1 Construir AFDs

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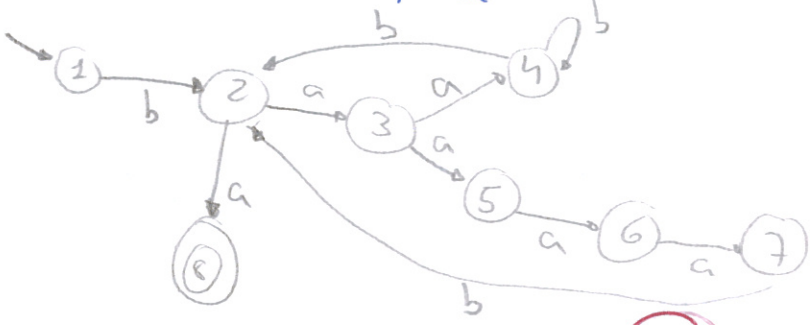
24-10-14

1. $a^*ba^*ab^*$

ND

2. $b((aab^* + a^4)b)^*a$



ND → se pedía AFD (está después)

2.

2.a

$L_0 = aL_1 + bL_3$

$L_1 = \varepsilon + aL_0 + bL_1$

$L_2 = \varepsilon + aL_1 + bL_0$

$L_3 = aL_2 + bL_3$

$L = AL + B$

$L = A^*B$

despejar

$L_1 = AL_1 + B \rightarrow L_1 = A^*B$

$L_1 = b^*(\varepsilon + aL_0)$

$L_2 = \varepsilon + ab^* + ab^*aL_0 + bL_0$

$L_3 = b^*aL_2 = b^*a + b^*aab^* + b^*a(ab^*a + b)L_0$

$L_0 = ab^* + ab^*aL_0 + bb^*a + bb^*aab^* + bb^*a(ab^*a + b)L_0$

$L_0 = (ab^*a + bb^*a(ab^*a + b))L_0 + ab^* + bb^*a + bb^*aab^*$

$L_0 = (ab^*a + bb^*a(ab^*a + b))^*(ab^* + bb^*a + bb^*aab^*)$

2b.

$L = AL + B$

$L = A^* B$

$L_A = bL_d + aL_b$

$L_D = aL_d + bL_d$

$L_B = \varepsilon + bL_A + aL_C$

$L_C = \varepsilon + bL_D + aL_B$

~~$L_A = b(a+b)^* + aL_b$~~

~~$L_D = (a+b)^*$~~

Mal $L_D = (a+b)L_D + \phi$

$\Rightarrow L_D = (a+b)^* \phi = \phi$

$L_C = \varepsilon + b(a+b)^* + aL_B$

$L_A = b(a+b)^* + aL_b$

$L_D = (a+b)^*$

$L_B = \varepsilon + bL_D + aL_C = \varepsilon + bb(a+b)^* + baL_b + aL_C$

$L_B = (ba)^* (\varepsilon + bb(a+b)^* + aL_C)$

$L_C = \varepsilon + b(a+b)^* + a(ba)^* (\varepsilon + bb(a+b)^* + aL_C)) =$

$= \varepsilon + b(a+b)^* + a(ba)^* + a(ba)^* bb(a+b)^* + a(ba)^* a L_C$

$L_C = (a(ba)^* a)^* (\varepsilon + b(a+b)^* + a(ba)^* + a(ba)^* bb(a+b)^*$

$L_A = b(a+b)^* + a(ba)^* + a(ba)^* bb(a+b)^* + a(ba)^* a (a(ba)^* a)^* (\varepsilon + b(a+b)^* + a(ba)^* + a(ba)^* bb(a+b)^*$

2d.

