LABORATORIO 2

Problema 1

a)

b)

	a	b	ε*
q0	-	-	{q0,q1,q2,q4,q7}
q1	-	-	{q1,q2,q4}
q2	q3	-	{q2}
q3	-	-	{q3,q6,q1,q2,q4,q7}
q4	-	q5	{q4}
q5	-	-	{q5, q6, q1, q2, q4, q7}
q6	-	-	{q6, q1,q2, q4, q7}
q7	-	-	{q7}

Estados AFN		aε*		bε*	
{q0,q1,q2,q4,q7}	= A	{q3,q6,q1,q2,q4,q7}	= B	{q5,q6,q1,q2,q4,q7}	= C
{q3,q6,q1,q2,q4,q7}	= B	B		C	
{q5,q6,q1,q2,q4,q7}	= C	B		C	
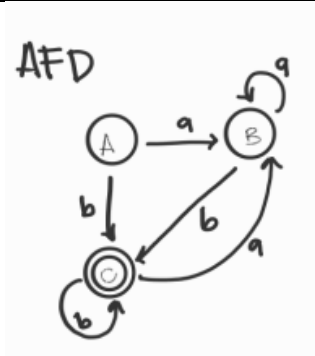
c)

c) (a*|b*)*

Expresión Regular a AFN

Conversión AFN a AFD

Estados AFN	aε*	bε*
{0,1,2,3,5,6,7,9,10,11} = A	{1,2,3,4,5,6,7,9,10,11} = B	{0,1,2,3,5,6,7,8,9,10,11} = C
{1,2,3,4,5,6,7,9,10,11} = B	{1,2,3,4,5,6,7,9,10,11} = B	{0,1,2,3,5,6,7,8,9,10,11} = C
{0,1,2,3,5,6,7,8,9,10,11} = C	{1,2,3,4,5,6,7,9,10,11} = B	{0,1,2,3,5,6,7,8,9,10,11} = C

Final
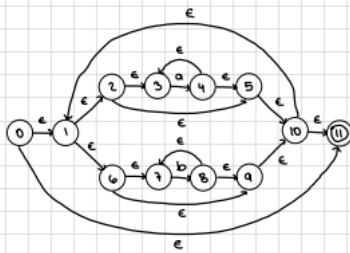
Tabla de transición

	a	b	ε*
0	–	–	{0,1,2,3,5,6,7,9,10,11}
1	–	–	{1,2,3,5,6,7,9,10,11}
2	–	–	{1,2,3,5,6,7,9,10,11}
3	4	–	{3}
4	–	–	{1,2,3,4,5,6,7,9,10,11}
5	–	–	{1,2,3,5,6,7,9,10,11}
6	–	–	{1,2,3,5,6,7,9,10,11}
7	–	8	{7}
8	–	–	{1,2,3,5,6,7,8,9,10,11}
9	–	–	{1,2,3,5,6,7,9,10,11}
10	–	–	{1,2,3,5,6,7,9,10,11}
11	–	–	{11}

d)

	a	ε*
q0	-	{q0,q1,q2,q3,q4,q6q7,q8,q9,q10q,11}
q1	-	{q1,q2,q3,q4,q6q7,q8,q9,q10q,11}
q2	-	{q2,q3,q10,q1,q4,q6,q7,q8,q9,q11}
q3	-	{q3,q10,q1,q2,q4,q6,q7,q8,q9,q11}
q4	q5	{q4}
q5	-	{q5,q10,q1,q2,q3,q4,q6,q7,q8,q9,q11}
q6	-	{q6,q7,q8,q9,q10,q1,q2,q3,q4,q11}
q7	-	{q7,q8,q9,q10,q1,q2,q3,q4,q6,q11}
q8	-	{q8,q9,q10,q1,q2,q3,q4,q6,q7,q11}
q9	-	{q9,q10,q1,q2,q3,q4,q6,q7,q8,q11}
q10	-	{q10,q1,q2,q3,q4,q6,q7,q8,q9,q11}
q11	-	{q11}

Estados AFN		aε*	
{q0,q1,q2,q3,q4,q6q7,q8,q9,q10q,11} = A		{q5,q10,q1,q2,q3,q4,q6,q7,q8,q9,q11} = B	
{q5,q10,q1,q2,q3,q4,q6,q7,q8,q9,q11} = B		B	

