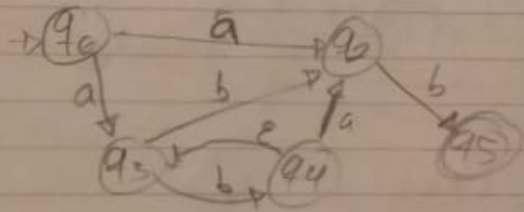
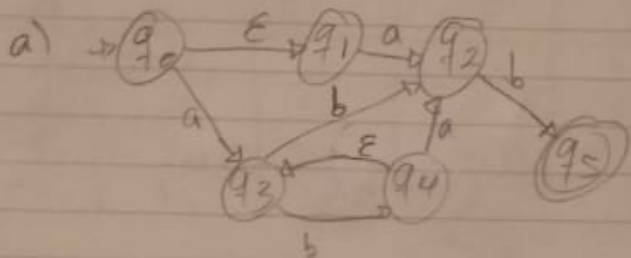


Tarea 14

1.- Encontrar un AFN sin transiciones  
épsilon equivalente, posteriormente  
encontrar un AFD equivalente, luego  
encontrar el AFD mínimo equivalente  
para los autómatas gigantos.

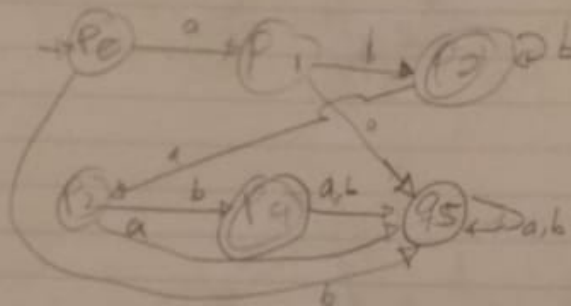


$\Delta$	a	b	c	Cerradura
$q_0$	$q_2, q_3$	$\emptyset$	$\emptyset$	$\{q_0\}$
$q_1$	$\emptyset$	$q_5$	$\emptyset$	$\{q_1\}$
$q_2$	$\emptyset$	$q_2, q_4$	$\emptyset$	$\{q_2\}$
$q_3$	$q_1$	$\emptyset$	$q_3$	$\{q_3, q_4\}$
$q_4$	$\emptyset$	$\emptyset$	$\emptyset$	$\{q_5\}$

$\sigma$	$a$	$b$
$+q_0$	$\{q_2, q_3\}$	$\{q_1\}$
$q_2$	$\emptyset$	$\{q_1, q_3\}$
$q_3$	$\emptyset$	$\{q_1, q_2, q_3\}$
$q_4$	$\{q_2\}$	$\{q_1, q_2, q_3, q_4\}$
$+q_5$	$\emptyset$	$\emptyset$

$\delta$	a	b
$\rightarrow q_0$	$[q_2, q_1]$	$[\emptyset]$
$[q_2, q_1]$	$[\emptyset]$	$[q_0, q_2, q_1, q_5]$
$[q_2, q_1, q_5]$	$[q_2]$	$[q_2, q_1, q_4, q_5]$
$[q_2]$	$[\emptyset]$	$[q_5]$
$[q_5]$	$[\emptyset]$	$[\emptyset]$
$[\emptyset]$	$[\emptyset]$	$[\emptyset]$

$\delta$	a	b
$\rightarrow q_0$	$p_1$	$p_5$
$p_1$	$p_5$	$p_2$
$*p_2$	$p_3$	$p_2$
$p_3$	$p_5$	$p_4$
$*p_4$	$p_5$	$p_5$
$p_5$	$p_5$	$p_5$



$C_1 = \{p_2, p_4\}, C_2 = \{p_0, p_1, p_3, p_5\}$

$C_1$

$\delta$	a	b
$*p_2$	$p_3$	$p_2$
$*p_4$	$p_5$	$p_5$

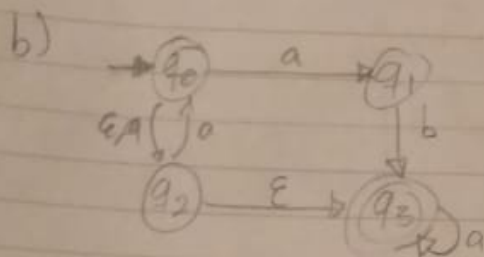
$C_2$

$\delta$	a	b
$p_0$	$p_1$	$p_5$
$p_1$	$p_5$	$p_2$
$p_3$	$p_5$	$p_4$
$p_5$	$p_5$	$p_5$