$L_0 = bL_0 + aL_2 \rightarrow$

$L_1 = bL_1 + aL_0 \rightarrow$

$L_2 = \varepsilon + bL_1$

$L_0 = b^* aL_2 = b^* a(ab^* ab^* a)^*$ ✓ Bien

$L_1 = b^* aL_0 = b^* ab^* aL_2$

$L_2 = \varepsilon + bb^* ab^* aL_2$

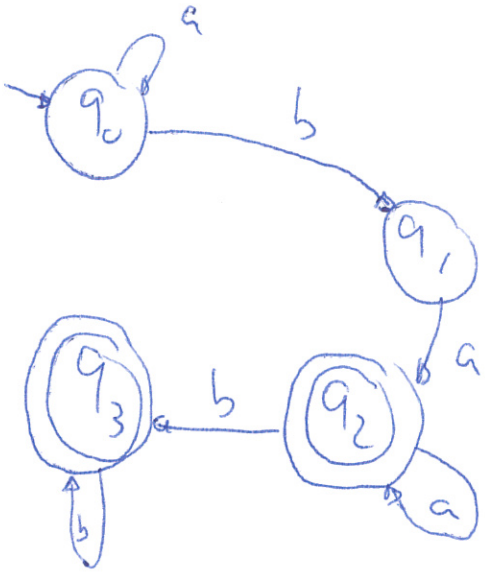
$L_2 = (bb^* ab^* a)^*$

Determinizar autómatas fj 1

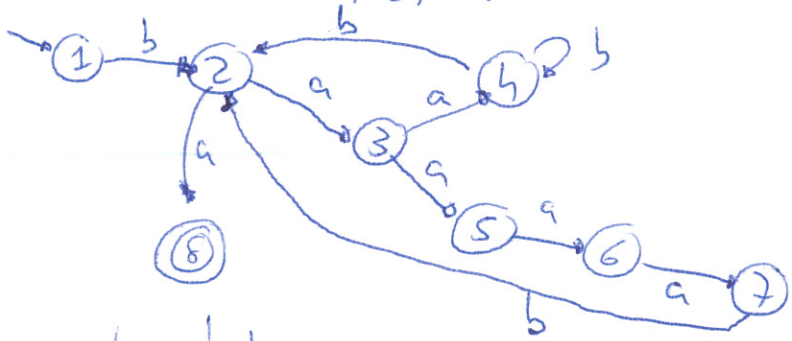
Javier González

1. $a^*ba^*ab^*$

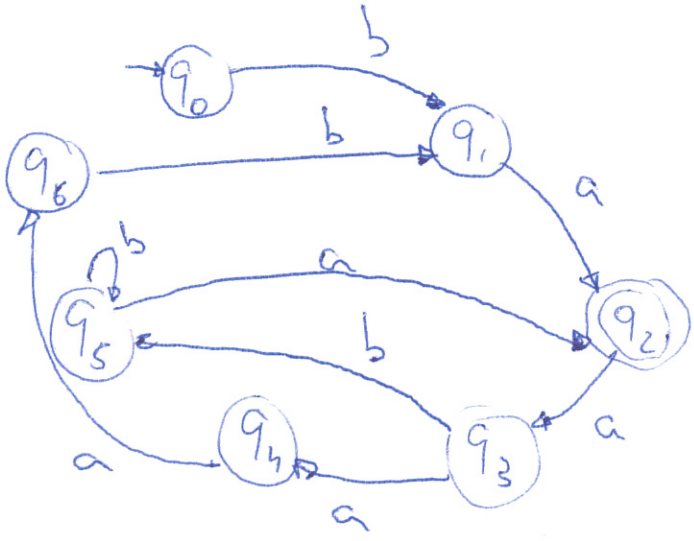
	a	b
$q_0 \leftarrow 1$	1	2
$q_1 \leftarrow 2$	2,3	ϕ
$q_2 \leftarrow 2,3$	2,3	3
$q_3 \leftarrow 3$	ϕ	3



2. $b((aab^* + a^4)/b)^*a$

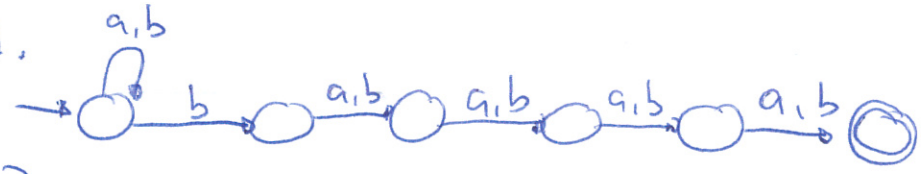


	a	b
$q_0 \leftarrow 1$	ϕ	2
$q_1 \leftarrow 2$	3,8	ϕ
$q_2 \leftarrow 3,8$	4,5	ϕ
$q_3 \leftarrow 4,5$	6	2,4
$q_4 \leftarrow 6$	7	ϕ
$q_5 \leftarrow 2,4$	3,8	2,4
$q_6 \leftarrow 7$	ϕ	2
~~3,8~~	~~4,5~~	



