

① Draw the following DFA using table filling algorithm where A is start state & C, F, I are final state

	0	1
A	B	E
B	*C	*F
*C	D	H
D	E	H
E	*F	*I
*F	G	B
G	H	B
H	*I	*C
*I	A	E

Step 1:-

Cross the

combinations of
final & non-f
final states in

table below.

B	X						
C	X	X					
D		X	X				
E	X		X	X			
F	X	X		X	X		
G		X	X		X	X	
H	X		X	X		X	X
I	X	X		X	X	X	X
A	B	C	D	E	F	G	H

Step 2: Check the 0 i/p & 1 i/p
combinations.

$$\begin{array}{ccccc} & O & I \\ \cancel{x} & A & B & E & \rightarrow (NF, NF) \end{array}$$

$$\begin{array}{ccccc} & B & C^* & F^* & \rightarrow (F, F) \\ \cancel{x} & A & B & E & (NF, NF) \end{array}$$

$$\begin{array}{ccccc} & E & F_x & I_x & (F, F) \\ \checkmark & A & B & E & (NF, NC) \end{array}$$

$$\begin{array}{ccccc} & D & E & H & (NF, NF) \\ \checkmark & A & B & E & (NF, NF) \end{array}$$

$$\begin{array}{ccccc} & G & H & B & (NF, NF) \\ \cancel{x} & A & B & E & \end{array}$$

$$\begin{array}{ccccc} & H & I_x & C^* & \\ \cancel{x} & B & C^* & F^* & \\ & D & E & H & \end{array}$$

$$\begin{array}{ccccc} \checkmark & B & C^* & F^* & \\ & E & F_x & I_x & \end{array}$$

$$\begin{array}{ccccc} \cancel{x} & B & C_x & F_x & \\ & G & H & B & \end{array}$$

$$\begin{array}{ccccc} \checkmark & B & C^* & F^* & \\ & H & I_x & C^* & \end{array}$$

$$\begin{array}{ccccc} \checkmark & P & D & H & \\ & F & G & B & \end{array}$$

$$\begin{array}{ccccc} \cancel{x} & C & D & H & \end{array}$$

$$\begin{array}{ccccc} \cancel{x} & I & A & E & \end{array}$$

$$\begin{array}{ccccc} \cancel{x} & P & E & H & \end{array}$$

$$\begin{array}{ccccc} & F & F_x & I_x & \\ \checkmark & P & E & H & \end{array}$$

$$\begin{array}{ccccc} & G & H & B & \end{array}$$

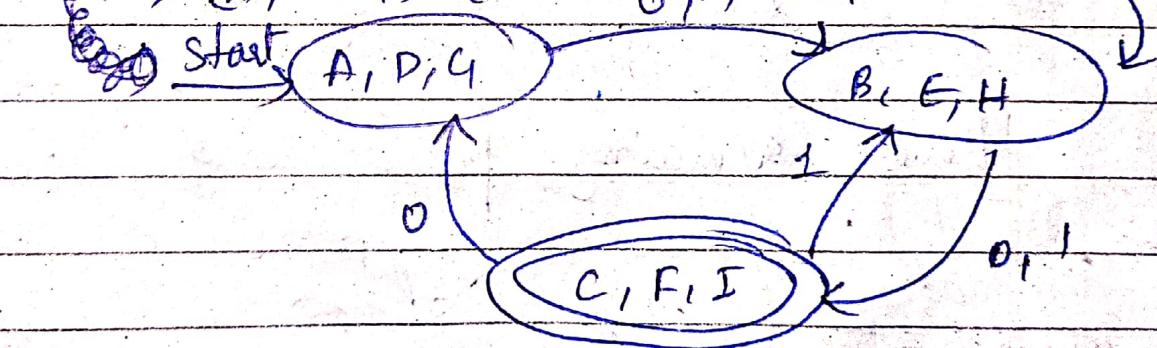
X	D	E	H	O	I
	H	I*	C*		
*	E	F*	I*		
	G	H	B		
✓	E	F*	I*	D*	
	H	I*	C*		
✓	*D	A	E		
*	P	G	B		
X	G	H	B		
	H	I*	C*		

Hence remaining pairs are

(A, D), (A, G), (B, E), (B, H), (C, F),

(C, I), (D, G), (E, H), (I, D)

→ (A, D, G), (B, E, H), (C, F, I)