$C_1 = \{p_2\}, C_2 = \{p_4\}, C_3 = \{p_0, p_5\}, C_4 = \{p_1, p_3\}$

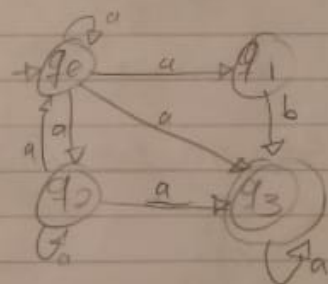
$C_1 = \{p_2\}, C_2 = \{p_4\}, C_3 = \{p_0\}, C_4 = \{p_1\}, C_5 = \{p_3\}, C_6 = \{p_5\}$

Ya es el mínimo



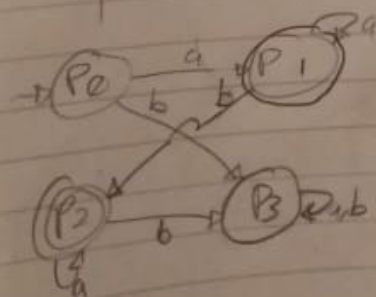
$\Delta$	a	b	$\epsilon$	Cerradura
$q_0$	$q_1, q_2$	$\emptyset$	$q_2$	$\{q_0, q_2\}$
$q_1$	$\emptyset$	$q_3$	$\emptyset$	$\{q_1\}$
$q_2$	$q_0$	$\emptyset$	$q_3$	$\{q_2, q_3\}$
$q_3$	$q_0$	$\emptyset$	$\emptyset$	$\{q_3\}$

$\delta$	a	b
$q_0$	$\{q_0, q_1, q_2, q_3\}$	$\emptyset$
$q_1$	$\emptyset$	$\{q_3\}$
$q_2$	$\{q_0, q_2, q_3\}$	$\emptyset$
$q_3$	$\{q_0\}$	$\emptyset$



$S$	a	b
$q_0$	$\{q_0, q_1, q_2, q_3\}$	$\emptyset$
$q_1$	$\emptyset$	$\{q_3\}$
$q_2$	$\{q_0, q_2, q_3\}$	$\emptyset$
$q_3$	$\{q_0\}$	$\emptyset$

$S$	a	b
$p_0$	$p_1$	$p_3$
$p_1$	$p_1$	$p_2$
$p_2$	$p_2$	$p_3$
$p_3$	$p_3$	$p_3$



$$C_1 = \{p_1, p_2\}, C_2 = \{p_0, p_3\}$$

$$C_1 = \{P_1, P_2\} \quad C_2 = \{P_0, P_3\}$$

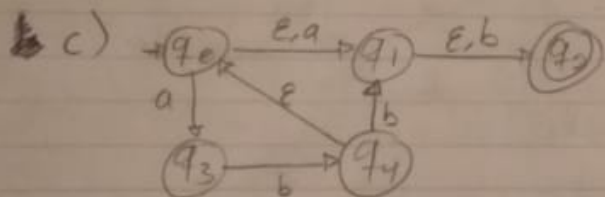
$C_1$	$\delta$	a	b		
$P_1$	$P_1$	$P_2$		1, 1	1, 2
$P_2$	$P_2$	$P_3$		1, 2	2, 4

