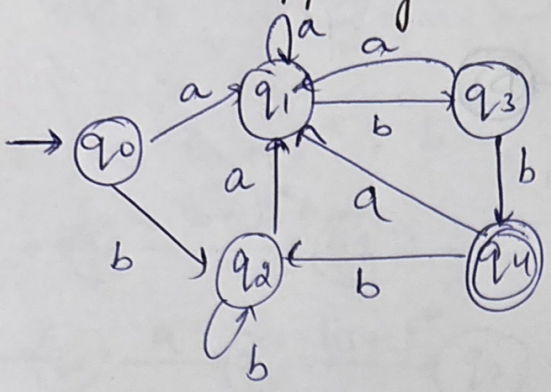
(2301010350)

Assignment-02

Q1. Minimize the DFA



S_1 → remove unreachable state.

S_2 → classes → 1. Accepting (Final)
2. Non-Accepting (Non-final)

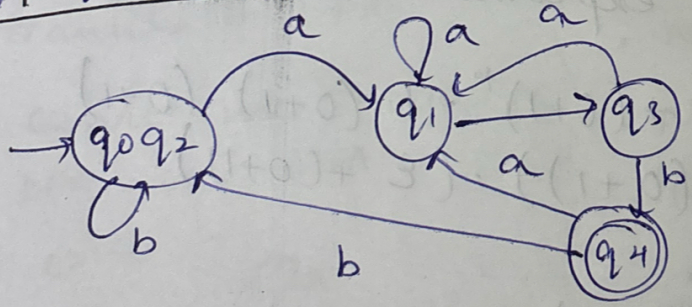
Transition Table

δ	a	b
q_0	q_1	q_2
q_1	q_1	q_3
q_2	q_1	q_2
q_3	q_1	q_4
q_4	q_1	q_2

$\pi_0 = \{q_0\ q_1\ q_2\ q_3\}\ \{q_4\}$

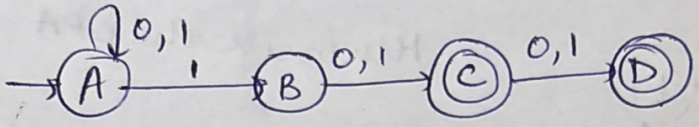
$\pi_1 = \{q_0\ q_1\ q_2\}\ \{q_3\}\ \{q_4\}$

$\pi_2 = \{q_0\ q_2\}\ \{q_1\}\ \{q_3\}\ \{q_4\}$



Q2

Ans 2. NFA to RE



$A = \varepsilon + A \cdot 0 + A \cdot 1$

$B = A \cdot 1$

$C = B \cdot 0 + B \cdot 1$

$D = C \cdot 0 + C \cdot 1$

By using arden's theorem, $R = Q + RP$

So, $R = QP^*$

$A = \varepsilon + (0+1)A$

$A = (0+1)^*$

put in B

$B = (0+1)^* \cdot 1$

put in C

$C = (0+1)^* \cdot 1(0+1)$

$D = (0+1)^* \cdot 1(0+1) \cdot (0+1)$

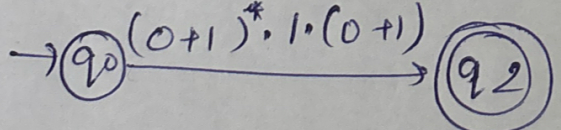
So, final regular expression will be C+D

$(0+1)^* \cdot 1(0+1) + (0+1)^* \cdot 1 \cdot (0+1) \cdot (0+1)$

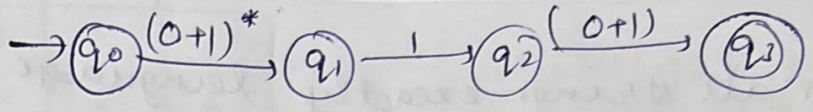
$((0+1)^* \cdot 1 \cdot (0+1)) \cdot (\varepsilon + (0+1))$

Q3.

Ans 3. $(0+1)^* \cdot 1 \cdot (0+1)$

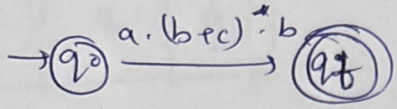


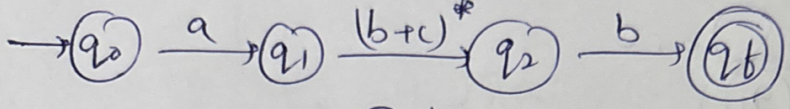
As there are two multiplication there will be two states.

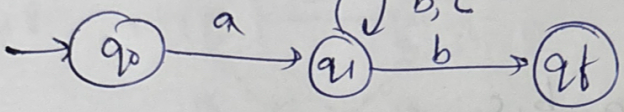


Q4.