AFD

e)

e) $(a|b)^* abb(a|b)^*$
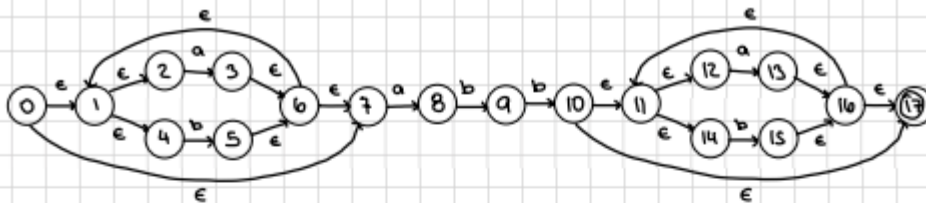
Tabla de transición

	a	b	ε*
0	—	—	{0,1,2,4,7}
1	—	—	{1,2,4}
2	3	—	{2}
3	—	—	{1,2,3,4,6,7}
4	—	5	{4}
5	—	—	{1,2,4,5,6,7}
6	—	—	{1,2,4,6,7}
7	8	—	{7}
8	—	9	{8}
9	—	10	{9}
10	—	—	{10,11,12,14,17}
11	—	—	{11,12,14}
12	13	—	{12}
13	—	—	{11,12,13,14,16,17}
14	—	15	{14}
15	—	—	{11,12,14,15,16,17}
16	—	—	{11,12,14,16,17}
17	—	—	{17}

Estados AFN	$a\epsilon^*$	$b\epsilon^*$
{0,1,2,4,7} = A	{1,2,3,4,6,7,8} = B	{1,2,4,5,6,7} = C
{1,2,3,4,6,7,8} = B	{1,2,3,4,6,7,8} = B	{1,2,3,4,5,6,7,9} = D
{1,2,4,5,6,7} = C	{1,2,3,4,6,7,8} = B	{1,2,4,5,6,7} = C
{1,2,3,4,5,6,7,9} = D	{1,2,3,4,6,7,8} = B	{1,2,4,5,6,7,10,11,12,14,15,16,17} = E
{1,2,4,5,6,7,10,11,12,14,15,16,17} = E	{1,2,3,4,6,7,8,11,12,13,14,16,17} = F	{1,2,4,5,6,7,11,12,14,15,16,17} = G
{1,2,3,4,6,7,8,11,12,13,14,16,17} = F	{1,2,3,4,6,7,8,11,12,13,14,16,17} = F	{1,2,4,5,6,7,9,11,12,14,15,16,17} = H
{1,2,4,5,6,7,11,12,14,15,16,17} = G	{1,2,3,4,6,7,8,11,12,13,14,16,17} = F	{1,2,4,5,6,7,11,12,14,15,16,17} = G
{1,2,4,5,6,7,9,11,12,14,15,16,17} = H	{1,2,3,4,6,7,8,11,12,13,14,16,17} = F	{1,2,4,5,6,7,10,11,12,14,15,16,17} = I
{1,2,4,5,6,7,10,11,12,14,15,16,17} = I	{1,2,3,4,6,7,8,11,12,13,14,16,17} = F	{1,2,4,5,6,7,11,12,14,15,16,17} = G

Final

f)

$$0?(1?)?0^*$$
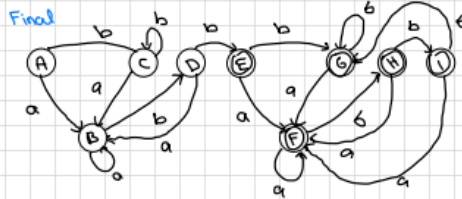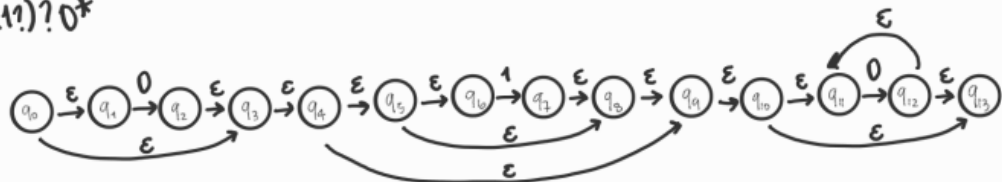
	0	1	ϵ^*
q0	-	-	{q0,q1, q3, q4,q5,q6,q8,q9,q10,q11,q13}
q1	q2	-	{q1}
q2	-	-	{q2,q3,q4,q5,q6,q8,q9,q10,q11,q13}
q3	-	-	{q3,q4,q5,q6,q8,q9,q10,q11,q13}
q4	-	-	{q4,q5,q6,q8,q9,q10,q11,q13}
q5	-	-	{q5,q6,q8,q9,q10,q11,q13}
q6	-	q7	{q6}
q7	-	-	{q7,q8,q9,q10,q11,q13}
q8	-	-	{q8,q9,q10,q11,q13}
q9	-	-	{q9,q10,q11,q13}
q10	-	-	{q10,q11,q13}
q11	q12	-	{q11}