$C_2$	$\delta$	a	b		
$P_0$	$P_1$	$P_3$		1, 2	1, 4
$P_3$	$P_3$	$P_3$		2, 2	4, 4

$$C_1 = \{P_1\}, C_2 = \{P_2\}, C_3 = \{P_0\}, C_4 = \{P_3\}$$

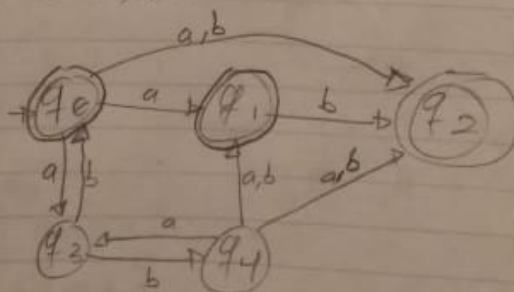
$$C_1 = \{P_1\}, C_2 = \{P_2\}, C_3 = \{P_0\}, C_4 = \{P_3\}$$

Y es el mínimo



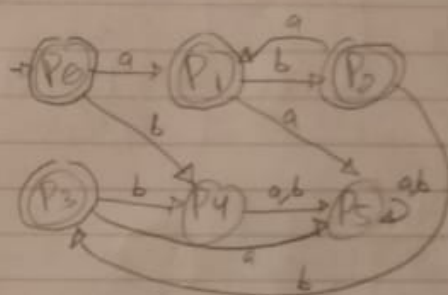
$\Delta$	a	b	$\epsilon$	Cerradura
$q_0$	$\{q_1, q_3\}$	$\emptyset$	$q_1$	$\{q_0, q_1, q_2\}$
$q_1$	$\emptyset$	$q_2$	$q_2$	$\{q_1, q_2\}$
$q_2$	$\emptyset$	$\emptyset$	$\emptyset$	$\{q_2\}$
$q_3$	$\emptyset$	$q_4$	$\emptyset$	$\{q_3\}$
$q_4$	$\emptyset$	$q_1$	$q_0$	$\{q_4, q_0\}$

$\delta$	a	b
$q_0$	$\{q_1, q_2, q_3\}$	$\{q_2\}$
$q_1$	$\emptyset$	$\{q_2\}$
$q_2$	$\emptyset$	$\emptyset$
$q_3$	$\emptyset$	$\{q_0, q_4\}$
$q_4$	$\{q_1, q_2, q_3\}$	$\{q_1, q_2\}$



$\delta$	a	b
* $[q_0]$	$[q_1, q_2, q_3]$	$[q_2]$
* $[q_1, q_2, q_3]$	$[\emptyset]$	$[q_0, q_2, q_4]$
* $[q_0, q_2, q_4]$	$[q_1, q_2, q_3]$	$[q_1, q_2]$
* $[q_1, q_2]$	$[\emptyset]$	$[q_2]$
* $[q_2]$	$[\emptyset]$	$[\emptyset]$
$[\emptyset]$	$[\emptyset]$	$[\emptyset]$

$\delta$	a	b
* $P_0$	$P_1$	$P_4$
* $P_1$	$P_5$	$P_2$
* $P_2$	$P_1$	$P_3$
* $P_3$	$P_5$	$P_4$
$P_4$	$P_5$	$P_5$
$P_5$	$P_5$	$P_5$

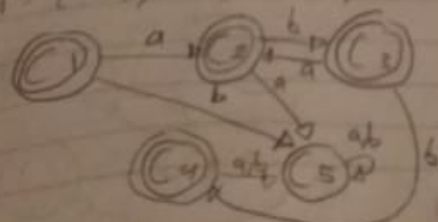


$$C_1 = \{P_0, P_1, P_2, P_3\}, C_2 = \{P_4, P_5\}$$

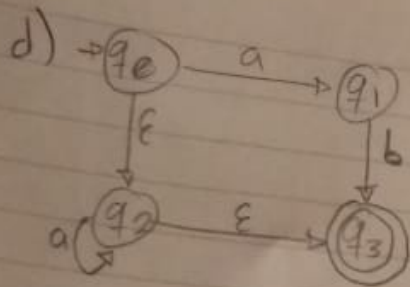
$\delta$	a	b			
* $P_1$	$P_5$	$P_2$	2, 1	5, 3	(2
* $P_2$	$P_1$	$P_3$	1, 1	2, 4	(3
* $P_3$	$P_5$	$P_4$	2, 2	5, 5	(4
* $P_0$	$P_1$	$P_4$	1, 2	2, 5	(1

