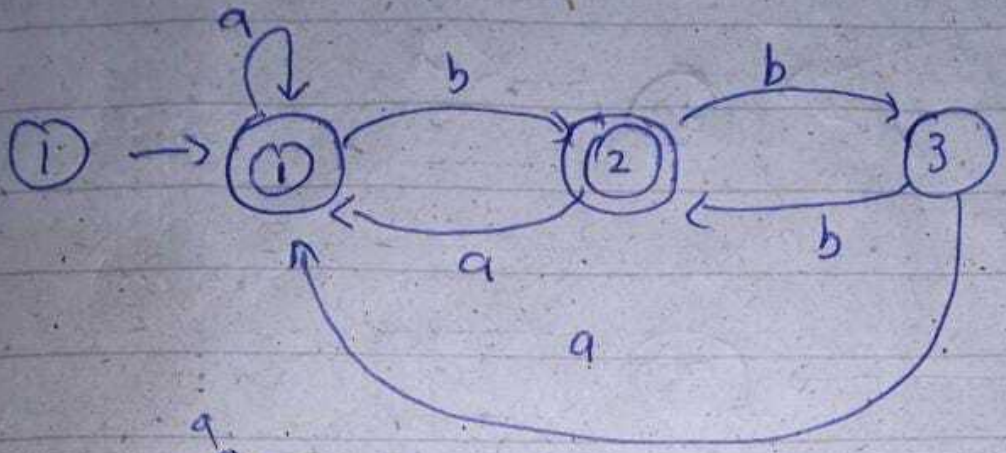
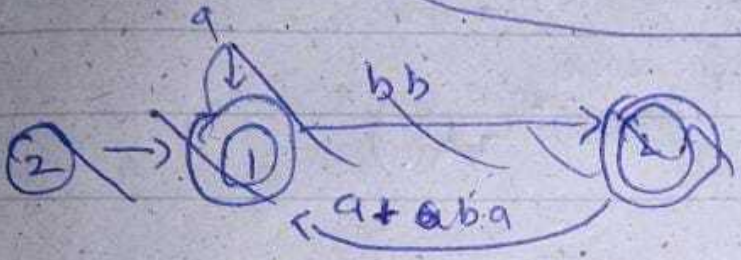
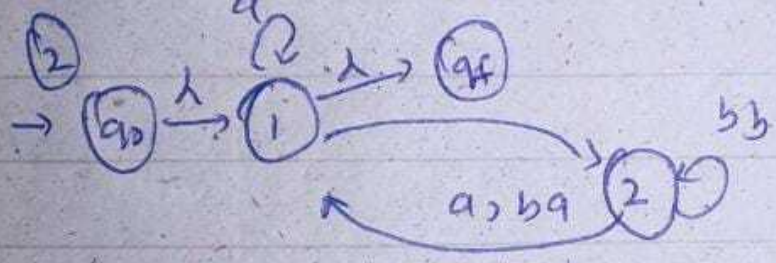
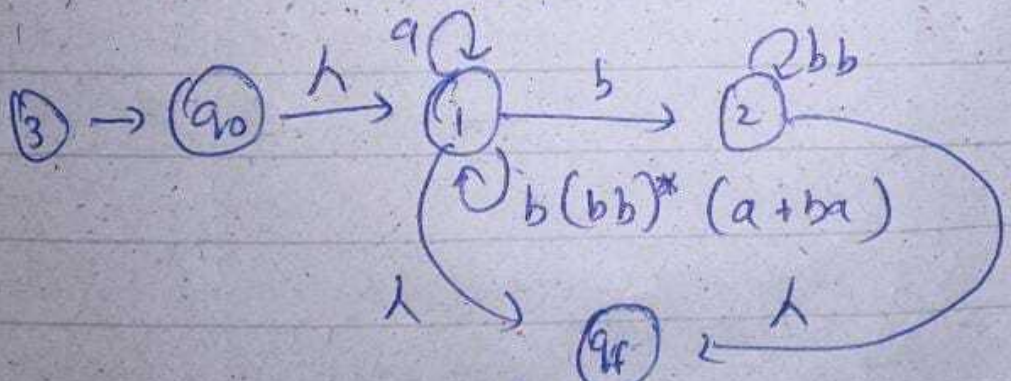
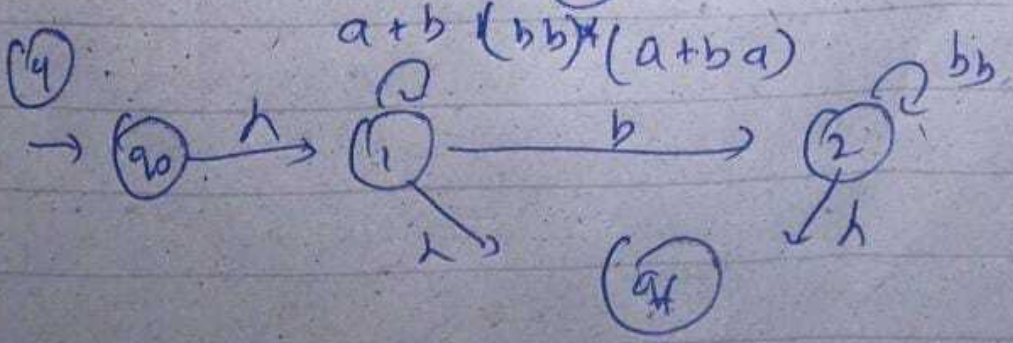
TOA assignment 2.