Ans 4. $a \cdot (b+c)^* \cdot b$





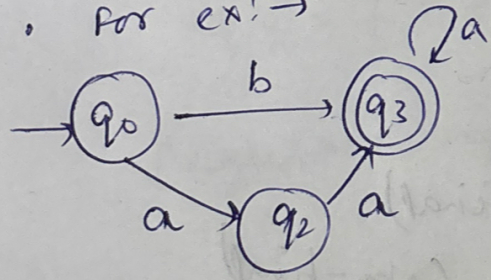


Q5.

Ans 5.

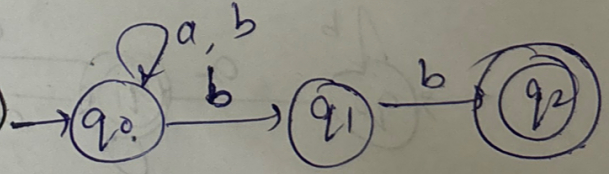
DFA

- DFA stands for Deterministic finite Automata.
- For each symbolic representation of the alphabet, there is only one transition in DFA
- DFA cannot use ε-transition
- All DFA are NFA
- For ex:→



NFA

- NFA stands for Non-Deterministic FA
- No need to specify ~~how~~ how does the NFA react acc. to some symbol
- NFA can use ε-transition
- Not all NFA are DFA
- For ex:→



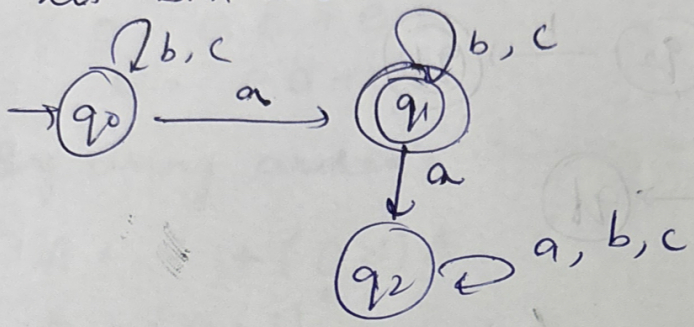
Q6-

Ans 6 → It accepts all strings exeactly language ...

⇒ { a, ab, abc, cab, cba, ccbbaa, ... }

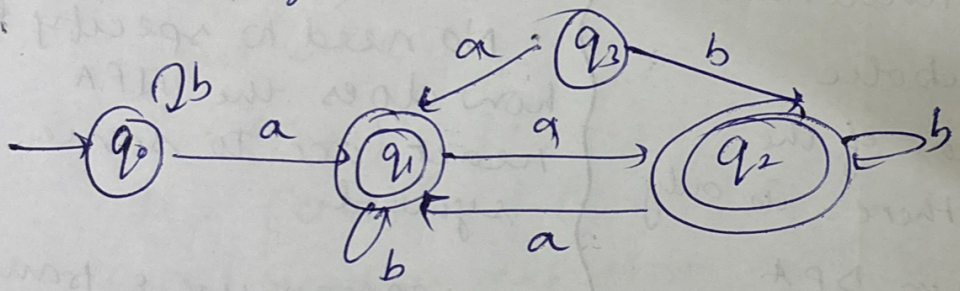
RE = $(b+c)^*\ a\ (b+c)^*$

its DFA will be :-

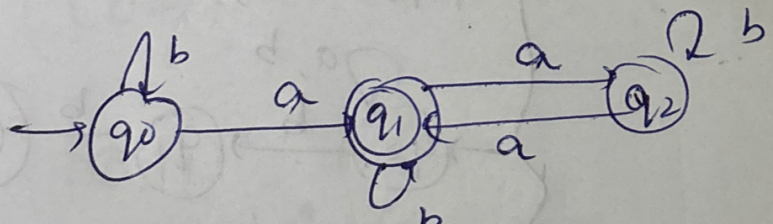


Q7

Ans 7 Minimize the DFA.



S1 → remove unreachable state q_3 is unreachable stable.



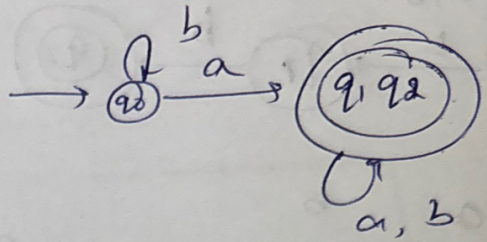
S2 → classes → 1) Accepting (final)

2) Non Accepting (Non-final)

δ	a	b
q_0	q_1	q_0
q_1	q_2	q_1
q_2	q_1	q_2

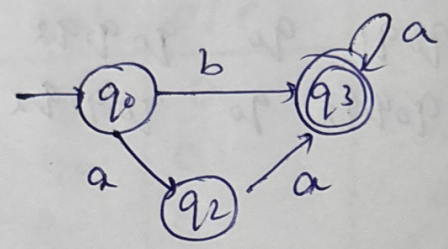
$\pi_0 = \{q_0\}\ \{q_1 q_2\}$

$\pi_1 = \{q_0\}\ \{q_1 q_2\}$



Q8.

