Practica 1

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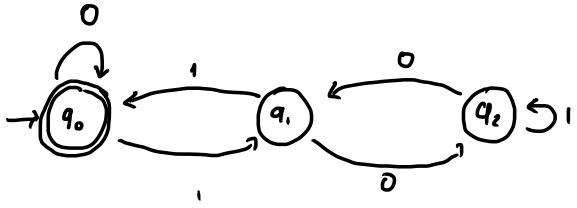
3.1

3.1.1. Construya una AFD que reconozca aquellas cadenas en el alfabeto {0,1} tales que las cadenas binarias representen un número decimal múltiplo de 3



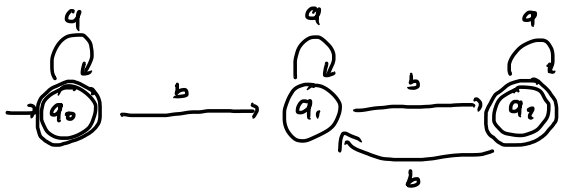
Aceptación

$0 \in L(M)$
$11 \in L(M)$
$0011 \in L(M)$
$1001 \in L(M)$
$1111 \in L(M)$
$1100\,11 \in L(M)$
$1111\,11 \in L(M)$

Rechazo

$1 \notin L(M)$
$01 \notin L(M)$
$10 \notin L(M)$
$111 \notin L(M)$
$101 \notin L(M)$
$100 \in L(M)$
$10101\,1 \notin L(M)$

3.1.2 Construya una AFD que reconozca aquellas cadenas en el alfabeto $\{a,b\}$ tales que tengan un número par de b consecutivas.



Aceptación

$a \in L(M)$
$bab \in L(M)$
$bb \in L(M)$
$bba \in L(M)$
$babbab \in L(M)$
$bbabbbb \in L(M)$
$acabaabcbbbbabab \in L(M)$

Rechazo

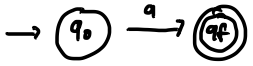
$b \notin L(M)$
$ab \notin L(M)$
$babb \notin L(M)$
$bbab \notin L(M)$
$bbbabb \notin L(M)$
$acbabbabbab \notin L(M)$
$babcbbaaab \notin L(M)$

3.2

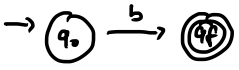
3.2.1 $(bb + aba)(ba)^*$

Exp Reg $\Rightarrow$ AFN-ε

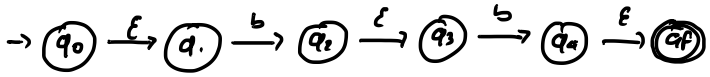
AFN-ε a



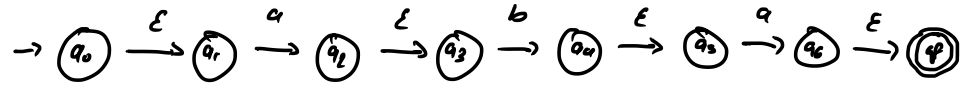
AFN-ε b



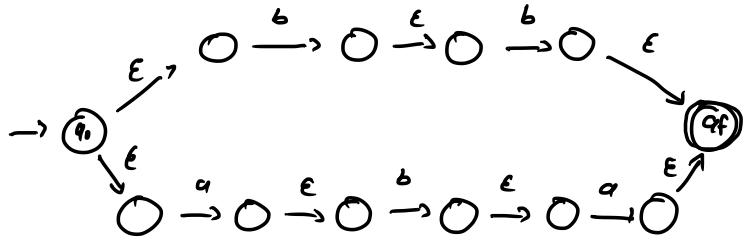
AFN-ε (bb)



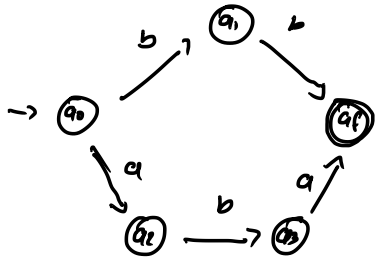
AFN-ε (aba)