q12	-	-	{q12,q11,q13}
q13	-	-	{q13}

| Estados AFN		0ε*		1ε*	
{q0,q1, q3, q4,q5,q6,q8,q9,q10,q11,q13}	= A	{q2,q3,q4,q5,q6,q8,q9,q10,q11,q12q,13} = B		{q7,q8,q9,q10,q11,q13} =	C
{q2,q3,q4,q5,q6,q8,q9,q10,q11,q12q,13}	= B	{q12,q13} = D		C	
{q7,q8,q9,q10,q11,q13}	= C	D		-	
{q12,q13}	= D	-		-	
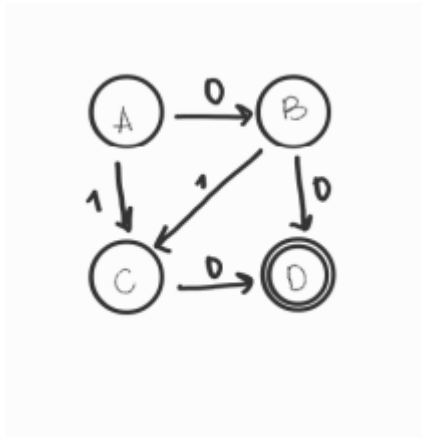
g)
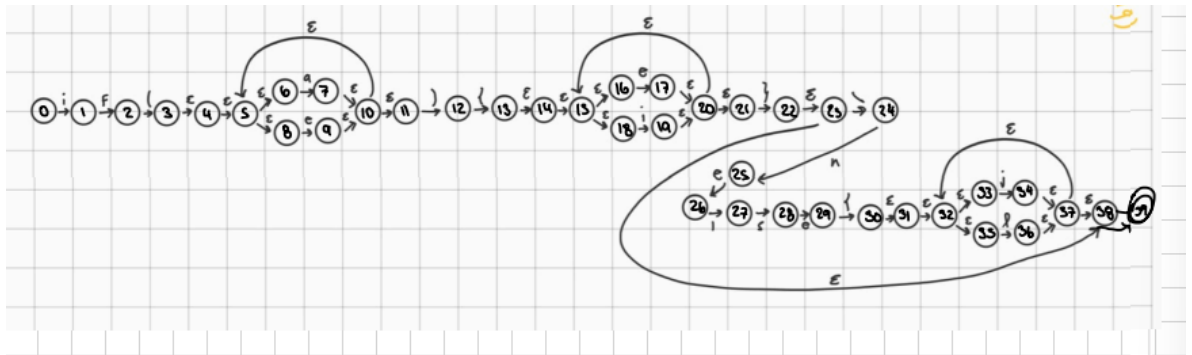
Tabla de transición

