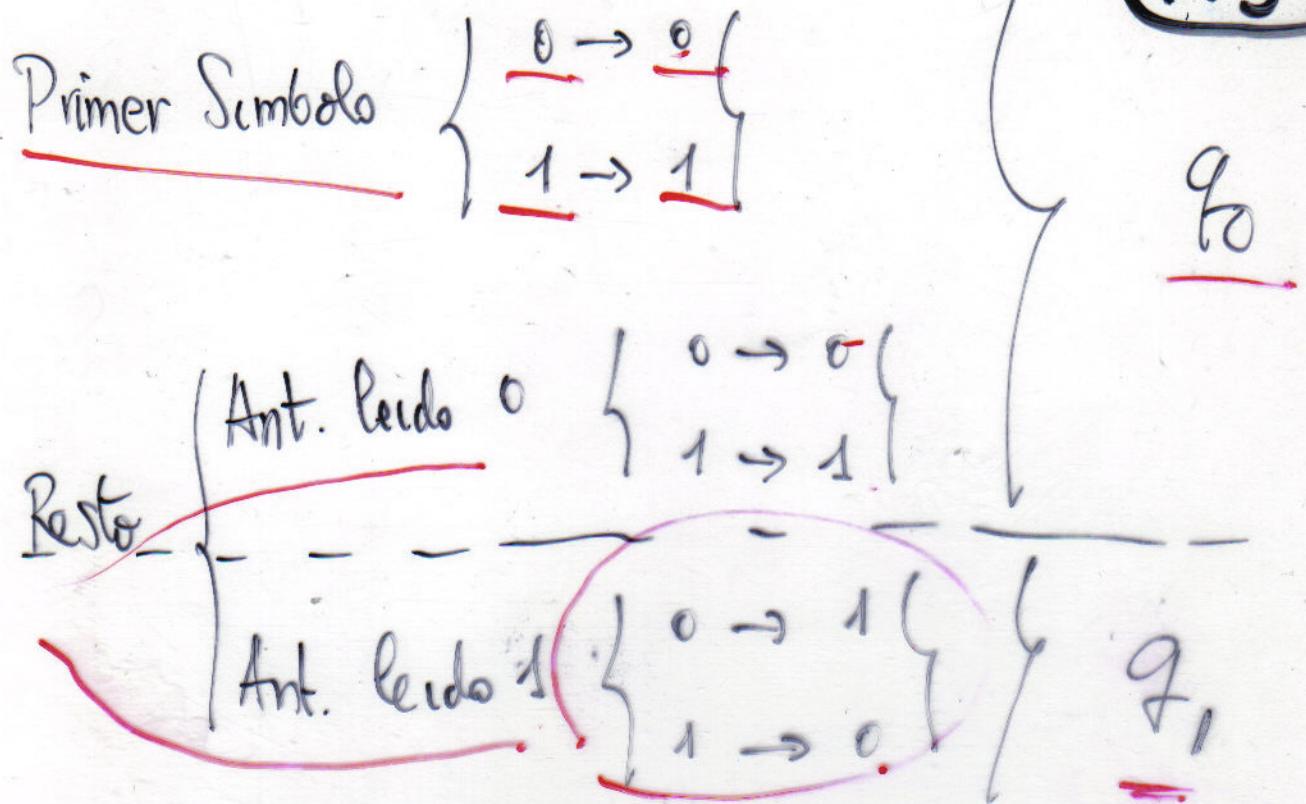


$$\Sigma = \{(0,1), (1,1), (1,0), (0,0)\}$$

$\langle 0,1 \rangle$
 $\langle 1,1 \rangle$



T.39



Entrada $\rightarrow 1000101$

$\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$

1100111

Parida

Decid.