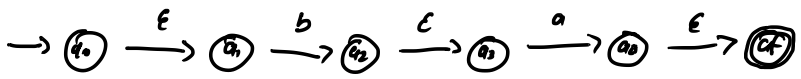
AFN-ε (bb + aba)



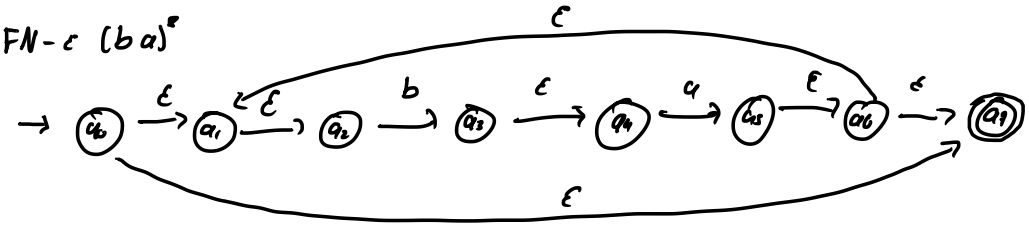
Simplificación (bb + aba)



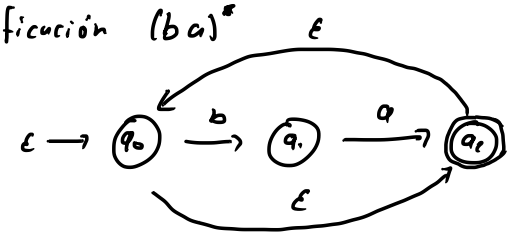
AFN-ε (ba)



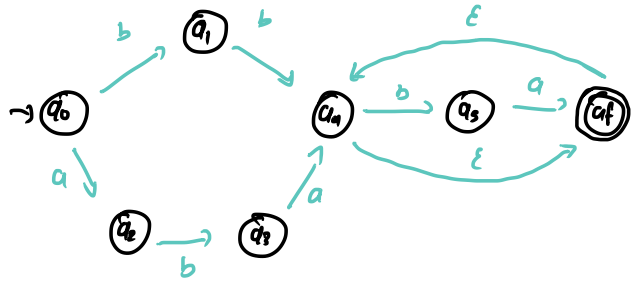
AFN-ε (ba)*



Simplificación (ba)*



AFN-ε (bb + aba)(ba)*

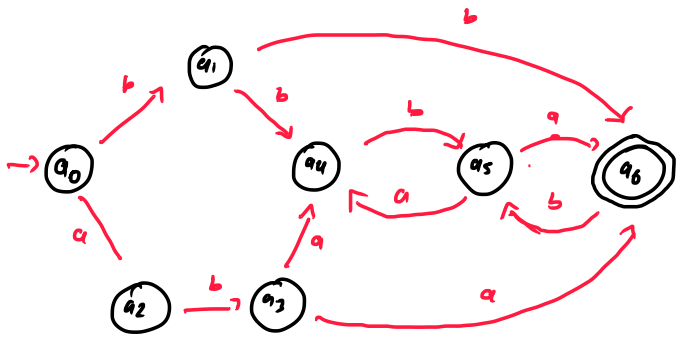


AFN-ε ⇒ AFN

$E(q_0) = \{q_0\}$
$E(q_1) = \{q_1\}$
$E(q_2) = \{q_2\}$
$E(q_3) = \{q_3\}$
$E(q_4) = \{q_4, q_6\}$
$E(q_5) = \{q_5\}$
$E(q_6) = \{q_6, q_4\}$