	i	f	{	a	e	}	{	}	\	n	l	s	j	ε*
0	1	-	-	-	-	-	-	-	-	-	-	-	-	{0}
1	-	2	-	-	-	-	-	-	-	-	-	-	-	{1}
2	-	-	3	-	-	-	-	-	-	-	-	-	-	{2}
3	-	-	-	-	-	-	-	-	-	-	-	-	-	{3,4,5,6,8}
4	-	-	-	-	-	-	-	-	-	-	-	-	-	{4,5,6,8}
5	-	-	-	-	-	-	-	-	-	-	-	-	-	{5,6,8}
6	-	-	-	7	-	-	-	-	-	-	-	-	-	{6}
7	-	-	-	-	9	-	-	-	-	-	-	-	-	{5,6,7,8,10,11}
8	-	-	-	-	-	-	-	-	-	-	-	-	-	{8}
9	-	-	-	-	-	-	-	-	-	-	-	-	-	{5,6,8,9,10,11}
10	-	-	-	-	-	-	-	-	-	-	-	-	-	{5,6,8,10,11}
11	-	-	-	-	12	-	-	-	-	-	-	-	-	{11}
12	-	-	-	-	-	-	13	-	-	-	-	-	-	{12}
13	-	-	-	-	-	-	-	-	-	-	-	-	-	{13,14,15,16,18}
14	-	-	-	-	-	-	-	-	-	-	-	-	-	{14,15,16,18}
15	-	-	-	-	-	-	-	-	-	-	-	-	-	{15,16,18}
16	-	-	-	-	17	-	-	-	-	-	-	-	-	{16}
17	-	-	-	-	-	-	-	-	-	-	-	-	-	{15,16,17,18,20,21}
18	19	-	-	-	-	-	-	-	-	-	-	-	-	{18}
19	-	-	-	-	-	-	-	-	-	-	-	-	-	{15,16,18,19,20,21}
20	-	-	-	-	-	-	-	-	-	-	-	-	-	{15,16,18,20,21}
21	-	-	-	-	-	-	22	-	-	-	-	-	-	{21}
22	-	-	-	-	-	-	-	-	-	-	-	-	-	{22,23,38}
23	-	-	-	-	-	-	-	-	24	-	-	-	-	{23,38}
24	-	-	-	-	-	-	-	-	-	25	-	-	-	{24}
25	-	-	-	-	26	-	-	-	-	-	-	-	-	{25}
26	-	-	-	-	-	-	-	-	-	-	27	-	-	{26}
27	-	-	-	-	-	-	-	-	-	-	-	28	-	{27}
28	-	-	-	-	29	-	-	-	-	-	-	-	-	{28}
29	-	-	-	-	-	-	30	-	-	-	-	-	-	{29}
30	-	-	-	-	-	-	-	-	-	-	-	-	-	{30,31,32,33,35}
31	-	-	-	-	-	-	-	-	-	-	-	-	-	{31,32,33,35}
32	-	-	-	-	-	-	-	-	-	-	-	-	-	{32,33,35}
33	-	-	-	-	-	-	-	-	-	-	-	-	34	{33}
34	-	-	-	-	-	-	-	-	-	-	-	-	-	{32,33,34,35,37,38}
35	-	-	-	-	-	-	-	-	-	-	36	-	-	{35}
36	-	-	-	-	-	-	-	-	-	-	-	-	-	{32,33,35,36,37,38}
37	-	-	-	-	-	-	-	-	-	-	-	-	-	{37,38}
38	-	-	-	-	-	-	-	39	-	-	-	-	-	{38}
39	-	-	-	-	-	-	-	-	-	-	-	-	-	{39}