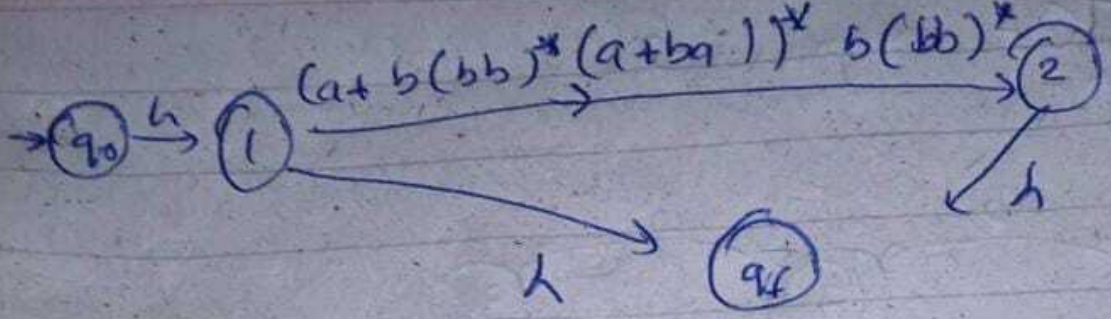






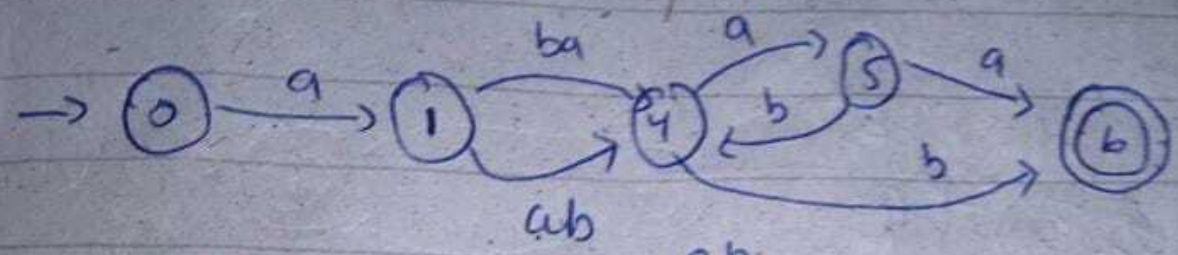


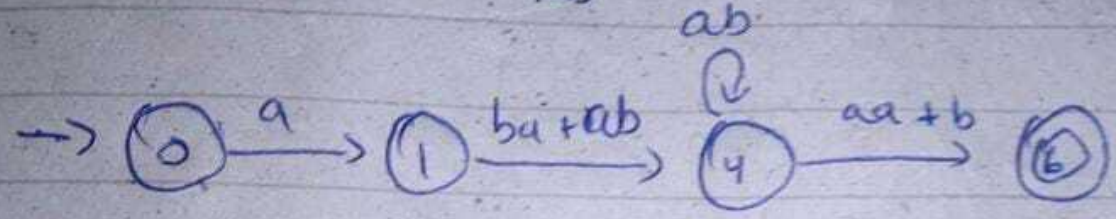


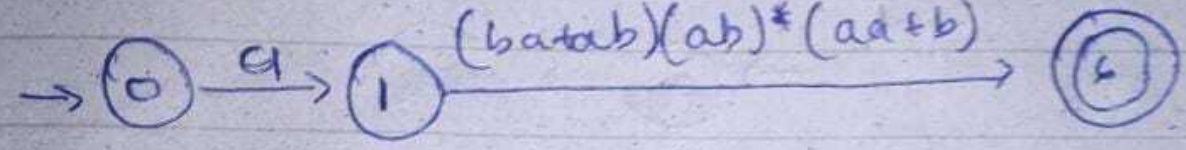


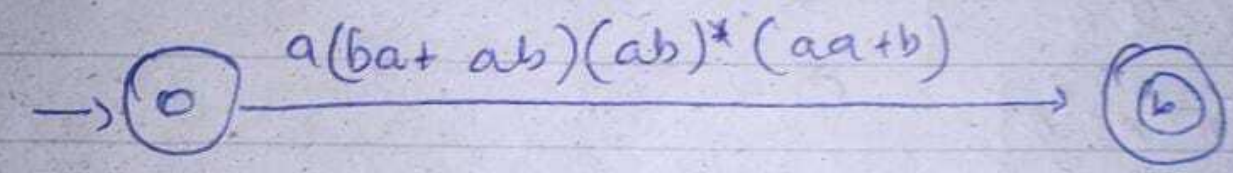
$((a + b(bb)^*(a+ba))^* b(bb)^* + \lambda)$

Ans2)







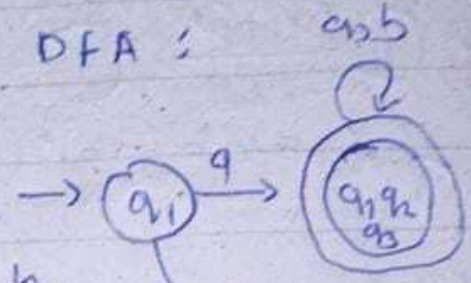


RE = $a(ba+ab)(ab)^*(aa+b)$

Q3)

States	a	b
q_1	(q_1, q_2, q_3)	$\emptyset$
$\{q_1, q_2, q_3\}$		

DFA :



NFA table

States	a	b