$\delta(q_0, a) = \{q_2\}$
$\delta(q_0, b) = \{q_1\}$
$\delta(q_1, a) = \emptyset$
$\delta(q_1, b) = \{q_4, q_6\}$
$\delta(q_2, a) = \emptyset$
$\delta(q_2, b) = \{q_3\}$
$\delta(q_3, a) = \{q_4, q_6\}$
$\delta(q_3, b) = \emptyset$
$\delta(q_4, a) = \emptyset$
$\delta(q_4, b) = \{q_5\}$
$\delta(q_5, a) = \{q_6, q_4\}$
$\delta(q_5, b) = \emptyset$
$\delta(q_6, a) = \emptyset$
$\delta(q_6, b) = \{q_5\}$

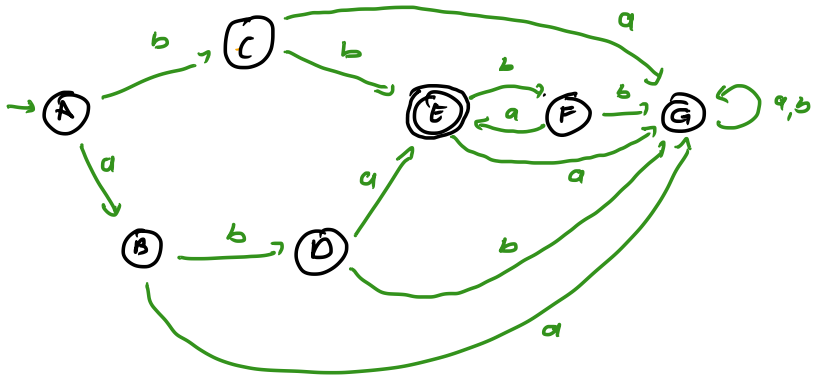
AFN (bb + aba)(ba)*



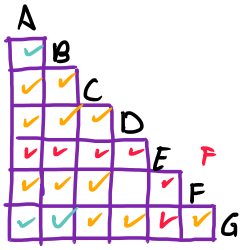
AFN => AFD

	a	b	
$\{q_0\}$	$\{q_2\}$	$\{q_1\}$	A
$\{q_2\}$	$\emptyset$	$\{q_3\}$	B
$\{q_1\}$	$\emptyset$	$\{q_4, q_6\}$	C
$\{q_3\}$	$\{q_4, q_6\}$	$\emptyset$	D
F $\{q_4, q_6\}$	$\emptyset$	$\{q_5\}$	E
$\{q_5\}$	$\{q_4, q_6\}$	$\emptyset$	F
$\emptyset$	$\emptyset$	$\emptyset$	G