Ans 8.



Using arden's theorum

$q_1 \Rightarrow \varepsilon$

$q_2 \Rightarrow q_1 \cdot a$

$q_3 \Rightarrow q_1 b + q_2 a + q_3 a$

Put values of q_1 & q_2 in q_3

$q_3 \Rightarrow b + aa + q_3 a$

by using $R = Q + RP$

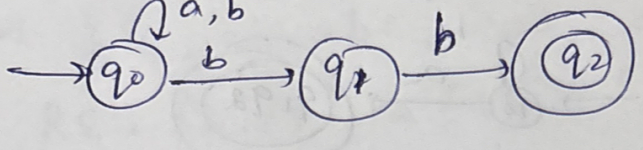
$R = QP^*$

$q_3 = (b + aa) + q_3 a$

Regular exp. $= (b + aa) \cdot a^*$

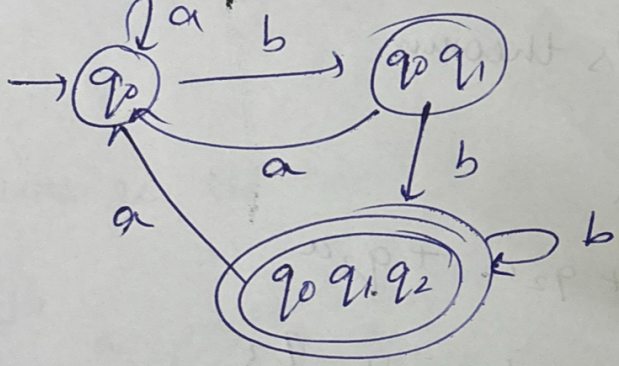
Q9.

Ans 9. NFA to DFA conversion



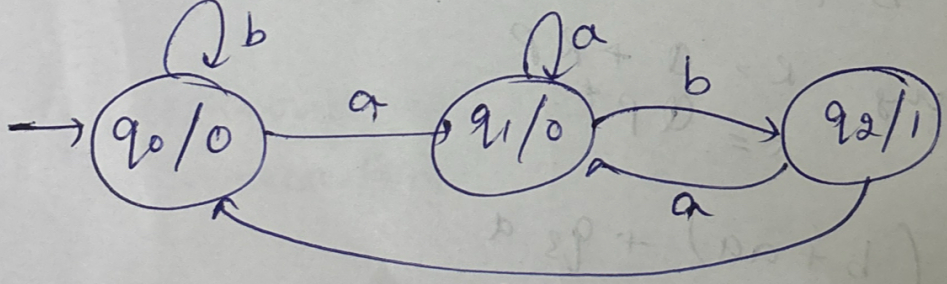
δ	a	b
q_0	q_0	$q_0 q_1$
q_1	–	q_2
q_2	–	–

δ	a	b
q_0	q_0	$q_0 q_1$
$q_0 q_1$	q_0	$q_0 q_1 q_2$
$q_0 q_1 q_2$	q_0	$q_0 q_1 q_2$

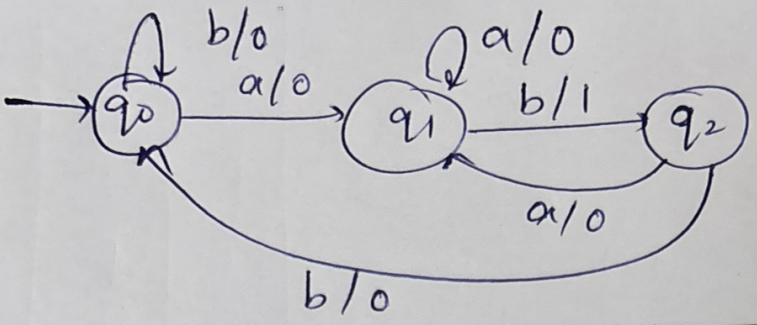


Q10.

Ans 10. Moore to Mealy Conversion :-



δ	New state a	New state b	O/P
q_0	q_1	q_0	0
q_1	q_1	q_2	0
q_2	q_1	q_0	1



δ	a		b	
	state	O/P	state	O/P
q_0	q_1	0	q_0	0
q_1	q_1	0	q_2	1
q_2	q_1	0	q_0	0