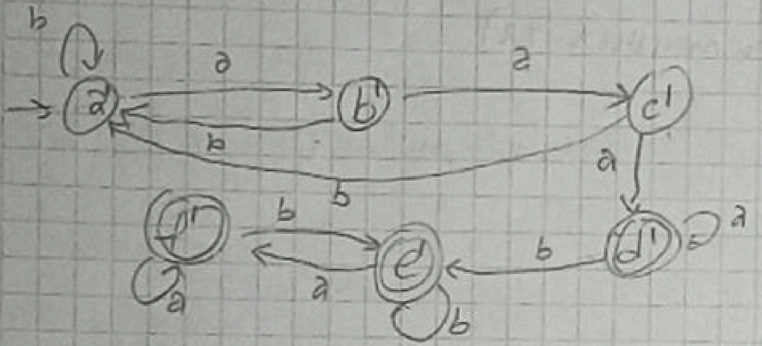
GUIA 3

1) $M_0 = \langle \overbrace{\{q_0, q_1, q_2, q_3\}}^{Q}, \{a, b\}, \delta_0, q_0, \{q_3\} \rangle$

$\delta_0' =$

$Q' \backslash \Sigma$	a	b
$a' = \{q_0\}$	$\{q_0, q_1\}$	$\{q_0\}$
$b' = \{q_0, q_1\}$	$\{q_0, q_1, q_2\}$	$\{q_0\}$
$c' = \{q_0, q_1, q_2\}$	$\{q_0, q_1, q_2, q_3\}$	$\{q_0\}$
$d' \{q_0, q_1, q_2, \underline{q_3}\}$	$\{q_0, q_1, q_2, q_3\}$	$\{q_0, q_3\}$
$e' = \{q_0, \underline{q_3}\}$	$\{q_0, q_1, \underline{q_3}\}$	$\{q_0, q_3\}$
$f' = \{q_0, q_1, \underline{q_3}\}$	$\{q_0, q_1, q_3\}$	$\{q_0, q_3\}$

$M = \langle Q', \Sigma, \delta_0', \{q_0\}, \{\{q_0, q_1, q_2, q_3\}, \{q_0, q_3\}\} \rangle$

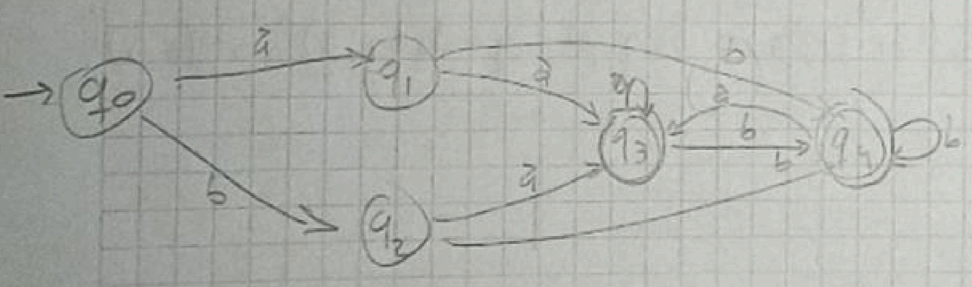


b)

$Q' \backslash \Sigma$	a	b
q_0 $\{0, 4\}$	$\{1, 0, 3, 4, 5\}$	$\{2, 0, 3, 4, 5\}$
q_1 $\{1, 0, 3, 4, 5\}$	$\{1, 4, 6, 0, 3, 5\}$	$\{2, 6, 0, 3, 5, 4\}$
q_2 $\{2, 0, 3, 4, 5\}$	$\{1, 4, 6, 0, 3, 5\}$	$\{2, 6, 0, 3, 5, 4\}$
q_3 $\{1, 4, \underline{6}, 0, 3, 5\}$	$\{1, 4, 6, 0, 3, 5\}$	$\{2, 6, 0, 3, 5, 4\}$
q_4 $\{2, \underline{6}, 0, 3, 5, 4\}$	$\{1, 4, 6, 0, 3, 5\}$	$\{2, 6, 0, 3, 5, 4\}$

δ_0'

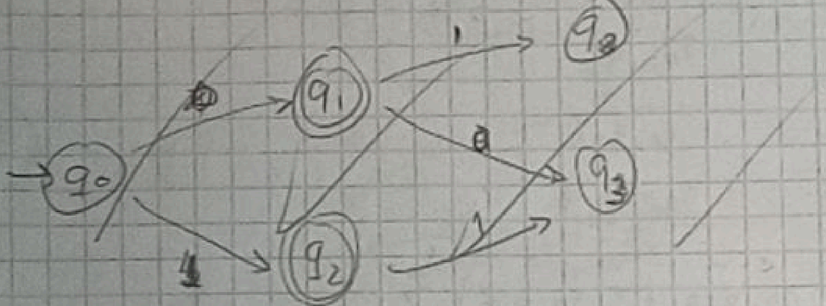
$M = \langle Q', \Sigma, \delta_0', q_0, \{q_3, q_4\} \rangle$



c)