$\delta$	a	b			
$P_4$	$P_5$	$P_5$	2, 2	5, 5	(5
$P_5$	$P_5$	$P_5$	2, 2	5, 5	(5

$$C_1 = \{P_0\}, C_2 = \{P_1\}, C_3 = \{P_2\}, C_4 = \{P_3\}, C_5 = \{P_4, P_5\}$$

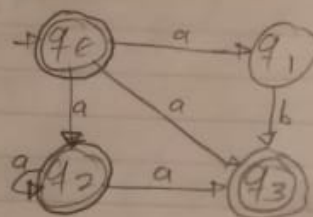






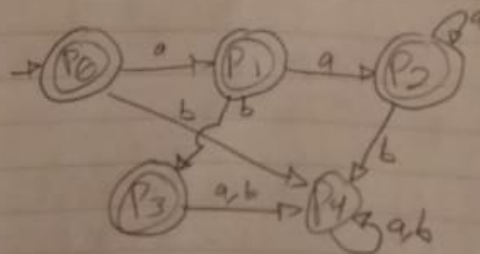
$\Delta$	a	b	$\epsilon$	Cerradura
$\rightarrow q_0$	$q_1$	$\emptyset$	$q_2$	$\{q_0, q_2, q_3\}$
$q_1$	$\emptyset$	$q_3$	$\emptyset$	$\{q_1\}$
$q_2$	$q_2$	$\emptyset$	$q_3$	$\{q_2, q_3\}$
$*q_3$	$\emptyset$	$\emptyset$	$\emptyset$	$\{q_3\}$

$\delta$	a	b
$\rightarrow q_0$	$\{q_1, q_2, q_3\}$	$\emptyset$
$q_1$	$\emptyset$	$\{q_3\}$
$*q_2$	$\{q_2, q_3\}$	$\emptyset$
$*q_3$	$\emptyset$	$\emptyset$



$\delta$	a	b
$\rightarrow [q_0]$	$[q_1, q_2, q_3]$	$[\emptyset]$
$*[q_1, q_3]$	$[q_2, q_3]$	$[q_3]$
$*[q_2, q_3]$	$[q_2, q_3]$	$[\emptyset]$
$*[q_3]$	$[\emptyset]$	$[\emptyset]$
$[\emptyset]$	$[\emptyset]$	$[\emptyset]$

$\delta$	a	b
$\rightarrow p_0$	$p_1$	$p_4$
$*p_1$	$p_2$	$p_3$
$*p_2$	$p_2$	$p_4$
$*p_3$	$p_4$	$p_4$
$p_4$	$p_4$	$p_4$



$$C_1 = \{P_0, P_1, P_2, P_3\}, \quad C_2 = \{P_4\}$$

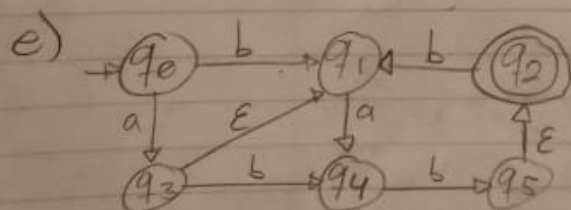
$C_1$					
$\delta$	a	b			
$\rightarrow P_0$	$P_1$	$P_4$	1, 2	2, 4	2, 5
$*P_1$	$P_2$	$P_3$	1, 1	1, 3	3, 4
$*P_2$	$P_2$	$P_4$	1, 2	1, 4	3, 5
$*P_3$	$P_4$	$P_4$	2, 2	4, 4	5, 5

$C_2$					
$\delta$	a	b			
$P_4$	$P_4$	$P_4$	2, 2	4, 4	5, 5

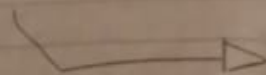
$$*C_1 = \{P_0, P_2\}, \quad *C_2 = \{P_1\}, \quad *C_3 = \{P_3\}, \quad C_4 = \{P_4\}$$

$$*C_1 = \{P_0\}, \quad *C_2 = \{P_1\}, \quad *C_3 = \{P_2\}, \quad C_4 = \{P_3\}, \quad C_5 = \{P_4\}$$