Conversión AFN a AFD

Estados AFN	iε*	fε*	{ε*	aε*	eε*	)ε*	{ε*	}ε*	\ε*	nε*	lε*	sε*	jε*
{0} = A	{1} = B	-	-	-	-	-	-	-	-	-	-	-	-
{1} = B	-	{2} = C	-	-	-	-	-	-	-	-	-	-	-
{2} = C	-	-	{3,4,5,6,8} = D	-	-	-	-	-	-	-	-	-	-
{3,4,5,6,8} = D	-	-	-	{5,6,7,8,10,11} = E	-	-	-	-	-	-	-	-	-
{5,6,7,8,10,11} = E	-	-	-	{5,6,7,8,10,11} = E	{5,6,8,9,10,11} = F	{12} = G	-	-	-	-	-	-	-
{5,6,8,9,10,11} = F	-	-	-	{5,6,7,8,10,11} = E	{5,6,8,9,10,11} = F	{12} = G	-	-	-	-	-	-	-
{12} = G	-	-	-	-	-	-	{13,14,15,16,18} = H	-	-	-	-	-	-
{13,14,15,16,18} = H	{15,16,18,19,20,21} = I	-	-	{15,16,17,18,20,21} = J	-	-	-	-	-	-	-	-	-
{15,16,18,19,20,21} = I	{15,16,18,19,20,21} = I	-	-	{15,16,17,18,20,21} = J	-	-	{22,23,38} = K	-	-	-	-	-	-
{15,16,17,18,20,21} = J	{15,16,18,19,20,21} = I	-	-	{15,16,17,18,20,21} = J	-	-	{22,23,38} = K	-	-	-	-	-	-
{22,23,39} = K	-	-	-	-	-	-	-	-	{24} = L	-	-	-	-
{24} = L	-	-	-	-	-	-	-	-	-	{25} = M	-	-	-
{25} = M	-	-	-	-	{26} = N	-	-	-	-	-	-	-	-
{26} = N	-	-	-	-	-	-	-	-	-	-	{27} = Ñ	-	-
{27} = Ñ	-	-	-	-	-	-	-	-	-	-	-	{28} = O	-
{28} = O	-	-	-	-	{29} = P	-	-	-	-	-	-	-	-
{29} = P	-	-	-	-	-	-	{30,31,32,33,35} = Q	-	-	-	-	-	-
{30,31,32,33,35} = Q	-	-	-	-	-	-	-	-	-	-	{32,33,35,36,37,38} = R	-	{32,33,34,35,37,38} = S
{32,33,35,36,37,38} = R	-	-	-	-	-	-	-	-	-	-	{32,33,35,36,37,38} = R	-	{32,33,34,35,37,38} = S
{32,33,34,35,37,38} = S	-	-	-	-	-	-	-	{39} = T	-	-	{32,33,35,36,37,38} = R	-	{32,33,34,35,37,38} = S
{39} = T	-	-	-	-	-	-	-	-	-	-	-	-	-

Final

A —i→ B —f→ C —{→ D —a→ E (e, a loops) —)→ F (a loop) —{→ G —i→ H —{→ ... I —e→ J (i, e loops) —}→ K —\→ L —n→ M —e→ Ñ —l→ N —s→ O —e→ P —{→ Q —l→ R (l loop) —j→ S (j loop) —}→ T