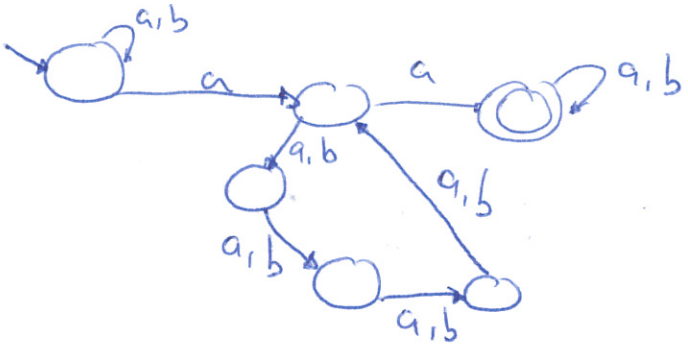
9. 9.

1.



✓

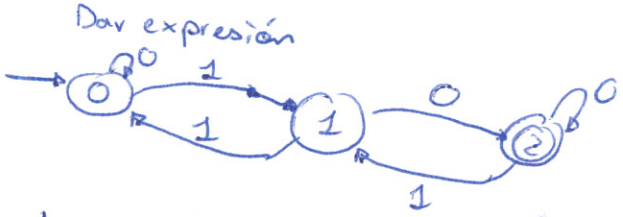
2.



✓

5.

Dar expresión



$L = AL + B$

$L = A^*B$

$L_0 = 1L_1 + 0L_0 \rightarrow L_0 = 0^*(1L_1)$

$L_1 = 1L_0 + 0L_2 \rightarrow L_1 = 1L_0 + 00^* + 00^*1L_1 \quad L_1 = (00^*1)^*(1L_0 + 00^*)$

$L_2 = \varepsilon + 0L_2 + 1L_1 \rightarrow L_2 = 0^*(\varepsilon + 1L_1) = 0^* + 0^*1L_1$

$L_0 = 0^*(1L_1)$

$L_1 = (00^*1)^*(1L_0 + 00^*) = (00^*1)^*1L_0 + (00^*1)^*00^*$

$L_0 = 0^*(1(00^*1)^*1L_0) + (1(00^*1)^*00^*))$

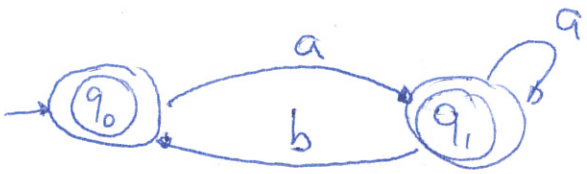
$L_0 = 0^*1(00^*1)^*1L_0 + (0^*1(00^*1)^*00^*)$

$L_0 = (0^*1(00^*1)^*1)^*(0^*1(00^*1)^*00^*)$ ✓

Para comprobar la equivalencia basta hacer el autómata mínimo para la otra expresión

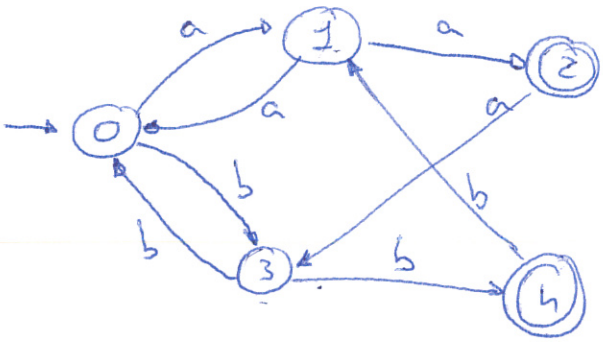
11.