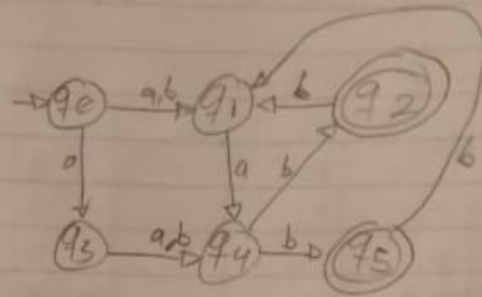
No tiene mínimo (ya es mínimo)



$\Delta$	a	b	$\epsilon$	Cerradura
$\rightarrow q_0$	$q_3$	$q_1$	$\emptyset$	$\{q_0\}$
$q_1$	$q_4$	$\emptyset$	$\emptyset$	$\{q_1\}$
$*q_2$	$\emptyset$	$q_1$	$\emptyset$	$\{q_2\}^*$
$q_3$	$\emptyset$	$q_4$	$q_1$	$\{q_3, q_1\}$
$q_4$	$\emptyset$	$q_5$	$\emptyset$	$\{q_4\}$
$q_5$	$\emptyset$	$\emptyset$	$q_2$	$\{q_5, q_2\}^*$

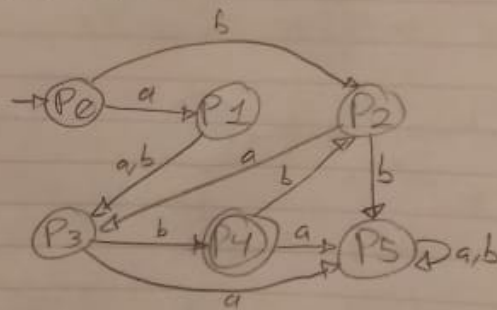


$\delta$	a	b
$\rightarrow q_0$	$\{q_3, q_1\}$	$\{q_1, q_2\}$
$q_1$	$\{q_4\}$	$\emptyset$
$*q_2$	$\emptyset$	$\{q_1\}$
$q_3$	$\{q_4\}$	$\{q_4\}$
$q_4$	$\emptyset$	$\{q_5, q_2\}$
$*q_5$	$\emptyset$	$\{q_1\}$



$\delta$	a	b
$\rightarrow [q_0]$	$[q_3, q_1]$	$[q_1]$
$[q_3, q_1]$	$[q_4]$	$[q_4]$
$[q_1]$	$[q_4]$	$[\emptyset]$
$[q_4]$	$[\emptyset]$	$[q_5, q_2]$
$*[q_5, q_2]$	$[\emptyset]$	$[q_1]$
$[\emptyset]$	$[\emptyset]$	$[\emptyset]$

$\delta$	a	b
$\rightarrow P_0$	$P_1$	$P_2$
$P_1$	$P_3$	$P_3$
$P_2$	$P_3$	$P_5$
$P_3$	$P_5$	$P_4$
$*P_4$	$P_5$	$P_2$
$P_5$	$P_5$	$P_5$



$C_1 = \{P_4\}, C_2 = \{P_0, P_1, P_2, P_3, P_5\}$

$\delta$	a	b			
$P_4$	$P_5$	$P_2$	2, 2	2, 2	2, 4

$\delta$	a	b			
$P_0$	$P_1$	$P_2$	2, 2	2, 2	3, 4
$P_1$	$P_3$	$P_3$	2, 2	3, 3	5, 5
$P_2$	$P_3$	$P_5$	2, 2	3, 2	5, 2
$P_3$	$P_5$	$P_4$	2, 1	2, 1	2, 1
$P_5$	$P_5$	$P_5$	2, 2	2, 2	2, 2