$\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$

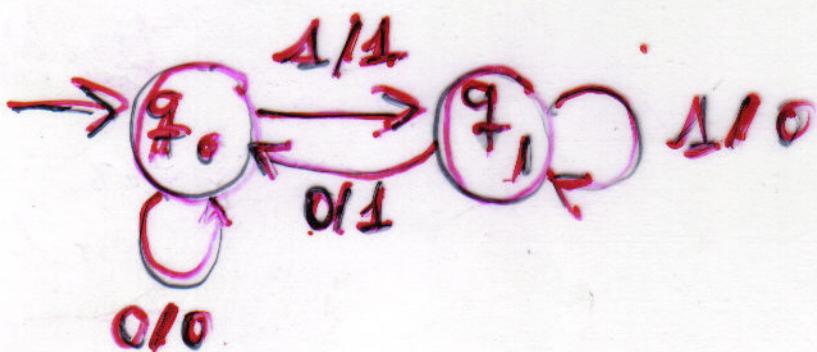
1000101

$q_1 =$ Si ha
leido un

1

$q_0 =$ Si ha
leido un

0

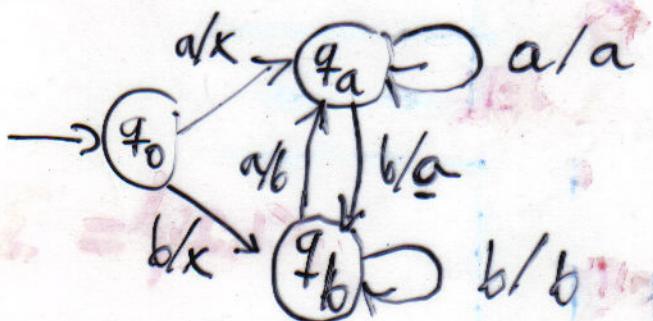


Maquina de Mealy

(T.41)

a b b a b
 ↓ ↓ ↓ ↓ ↓
 x a b b a

Salida(n) ← Entrada(n-1)

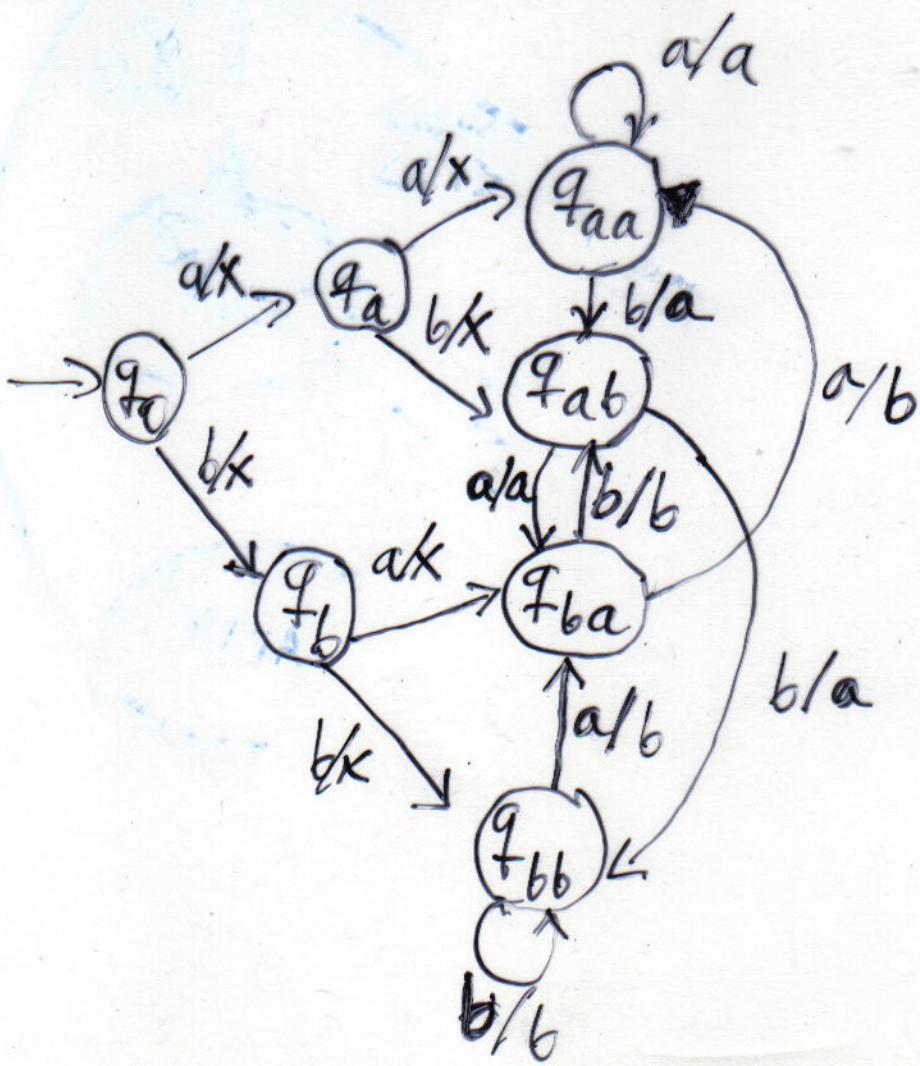


a f b a b
 ↓ ↓ ↓ ↓ ↓
 x a b b a

Salidas asociadas a las Transiciones (Máq. de Maly)

Entrada → ~~a b b a b a~~
 ↓ ↓ ↓ ↓ ↓
 x x a b b a

Salida(n) ← Entrada(n-2)



Máquina
de
Estados