Convertir AFnD en un AFD ✓ Javier González

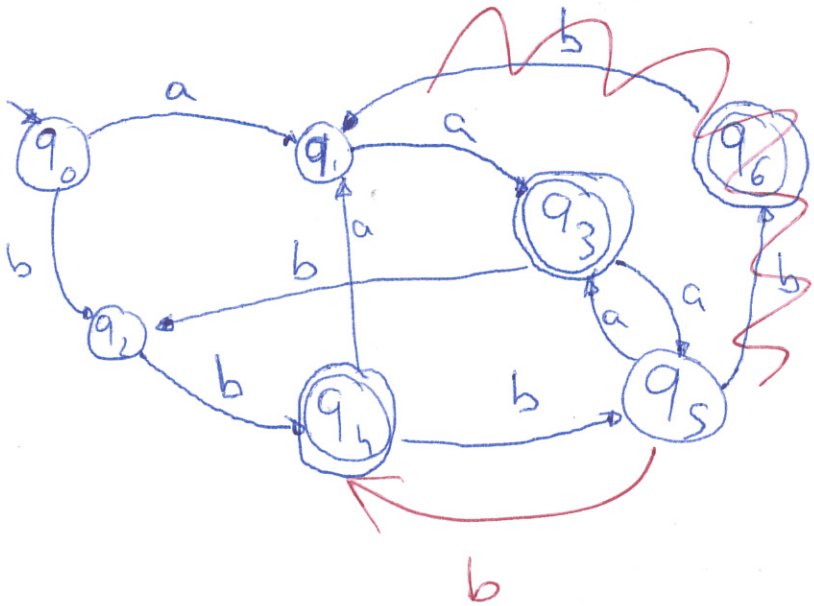


	a	b
$q_0 \leftarrow A$	A,B	∅
$q_1 \leftarrow A,B$	A,B	B,A

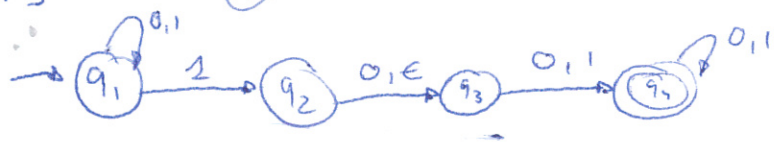
12.



	a	b
$q_0 \leftarrow 0$	1	3
$q_1 \leftarrow 1$	0,2	∅
$q_2 \leftarrow 3$	∅	0,4
$q_3 \leftarrow 0,2$	1,3	3,
$q_4 \leftarrow 0,4$	1.	3,1
$q_5 \leftarrow 1,3$	2,0	0,4
$q_6 \leftarrow 4$	∅	1

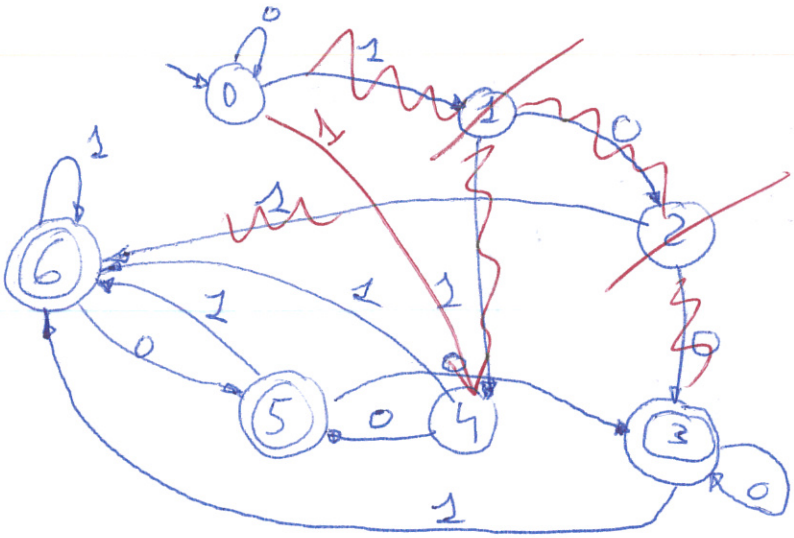


13 (13)