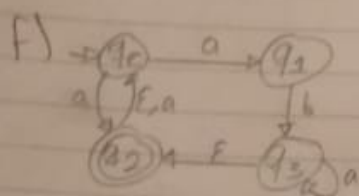


$C_1 = \{P_4\}$ ,  $C_2 = \{P_0, P_1, P_2, P_5\}$ ,  $C_3 = \{P_3\}$

$C_1 = \{P_4\}$ ,  $C_2 = \{P_0, P_5\}$ ,  $C_3 = \{P_1\}$ ,  $C_4 = \{P_2\}$ ,  $C_5 = \{P_3\}$

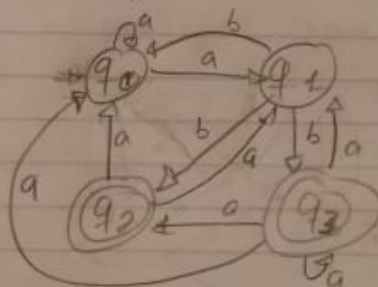
$C_1 = \{P_4\}$ ,  $C_2 = \{P_0\}$ ,  $C_3 = \{P_1\}$ ,  $C_4 = \{P_2\}$ ,  $C_5 = \{P_3\}$ ,  $C_6 = \{P_5\}$

No tiene mínimo (ya es el mínimo)



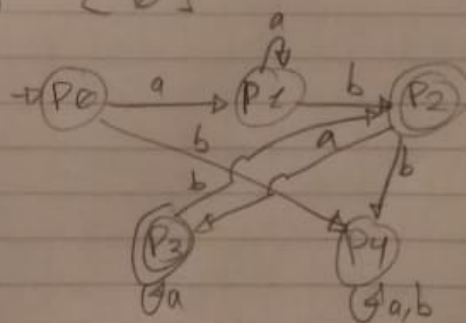
$\Delta$	a	b	$\epsilon$	Cerradura
$+q_0$	$q_0, q_1$	$\emptyset$	$\emptyset$	$\{q_0\}$
$q_1$	$\emptyset$	$q_3$	$\emptyset$	$\{q_1\}$
$+q_2$	$q_0$	$\emptyset$	$q_0$	$\{q_0, q_2\}$
$q_3$	$q_3$	$\emptyset$	$q_2$	$\{q_0, q_2, q_3\}$

$\delta$	a	b
$+q_0$	$\{q_0, q_1\}$	$\emptyset$
$q_1$	$\emptyset$	$\{q_0, q_2, q_3\}$
$+q_2$	$\{q_0, q_1\}$	$\emptyset$
$+q_3$	$\{q_0, q_1, q_2, q_3\}$	$\emptyset$



$\delta$	a	b
$+ [q_0]$	$[q_0, q_1]$	$[\emptyset]$
$[q_0, q_1]$	$[q_0, q_1]$	$[q_0, q_2, q_3]$
$+ [q_0, q_2, q_3]$	$[q_0, q_1, q_2, q_3]$	$[\emptyset]$
$+ [q_0, q_1, q_2, q_3]$	$[q_0, q_1, q_2, q_3]$	$[q_0, q_2, q_3]$
$[ \emptyset ]$	$[ \emptyset ]$	$[ \emptyset ]$

$\delta$	a	b
$+P_0$	$P_1$	$P_4$
$P_1$	$P_1$	$P_2$
$+P_2$	$P_3$	$P_4$
$+P_3$	$P_3$	$P_2$
$P_4$	$P_4$	$P_4$



$$C_1 = \{P_2, P_3\}, C_2 = \{P_0, P_1, P_4\}$$

$C_1$

$\delta$	a	b		
$P_2$	$P_3$	$P_4$	1, 2	2, 3
$P_3$	$P_3$	$P_2$	1, 1	2, 1

$C_2$

$\delta$	a	b		
$P_0$	$P_1$	$P_4$	2, 2	4, 3
$P_1$	$P_1$	$P_2$	2, 1	4, 1
$P_4$	$P_4$	$P_4$	2, 2	3, 3

$$C_1 = \{P_2\}, C_2 = \{P_3\}, C_3 = \{P_0, P_4\}, C_4 = \{P_1\}$$

$$C_1 = \{P_2\}, C_2 = \{P_3\}, C_3 = \{P_0\}, C_4 = \{P_1\}, C_5 = \{P_4\}$$

No tiene mínimo (ya es el mínimo)