q_1	$\{q_1, q_2, q_3\}$	$\emptyset$
q_2	$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$
q_3	$\{q_1, q_2\}$	$\emptyset$

DFA table

States	a	b
q_1	$\{q_1, q_2, q_3\}$	$\emptyset$
$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$
$\emptyset$	$\emptyset$	$\emptyset$

Ans 4)

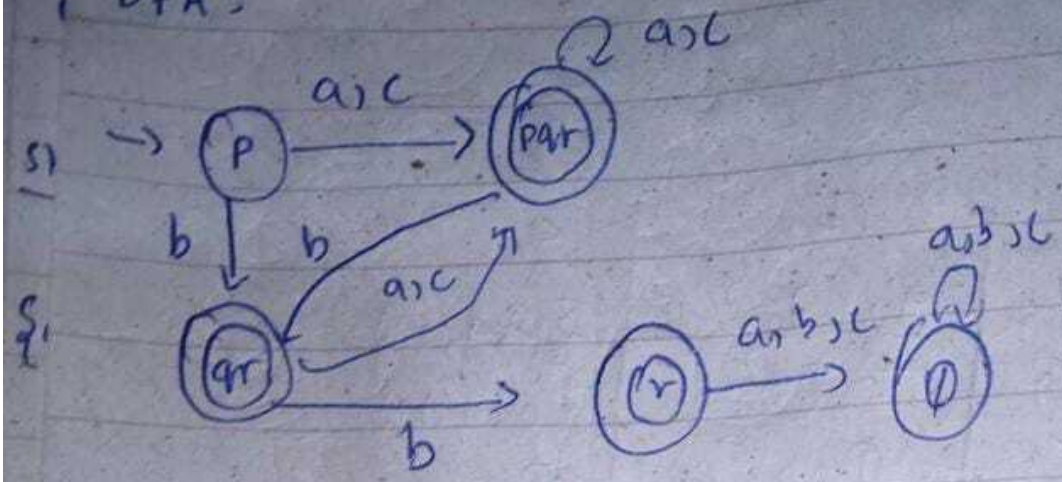
NFA Table

States	a	b	c
P	{p, q, r}.	{q, r}.	{p, q, r}.
~~{q, r}.~~ {p, q, r}.	{p, q, r}	r	{p, q, r}.
r	ϕ	ϕ	ϕ