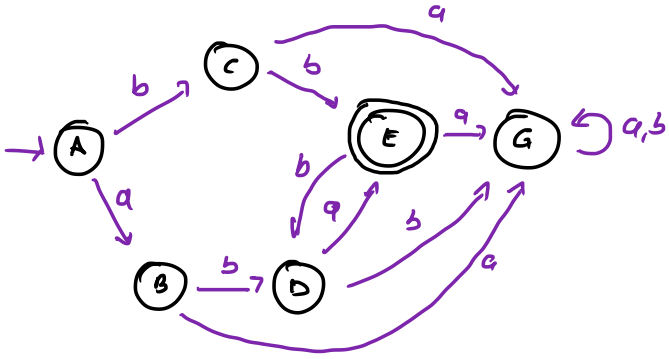
AFD $(bb + aba)(ba)^*$



AFD => AFD mínimo

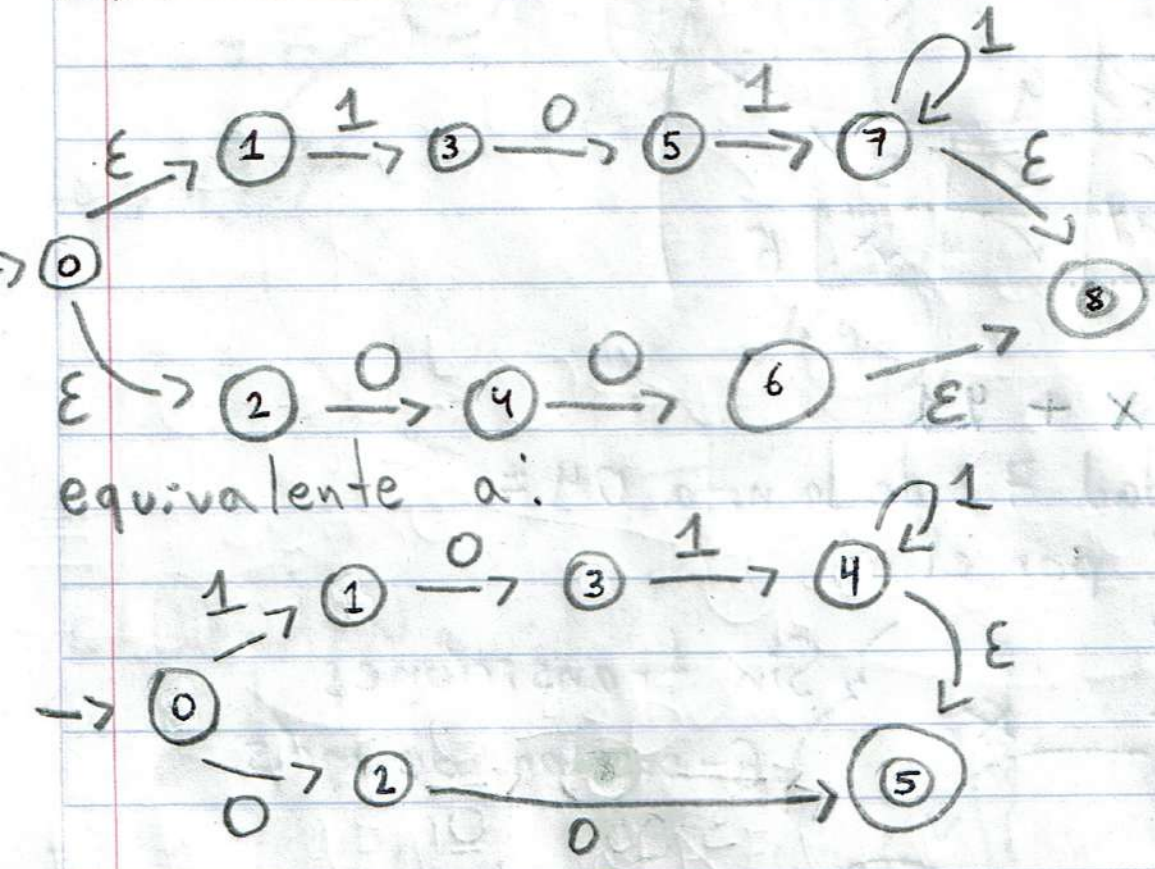


D ≃ F



3.2.2: Sea $1011^* + 00$

a)



equivalente a:

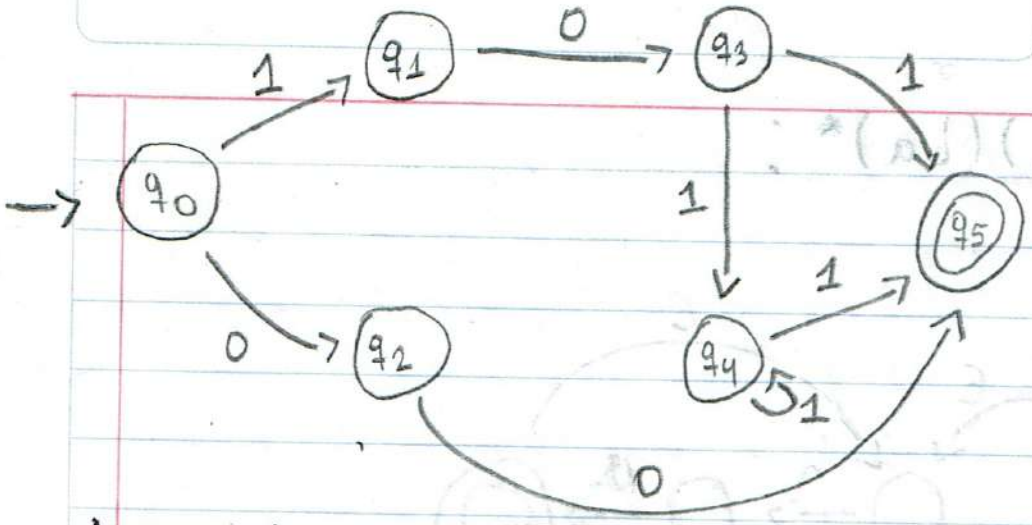
b) De AFN-ε a AFN

- Sacamos Eclosures:

Eclo. $(q_0) = \{q_0\}$
Eclo. $(q_1) = \{q_1\}$
Eclo. $(q_2) = \{q_2\}$
Eclo. $(q_3) = \{q_3\}$
Eclo. $(q_4) = \{q_4, q_5\}$
Eclo. $(q_5) = \{q_5\}$

δ_M:

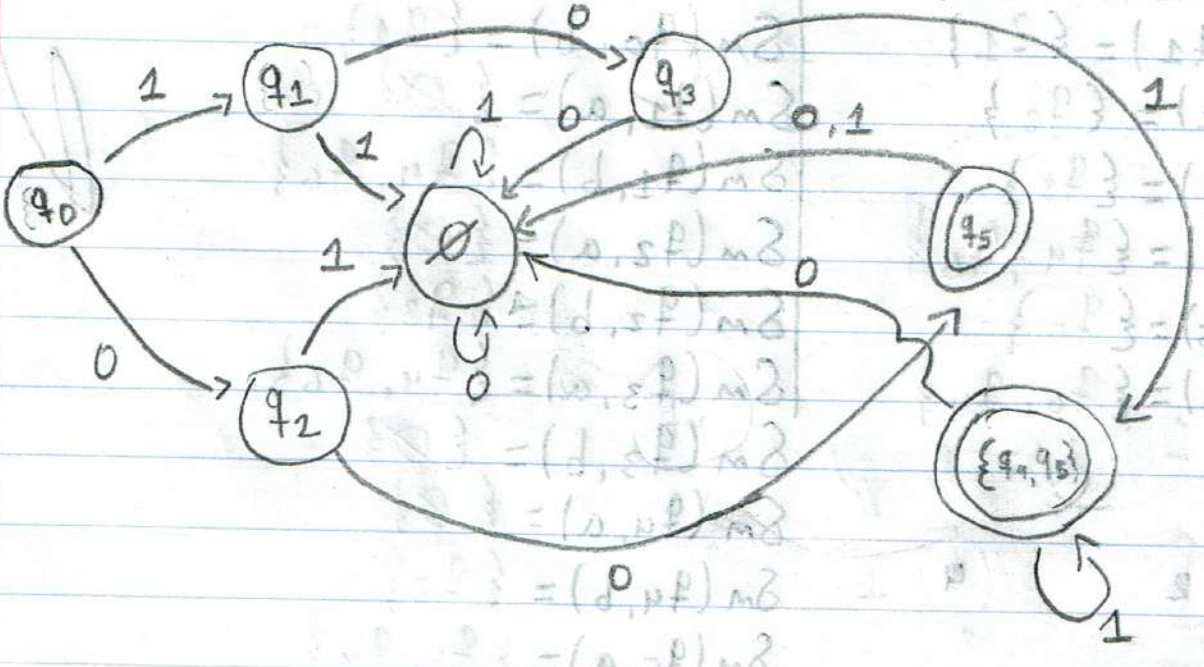
$\delta_M(q_0, 0) = \{q_2\}$
$\delta_M(q_0, 1) = \{q_1\}$
$\delta_M(q_1, 0) = \{q_3\}$
$\delta_M(q_1, 1) = \{\emptyset\}$
$\delta_M(q_2, 0) = \{q_5\}$
$\delta_M(q_2, 1) = \{\emptyset\}$
$\delta_M(q_3, 0) = \{\emptyset\}$
$\delta_M(q_3, 1) = \{q_4, q_5\}$
$\delta_M(q_4, 0) = \{\emptyset\}$
$\delta_M(q_4, 1) = \{q_4, q_5\}$
$\delta_M(q_5, 0) = \{\emptyset\}$
$\delta_M(q_5, 1) = \{\emptyset\}$