h)
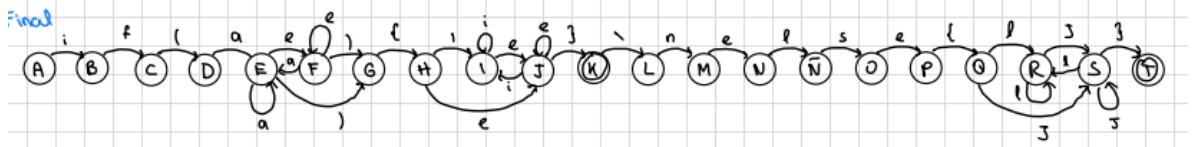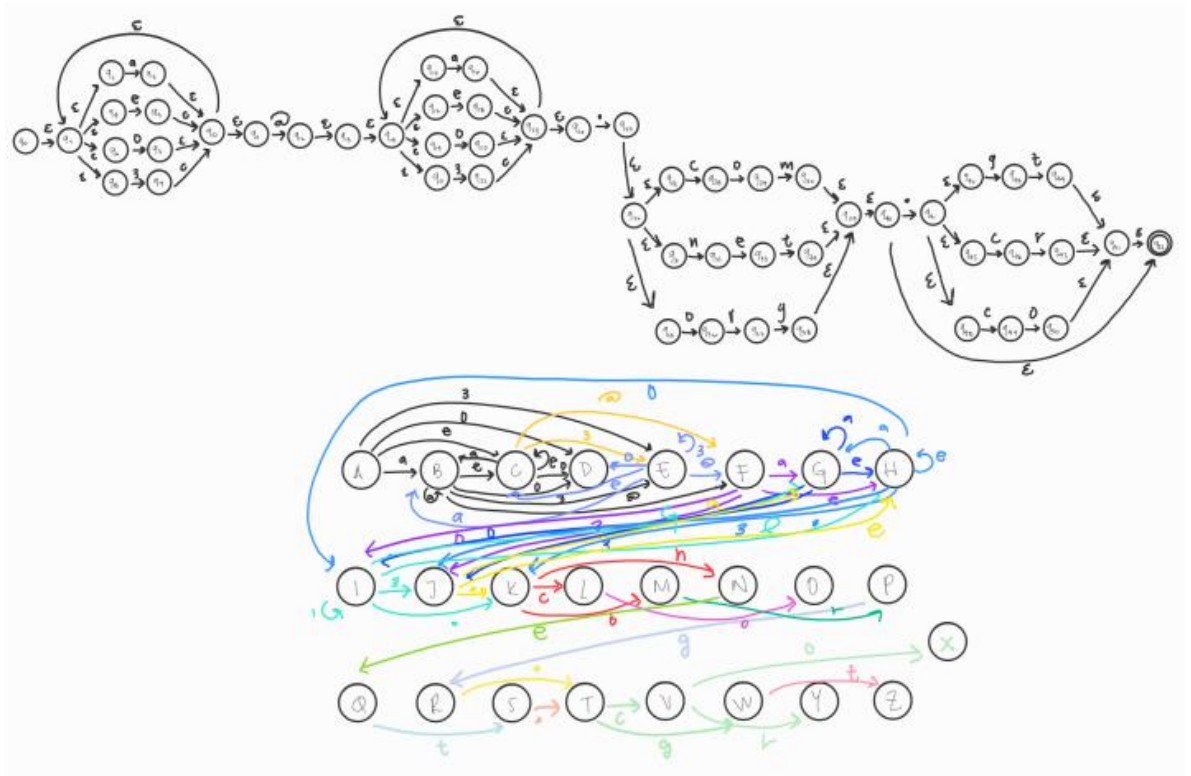
o	m	n	t	r	g	ε*
-	-	-	-	-	-	{q0,q1,q2,q4,q6,q8}
-	-	-	-	-	-	{q1,q2,q4,q6,q8}
-	-	-	-	-	-	{q2}
-	-	-	-	-	-	{q3,q10,q1,q2,q4,q6,q8,q11}
-	-	-	-	-	-	{q4}
-	-	-	-	-	-	{q5,q10,q1,q2,q4,q6,q8,q11}
-	-	-	-	-	-	{q6}
-	-	-	-	-	-	{q7,q10,q1,q2,q4,q6,q8,q11}
-	-	-	-	-	-	{q8}
-	-	-	-	-	-	{q9, q10,q1,q2,q4,q6,q8,q11}
-	-	-	-	-	-	{q10,q1,q2,q4,q6,q8,q11}
-	-	-	-	-	-	{q11}
-	-	-	-	-	-	{q12,q13,q14,q15,q17,q19,q21}
-	-	-	-	-	-	{q13,q14,q15,q17,q19,q21}
-	-	-	-	-	-	{q14,q15,q17,q19,q21}
-	-	-	-	-	-	{q15}
-	-	-	-	-	-	{q16,q23,q14,q15,q17,q19,q21,q24}
-	-	-	-	-	-	{q17}
-	-	-	-	-	-	{q18,q23,q14,q15,q17,q19,q21,q24}
-	-	-	-	-	-	{q19}
-	-	-	-	-	-	{q20,q23,q14,q15,q17,q19,q21,q24}

-	-	-	-	-	-	{q21}
-	-	-	-	-	-	{q22,q23,q14,q15,q17,q19,q21,q24}
-	-	-	-	-	-	{q23,q14,q15,q17,q19,q21,q24}
-	-	-	-	-	-	{q24}
-	-	-	-	-	-	{q25,q26,q27,q31,q35}
-	-	-	-	-	-	{q26,q27,q31,q35}
-	-	-	-	-	-	{q27}
q29	-	-	-	-	-	{q28}
-	q30	-	-	-	-	{q29}
-	-	q32	-	-	-	{q30,q39,q40}
-	-	-	-	-	-	{q31}
-	-	-	-	-	-	{q32}
-	-	-	q34	-	-	{q33}
-	-	-	-	-	-	{q34,q39,q40}
q36	-	-	-	-	-	{q35}
-	-	-	-	q37	-	{q36}
-	-	-	-	-	q38	{q37}
-	-	-	-	-	-	{q38,q39,q40}
-	-	-	-	-	-	{q39,q40}
-	-	-	-	-	-	{q40}
-	-	-	-	-	-	{q41,q42,q45,q48,q52}
-	-	-	-	-	q43	{q42}
-	-	-	q44	-	-	{q43}
-	-	-	-	-	-	{q44,q51,q52}
-	-	-	-	-	-	{q45}
-	-	-	-	q47	-	{q46}
-	-	-	-	-	-	{q47,q51,q52}
-	-	-	-	-	-	{q48}
q50	-	-	-	-	-	{q49}
-	-	-	-	-	-	{q50,q51,q52}
-	-	-	-	-	-	{q51,q52}
-	-	-	-	-	-	{q52}