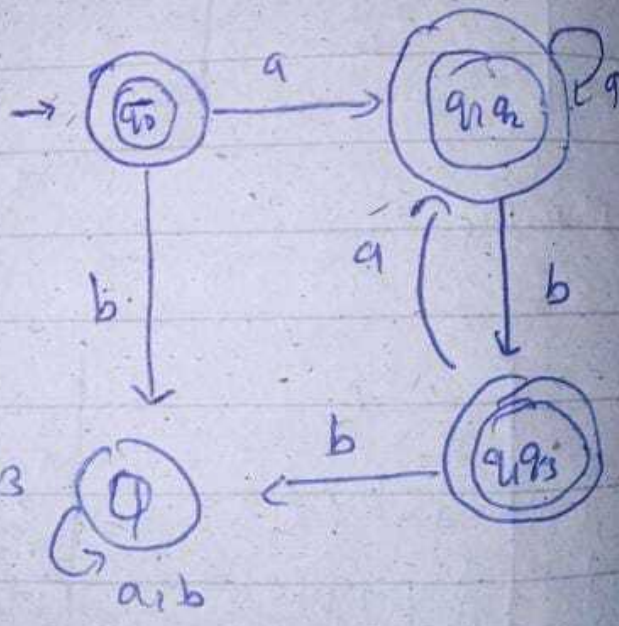
DFA table

States	A	B	C
P	{p, q, r}.	{q, r}	{p, q, r}.
{p, q, r}.	{p, q, r}	{q, r}	{p, q, r}.
{q, r}.	{p, q, r}.	r	{p, q, r}.
r	ϕ	ϕ	ϕ
ϕ	ϕ	ϕ	ϕ

DFA:



Q5) NFA Table



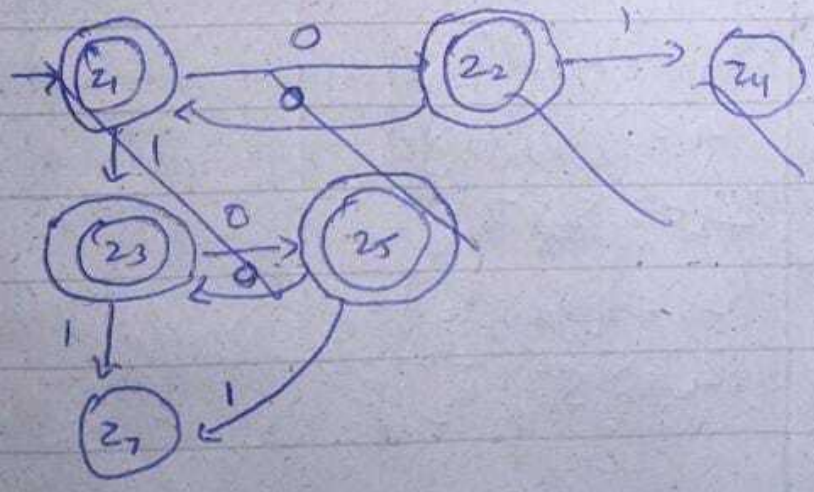
States	a	b
q_0	q_1, q_2	$\emptyset$
q_1	q_1, q_2	$\emptyset$
q_2	$\emptyset$	q_1, q_3
q_3	q_2, q_1	$\emptyset$

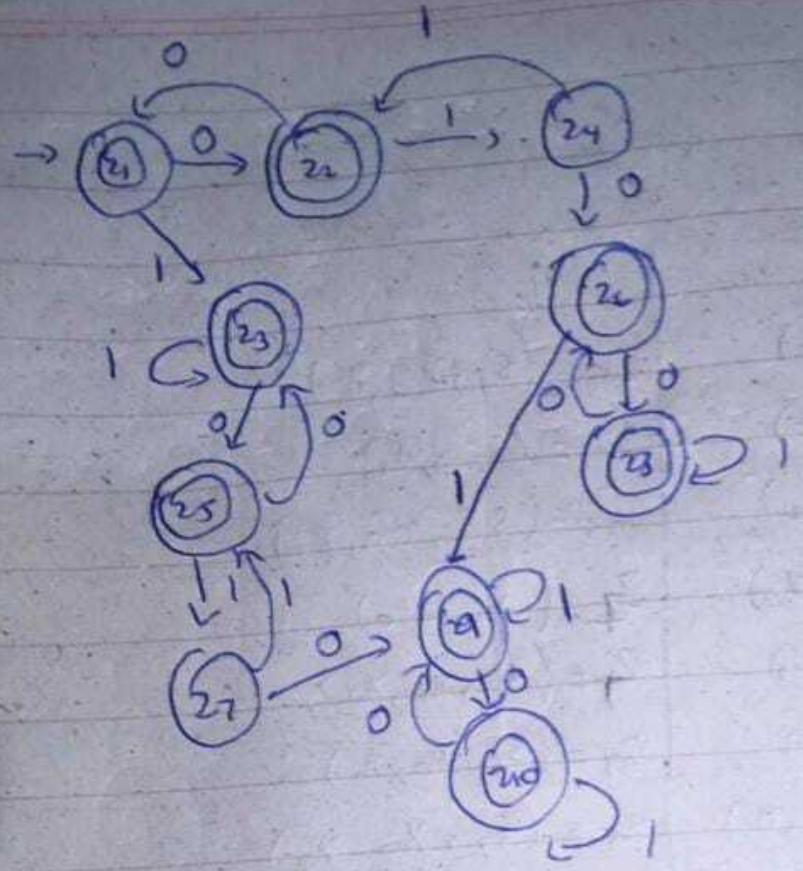
DFA Table:

States	a	b
$\rightarrow q_0$	q_1, q_2	$\emptyset$
$+ q_1, q_2$	q_1, q_2	q_1, q_3
$\emptyset$	$\emptyset$	$\emptyset$
$+ q_1, q_3$	q_1, q_2	$\emptyset$

Concatenation

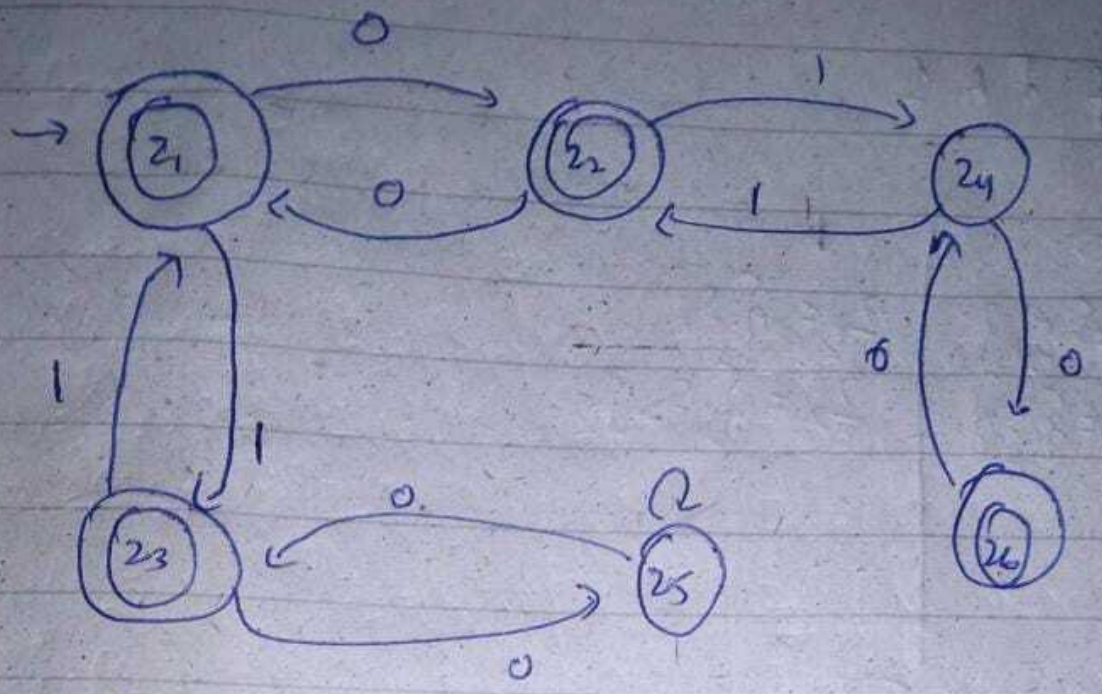
States	0	1
$\overset{+}{Z_1} = (S_1, x_0)$	$Z_2 = (S_2, x_0)$	$Z_3 = (S_1, x_0, x_1)$
$+Z_2 = (S_2, x_0)$	$Z_1 = (S_1, x_0)$	$Z_4 = (S_2, x_1)$
$+ Z_3 = (S_1, x_0, x_1)$	$Z_5 = (S_2, x_0, x_2)$	$Z_3 = (S_1, x_0, x_1)$
$Z_4 = (S_2, x_1)$	$Z_6 = (S_1, x_0, x_2)$	$Z_7 = (S_2, x_0)$
$Z_5^+ = (S_2, x_0, x_2)$	$Z_3 = (S_1, x_0, x_1)$	$Z_4 = (S_1, x_1, x_2)$
$Z_6^+ = (S_1, x_0, x_2)$	$Z_8 = (S_2, x_0, x_1)$	$Z_9 = (S_1, x_0, x_1)$
$Z_7 = (S_2, x_1, x_2)$	$Z_9 = (S_1, x_0, x_2, x_1)$	$Z_5 = (S_2, x_0, x_2)$
$Z_8^+ = (S_2, x_0, x_1)$	$Z_6 = (S_1, x_0, x_2)$	$Z_8 = (S_2, x_1, x_0)$
$Z_9^+ = (S_1, x_0, x_2, x_1)$	$Z_{10} = (S_2, x_0, x_1, x_2)$	$Z_9 = (S_1, x_0, x_2, x_1)$
$Z_{10}^+ = (S_2, x_0, x_1, x_2)$	$Z_9 = (S_1, x_0, x_2, x_1)$	$Z_{10} = (S_2, x_1, x_0, x_2)$