c) De AFN a AFD:

Edos.	0	1
$\emptyset$	$\emptyset$	$\emptyset$
$\rightarrow \{q_0\}$	$\{q_2\}$	$\{q_1\}$
$\{q_1\}$	$\{q_3\}$	$\emptyset$
$\{q_2\}$	$\{q_5\}$	$\emptyset$
$\{q_3\}$	$\emptyset$	$\{q_4, q_5\}$
$\{q_4\}$	$\emptyset$	$\{q_4, q_5\}$
F $\{q_5\}$	$\emptyset$	$\emptyset$
F $\{q_4, q_5\}$	$\emptyset$	$\{q_4, q_5\}$

Automata resultante:



q_4 es inalcanzable, por ello no se coloca.

$\emptyset$ sera q_4 y $\{q_4, q_5\}$ será q_6 para los siguientes ejersicios.

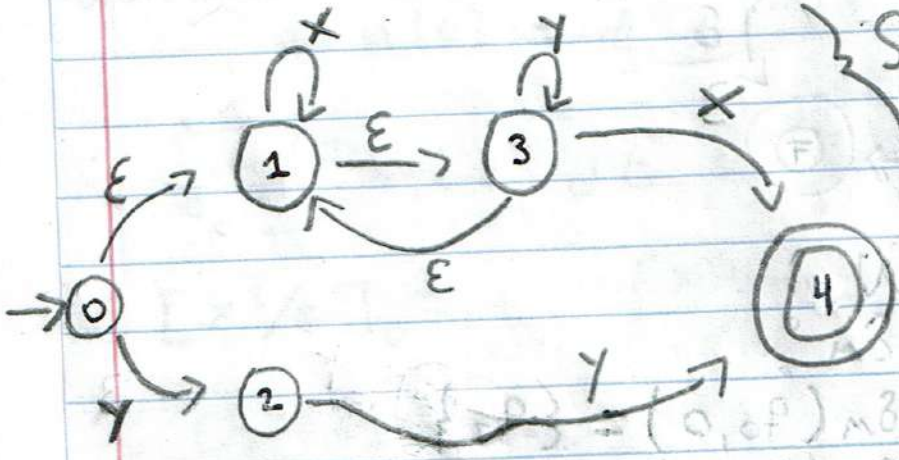
d)

	0	1	2	3	4	5	6
1	X						
2	X	X					
3	X	X	X				
4	X	X	X	X			
5	✓	✓	✓	✓	✓		
6	✓	✓	✓	✓	✓	X	

} No se puede Minimizar

3.2.3 Sea $(x+y)^*x + yy$

a) Usando la propiedad 7.3 de la nota 04 = $(x^* y^*)^* x + yy$ por ello:



} Sin transiciones ε-epsilon de más

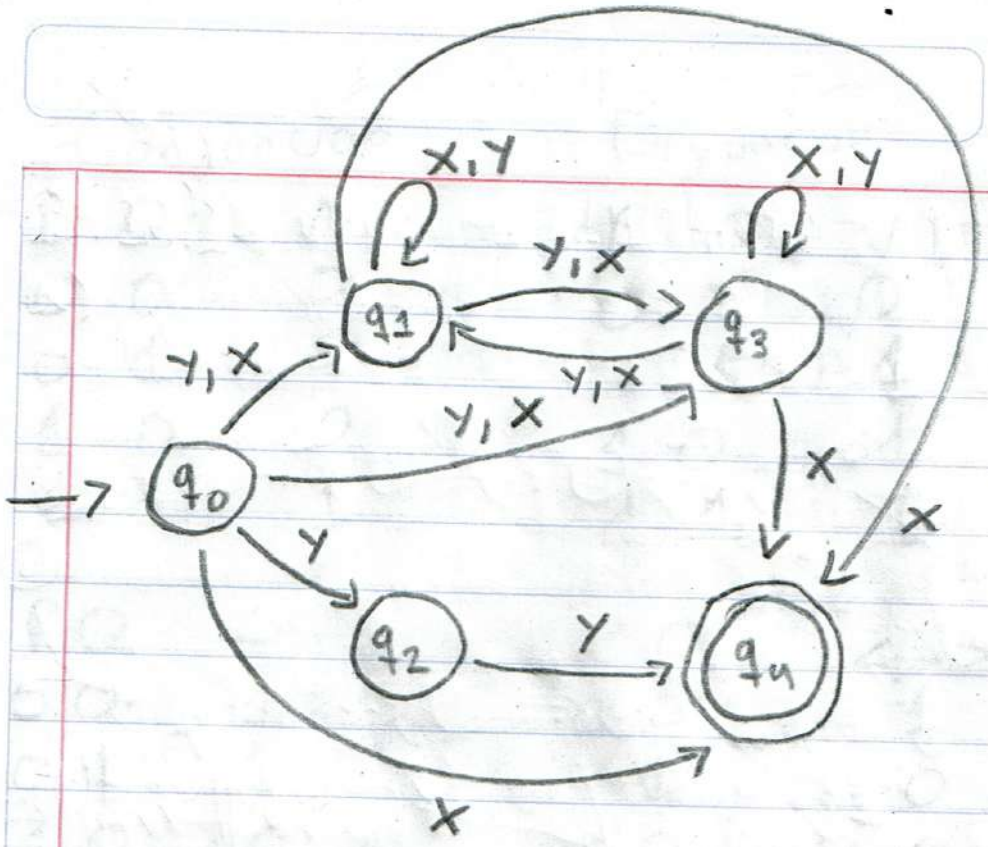
b) De AFN-ε a AFN

Sacamos Eclosures:

$Eclo.(q_0) = \{q_0, q_1, q_3\}$
$Eclo.(q_1) = \{q_1, q_3\}$
$Eclo.(q_2) = \{q_2\}$
$Eclo.(q_3) = \{q_3, q_1\}$
$Eclo.(q_4) = \{q_4\}$

δMS:

$\delta_M(q_0, x) = \{q_1, q_3, q_4\}$
$\delta_M(q_0, y) = \{q_2, q_3, q_1\}$
$\delta_M(q_1, x) = \{q_1, q_3, q_4\}$
$\delta_M(q_1, y) = \{q_3, q_1\}$
$\delta_M(q_2, x) = \emptyset$
$\delta_M(q_2, y) = \{q_4\}$
$\delta_M(q_3, x) = \{q_1, q_3, q_4\}$
$\delta_M(q_3, y) = \{q_3, q_1\}$
$\delta_M(q_4, x) = \emptyset$
$\delta_M(q_4, y) = \emptyset$