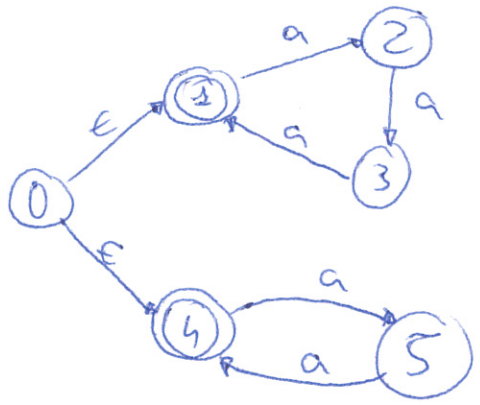


		0	1
0	q_1	q_1	q_1, q_2, q_3
1	$q_1 q_2$	q_1, q_3	q_1, q_2, q_3
2	$q_1 q_3$	q_1, q_4	q_1, q_2, q_3, q_4
3	$q_1 q_4$	$q_1 q_4$	$q_1, q_2 q_3, q_4$.
4	$q_1 q_2 q_3$	$q_1 q_3 q_4$	$q_1 q_2 q_3 q_4$ —
5	$q_1 q_3 q_4$	$q_1 q_4$	$q_1 q_2 q_3 q_4$.
6	$q_1 q_2 q_3 q_4$	$q_1 q_3 q_4$	$q_1 q_2 q_3 q_4$.

hay que considerar las entradas como si fueran $0\varepsilon^*$ y $1\varepsilon^*$



15.

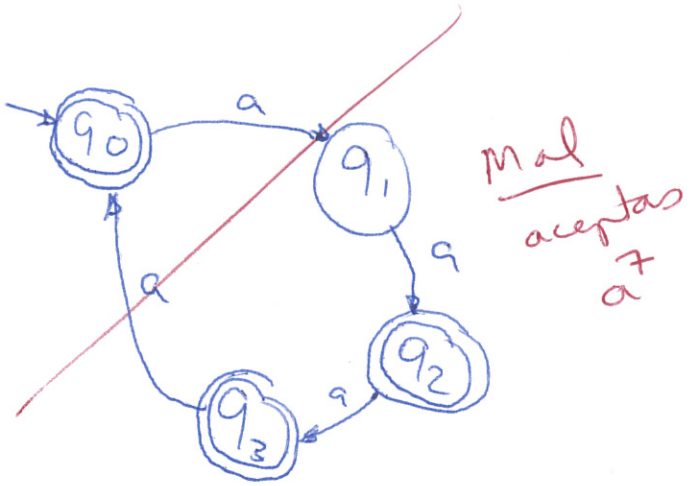


Javier González

Para contar módulo 2 y 3 a la vez necesitas 6 estados

	a
$q_0 \leftarrow$ 0 1 4	2,5
$q_1 \leftarrow$ 2 5	3,4 +
$q_2 \leftarrow$ 3 4	1,5 +
$q_3 \leftarrow$ 1 5	2,5 +
2 4	3 5
3 5	1 4 +
1 4	2 5

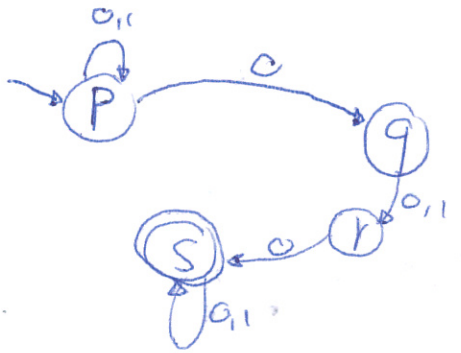
17.



mal aceptas a^+

1. $M = (Q = \{p, q, r, s\}, \{0,1\}, \delta, q_0 = p, F = \{s\}$

δ	0	1
p	{p,q}	{p}
q	{r}	{r}
r	{s}	$\emptyset$
s	{s}	{s}



	0	1
$\emptyset \leftarrow$ p	p q	p
1 $\leftarrow$ p q	p q r	p r
2 $\leftarrow$ p r	p q s	p
3 $\leftarrow$ p q r	p q r s	p r
4 $\leftarrow$ p q s	p q r s	p s
5 $\leftarrow$ p q r s	p q r s	p r s
6 $\leftarrow$ p s	p q s	p s
7 $\leftarrow$ p r s	p q r s	p s