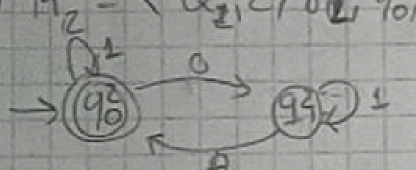
$Q' \backslash \Sigma$		0	1
q_0	$\{p\}$	$\{q,s\}$	$\{q\}$
q_1	$\{q,s\}$	$\{r\}$	$\{q,r,p\}$
q_2	$\{q\}$	$\{r\}$	$\{q,r\}$
q_3	$\{r\}$	$\{s\}$	$\{p\}$
q_4	$\{q,r\}$	$\{r,s\}$	$\{q,r,p\}$
q_5	$\{s\}$	$\emptyset$	$\{p\}$
q_6	$\{p\}$	$\{q,s\}$	$\{q\}$
q_7	$\{r,s\}$	$\{s\}$	$\{p\}$
q_8	$\{q,r,p\}$	$\{q,r,s\}$	$\{q,r,p\}$
q_9	$\{q,r,s\}$	$\{r,s\}$	$\{q,r,p\}$

δ_0'

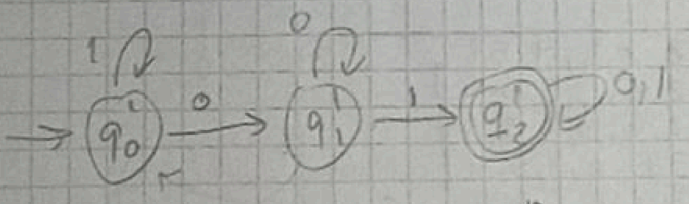


2) Done (son todos deterministas ya)

3) $M_2 = \langle Q_2, \Sigma, \delta_2, q_0^2, \underbrace{\{q_2^2\}}_{F_2} \rangle$ cantidad par de 0



$M_1 = \langle Q_1, \Sigma, \delta_1, q_0^1, \underbrace{\{q_2^1\}}_{F_1} \rangle$ contiene subcadena 01



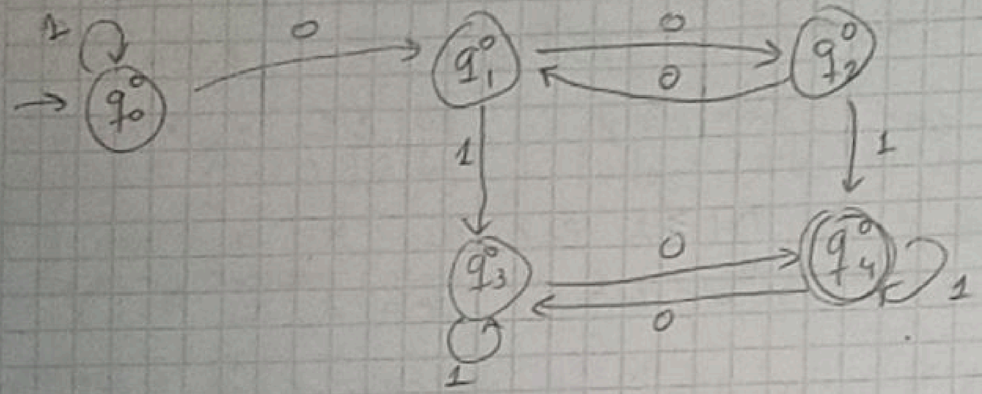
$M_0 = \langle Q_0, \Sigma, \delta_0, q_0^0, F^0 \rangle$ $\mathcal{L}(M_0) = \mathcal{L}_1 \cap \mathcal{L}_2$

$Q_0 \subseteq Q_1 \times Q_2$ $q_0^0 = (q_0^1, q_0^2)$

$F^0 = F_1 \times F_2$ $\delta_0((r,s), a) = \{(q,p) : q \in \delta_1(r,a) \wedge p \in \delta_2(s,a)\}$

Q_0 \ Σ	0	1
$q_0^0 = (q_0^1, q_0^2)$	(q_1^1, q_1^2)	(q_0^1, q_0^2)
$q_1^0 = (q_1^1, q_1^2)$	(q_1^1, q_0^2)	(q_2^1, q_1^2)
$q_2^0 = (q_1^1, q_0^2)$	(q_1^1, q_1^2)	(q_2^1, q_0^2)
$q_3^0 = (q_2^1, q_1^2)$	(q_2^1, q_0^2)	(q_2^1, q_1^2)
$q_4^0 = \underbrace{(q_2^1, q_0^2)}_{\text{final}}$	(q_2^1, q_1^2)	(q_2^1, q_0^2)

$\delta_0 =$



Practica 4 Pumping

1) a) $L = \{a^{2n} \mid n \geq 1\} = \{aa, aaaa, aaaaaa, \text{cant } a \text{ par}\}$

Supongamos L regular. Por lema de pumping existe $p > 0$ tq para toda cadena $\alpha \in L$ con $|\alpha| \geq p$ se puede descomponer en $\alpha = xyz$ con

$|xy| \leq p$ $\quad |y| \geq 1$ $\quad$ y $\quad \forall i \geq 0 \quad xy^iz \in L$

Si encontramos $\alpha \in L$ tq algun pumpeo $\notin L$ entonces demostraremos que no es regular

$\alpha = a^{2p}$ tenemos $\alpha \in L$ y $|\alpha| \geq p$

Sea $\alpha = \underbrace{a^{2p}}_{a^p a^p} = xyz$ la descomposición

$x = a^r \quad r \geq 0 \qquad y = a^t \quad t \geq 1 \qquad z = a^{p-r-t} a^p$

$xy^0z = a^r a^{p-r-t} a^p = a^{p-t} a^p = a^{2p-t}$

(no llego a nada porque no se si t es par o impar)