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AT Tutorial 3

a) Binary String where every 0 followed by 11

$M = (Q, \Sigma, \delta, q_0, F)$ $\Sigma = \{0, 1\}$ $\delta: Q \times \Sigma \to Q$

$Q = q_0 \to$ String ending in 0

$q_1 \to$ string ending in 1

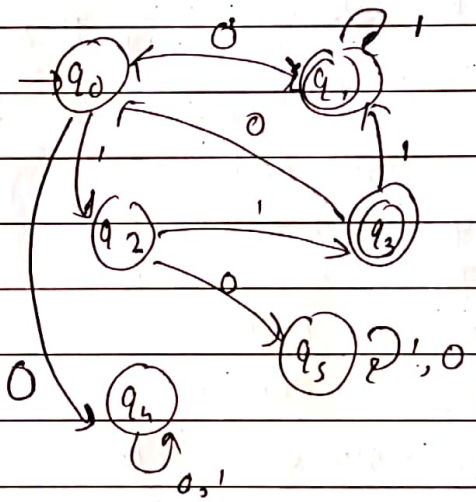
$q_2 \to$ String ending in 01

q_3 string ending in 011

$q_4 \to$ string ending in 00

$q_5 \to$ string ending in 010

$Q \setminus$	0	1
$\to q_0$	q_4	q_2
$*q_1$	q_0	q_1
q_2	q_5	q_3
$*q_3$	q_0	q_1
q_4	q_4	q_4
q_5	q_5	q_5



b) String that does not contain 010

$M = (Q, \Sigma, \delta, q_0, F)$

$\Sigma = \{0, 1\}$ $\delta: Q \times \Sigma \to Q$

$Q \Rightarrow q_0 \Rightarrow$ String ending 0

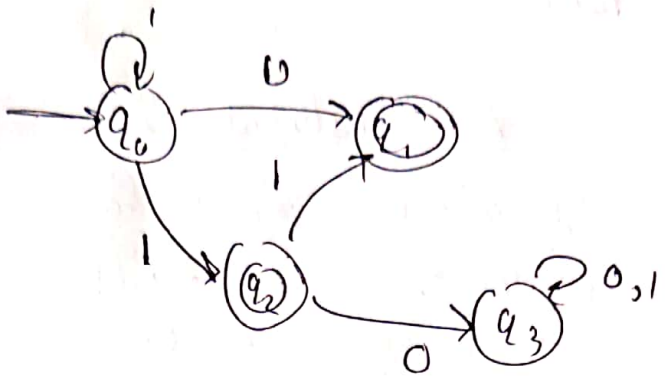
$q_1 \to$ string ending 1

$q_2 \to$ string ending 01

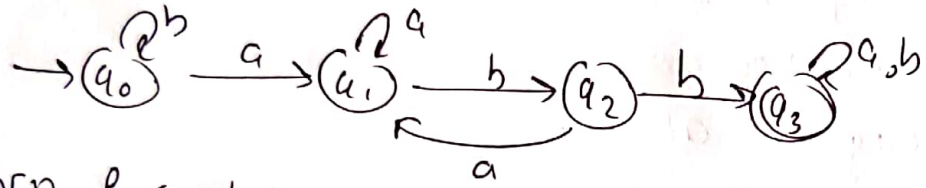
$q_3 \to$ string ending 010

$F = \{q_0, q_1, q_2\}$

	0	1
→ q_0	q_0	q_2
* q_1	q_0	q_1
* q_2	q_3	q_1
q_3	q_3	q_3



Q2] Design automata for $(a+b)^* abb (a+b)^*$

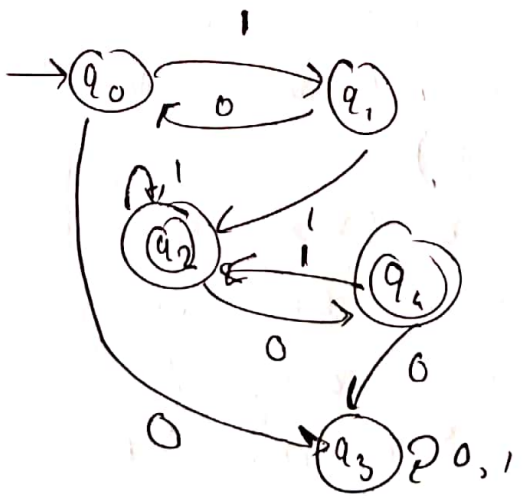


Q3] DFA for string containing 11 & not 00

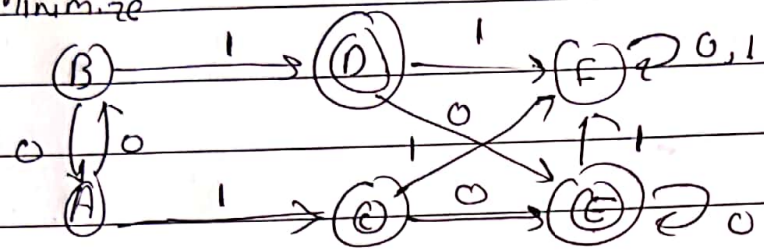
$M = (Q, \Sigma, \delta, q_0, F)$ $\Sigma = \{0,1\}$ $\delta : Q \times \Sigma \to Q$

$Q \Rightarrow$ $q_0 \to$ str end in 0
$q_1 \to$ str end in 1
$q_2 \to$ str end in 11
$q_2 \to$ str end in 11
$q_3 \to$ str end in 00
$q_4 \to$ str end in 110 $F = \{q_2, q_4\}$

	0	1
q_0	q_3	q_1
q_1	q_0	q_2
q_2	q_2	q_2
q_3	q_3	q_3
q_4	q_3	q_2

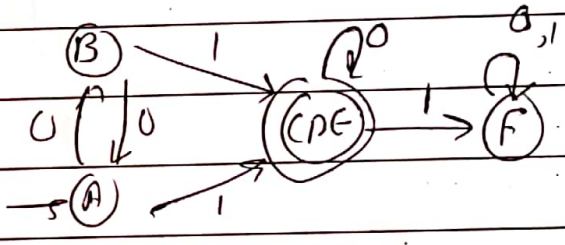


Q4] Minimize



Q	0	1
A	B	C
B	A	D
C	E	F
D	F	E
E	E	F
F	F	F

Q	0	1
A	B	CDE
B	D	CDE
CDE	CDE	F
F	F	F



5] Minimize

Q	0	1
q_0	q_1	q_7
q_1	q_3	q_4
q_2	q_5	q_1
* q_3	q_5	q_4
q_4	q_5	q_1
* q_5	q_3	q_4

Q	0	1
→ q_0	q_1	q_2
q_1	q_{35}	q_{74}
q_{74}	q_{35}	q_1
* q_{35}	q_{35}	q_{74}