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Estados AFN	aε*	eε*	0ε*	3ε*	arrobaε*	.ε*	cε*	oε*	mε*	nε*	tε*	rε*	gε*
{q0,q1,q2,q4,q6,q8} = A	{q3,q10,q1,q2,q4,q6,q8,q11} = B	{q5,q10,q1,q2,q4,q6,q8,q11} = C	{q7,q10,q1,q2,q4,q6,q8,q11} = D	{q9,q10,q1,q2,q4,q6,q8,q11} = E	-	-	-	-	-	-	-	-	-
{q3,q10,q1,q2,q4,q6,q8,q11} = B	B	C	D	E	{q12,q13,q14,q15,q17,q19,q21} = F	-	-	-	-	-	-	-	-
{q5,q10,q1,q2,q4,q6,q8,q11} = C	B	C	D	E	F	-	-	-	-	-	-	-	-
{q7,q10,q1,q2,q4,q6,q8,q11} = D	B	C	D	E	F	-	-	-	-	-	-	-	-
{q9,q10,q1,q2,q4,q6,q8,q11} = E	B	C	D	E	F	-	-	-	-	-	-	-	-
{q12,q13,q14,q15,q17,q19,q21} = F	{q16,q23,q14,q15,q17,q19,q21,q24} = G	{q18,q23,q14,q15,q17,q19,q21,q24} = H	{q20,q23,q14,q15,q17,q19,q21,q24} = I	{q22,q23,q14,q15,q17,q19,q21,q24} = J	-	-	-	-	-	-	-	-	-
{q16,q23,q14,q15,q17,q19,q21,q24} = G	G	H	I	J	-	{q25,q26,q27,q31,q35} = K	-	-	-	-	-	-	-
{q18,q23,q14,q15,q17,q19,q21,q24} = H	G	H	I	J	-	K	-	-	-	-	-	-	-
{q20,q23,q14,q15,q17,q19,q21,q24} = I	G	H	I	J	-	K	-	-	-	-	-	-	-
{q22,q23,q14,q15,q17,q19,q21,q24} = J	G	H	I	J	-	K	-	-	-	-	-	-	-
{q25,q26,q27,q31,q35} = K	-	-	-	-	-	-	{q28} = L	{q36} = M	-	{q32} = N	-	-	-
{q28} = L	-	-	-	-	-	-	-	{q29} = O	-	-	-	-	-
{q36} = M	-	-	-	-	-	-	-	-	-	-	-	{q37} = P	-
{q32} = N	-	{q33} = Q	-	-	-	-	-	-	-	-	-	-	-
{q37} = P	-	-	-	-	-	-	-	-	-	-	-	-	{q38,q39,q40,q52} = R
{q33} = Q	-	-	-	-	-	-	-	-	-	-	{q34,q39,q40,q52} = S	-	-
{q38,q39,q40,q52} = R	-	-	-	-	-	{q41,q42,q45,q48} = T	-	-	-	-	-	-	-
{q34,q39,q40,q52} = S	-	-	-	-	-	T	-	-	-	-	-	-	-
{q41,q42,q45,q48} = T	-	-	-	-	-	-	{q46,q49} = V	-	-	-	-	-	{q43} = W
{q46,q49} = V	-	-	-	-	-	-	-	{q50,q51,q52} = X	-	-	{q44,q51,q52} = Z	{q47,q51,q52} = Y	-
{q43} = W	-	-	-	-	-	-	-	-	-	-	-	-	-
{q50,q51,q52} = X	-	-	-	-	-	-	-	-	-	-	-	-	-
{q47,q51,q52} = Y	-	-	-	-	-	-	-	-	-	-	-	-	-
{q44,q51,q52} = Z	-	-	-	-	-	-	-	-	-	-	-	-	-

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