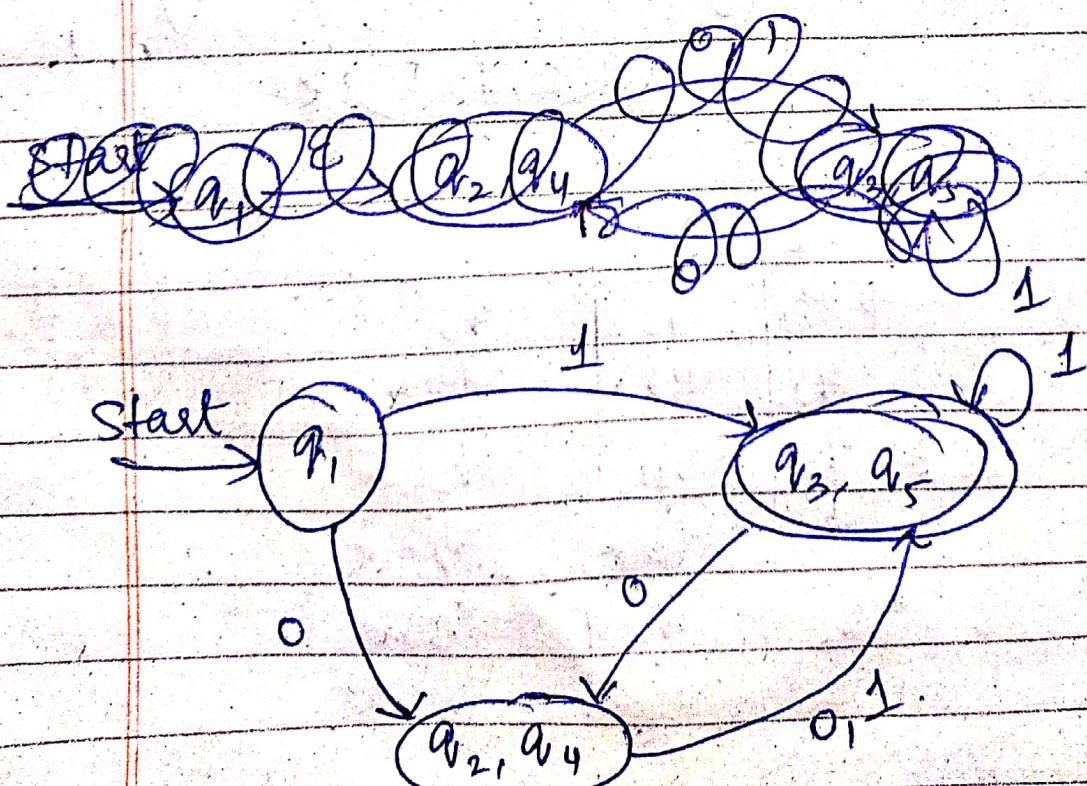
2.

S	0	1
→ q1	q2	q3*
q2	q3*	q5*
* q3	q4	q3 *
q4	q3*	q5 *
* q5	q2	q5 *

q_2	X			
* q_3	X	X		
q_4	X		X	
* q_5	X	X		X
	q_1	q_2	q_3	q_4

$$\begin{array}{ccccc}
 & & 0 & 1 & \\
 X q_1 & q_2 & q_3 & & \\
 q_2 & q_3 & q_5 & & \\
 \hline
 X q_1 & q_2 & q_3 & & \\
 q_4 & q_3 & q_5 & & \\
 \hline
 \checkmark q_2 & q_3 & q_5 & & \\
 q_4 & q_3 & q_5 & & \\
 \hline
 \checkmark *q_3 & q_4 & q_3 & & \\
 *q_5 & q_2 & q_5 & & \\
 \hline
 \end{array}$$

Hence remaining pairs are



	S	O	I
$\rightarrow q_1$	q_2	$q_6 \times$	
q_2	q_1	$q_3 \times$	
$\times q_3$	q_2	q_4	
q_4	q_4	q_2	
q_5	q_4	q_5	
$\times q_6$	q_5	q_4	

q_2					
$+ q_3$	X	X			
q_4	X	X	X		
q_5	X	X	X		
$\times q_6$	X	X	X	X	
	q_1	q_2	$q_3 \times$	q_4	q_5

	O	I
q_1	q_2	$q_6 \times$
q_2	q_1	$q_3 \times$
$\times q_1$	q_2	$q_6 \times$
q_4	q_4	q_2
$\times q_1$	q_2	$q_6 \times$
q_5	q_4	q_5
$\times q_2$	q_1	$q_3 \times$
q_4	q_4	q_2
$\times q_2$	q_1	$q_3 \times$
q_5	q_4	q_5
$\times q_3$	q_2	q_4
q_6	q_5	q_4

Remaining pairs are

(q_1, q_2) (q_4, q_5) (q_3, q_6)