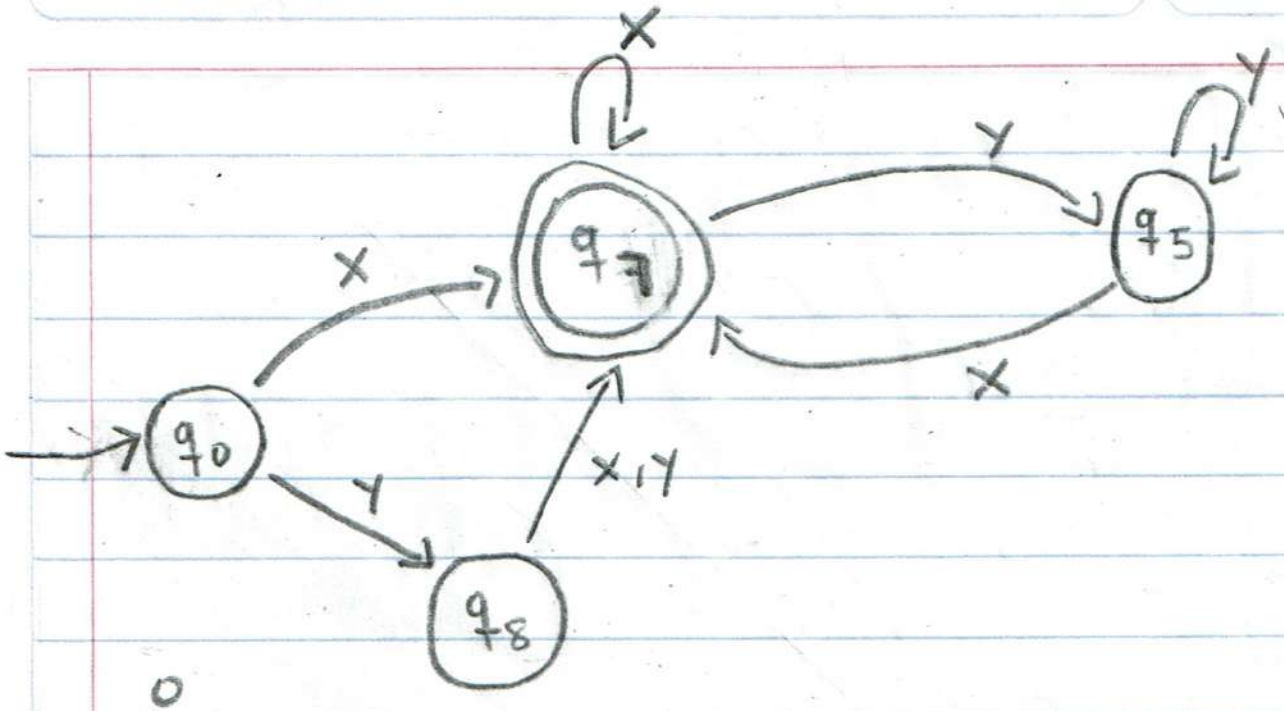


c) De AFN a AFD:

Edos.	x	y
∅	∅	∅
→ q_0	$\{q_1, q_3, q_4\}$	$\{q_2, q_3, q_1\}$ ✓
q_1	$\{q_1, q_3, q_4\}$ ✓	$\{q_1, q_3\}$ ✓
q_2	∅	$\{q_4\}$
q_3	$\{q_3, q_4\}$ ✓	$\{q_3\}$
F q_4	∅	∅
$\{q_1, q_3\}$	$\{q_1, q_3, q_9\}$	$\{q_1, q_3\}$
F $\{q_3, q_4\}$	$\{q_3, q_9\}$	$\{q_3\}$
$\{q_1, q_3, q_4\}$	$\{q_3, q_4, q_1\}$	$\{q_3, q_1\}$ (F)
$\{q_2, q_3, q_1\}$	$\{q_1, q_3, q_4\}$	$\{q_1, q_3, q_4\}$

$\{q_1, q_3\} = q_5$
$\{q_3, q_4\} = q_6 \rightarrow F$
$\{q_1, q_3, q_4\} = q_7 \rightarrow F$
$\{q_2, q_3, q_1\} = q_8$
$\emptyset = q_9$

Conservamos unicamente los estados, q_0, q_7, q_8 y q_5



d)

✓ 7		
✗	✓ 8	
✗	✓	✗ 5

0

} No se puede minimizar más