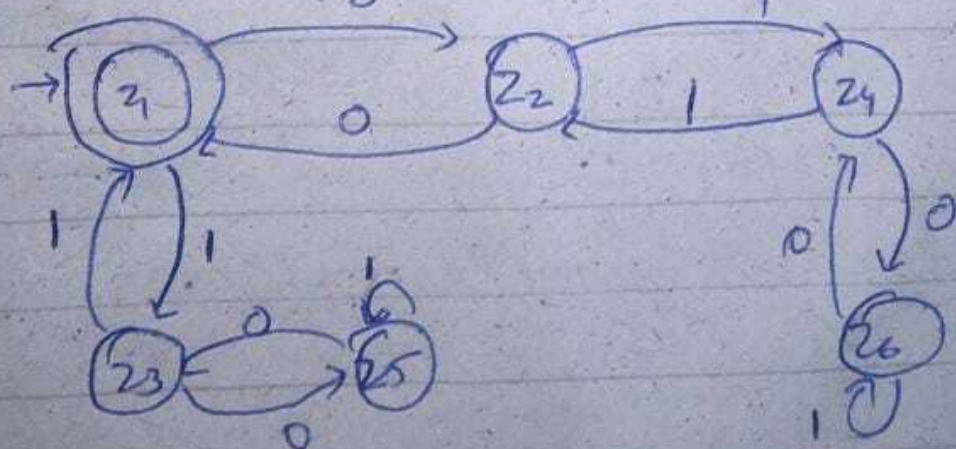
(2) Union

States	0	1
$+Z_1 = (S_1, T_0)$	$Z_2 = \{S_2, T_0$	$Z_3 = \{S_1, T_1\}$.
$+Z_2 = (S_2, S_0)$	$Z_1 = \{S_1, T_0\}$.	$Z_4 = \{S_2, T_1\}$.
$+Z_3 = (S_1, T_1)$	$Z_5 = \{S_2, T_2\}$	$Z_1 = \{S_1, T_0\}$.
$Z_4 = \{S_2, T_1\}$.	$Z_6 = \{S_1, T_2\}$	$Z_2 = \{S_2, T_0\}$.
$Z_5 = \{S_2, T_2\}$.	$Z_3 = \{S_1, T_1\}$.	$Z_5 = \{S_2, T_2\}$.
$+Z_6 = \{S_1, T_2\}$	$Z_4 = \{S_2, T_1\}$	$Z_6 = \{S_1, T_2\}$.



3- Intersection

Old states	0	1
$Z_1 = \{S_1, T_0\}$	Z_2	Z_3
$Z_2 = \{S_2, T_0\}$	Z_1	Z_4
$Z_3 = \{S_2, T_1\}$	Z_5	Z_1
$Z_4 = \{S_2, T_1\}$	Z_6	Z_2
$Z_5 = \{S_2, T_2\}$	Z_3	Z_5
$Z_6 = \{S_1, T_2\}$	Z_4	Z_6



Closure of FA 1

States	0	1
$Z_1 = \{S_1\}$	$Z_2 = \{S_1\}$	$Z_1 = \{S_1$
$Z_2 = \{S_2\}$	$Z_1 = \{S_1\}$	$Z_2 = \{S_2\}$