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

δ	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 and non-final states in the table below.

B								
*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 and 1 i/p combinations:

0 1

X A B E → (NF, NF)

B C* F* → (F, F)

X A B E (NF, NF)

E F* I* (F, F)

✓ A B G (NF, NF)

D E H (NF, NF)

✓ A B E (NF, NF)

G H B (NF, NF)

0 1

X A B E (NF, NF)

H I* C* (F, F)

X B C* F*

D E H

✓ B C* F*

E F* I*

X B C* F*

G H B

✓ B C* F*

H I* C*

✓ *C D H

*F G B

✓ C D H

*I A E

X D E H

E F* I*

✓ D E H

G H B

X D E H

E F* I*

✓ D E H

G H B

0 1

X D E H

H I* C*

X E F* I*

G H B

✓ E F* I*

H I* C*

✓ *I A E

*F G B

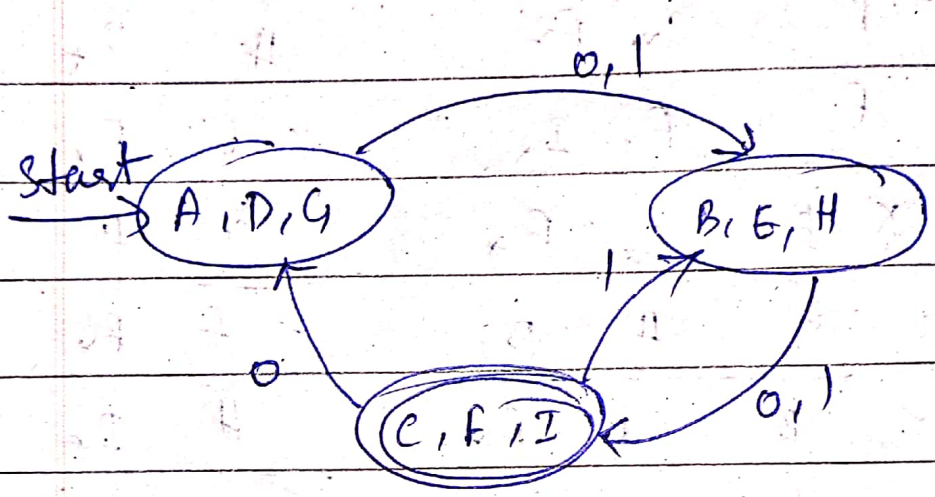
X G H B

H I* C*

Hence the remaining pairs are.

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

↳ (A, D, G) (B, E, H) (C, F, I)



2.

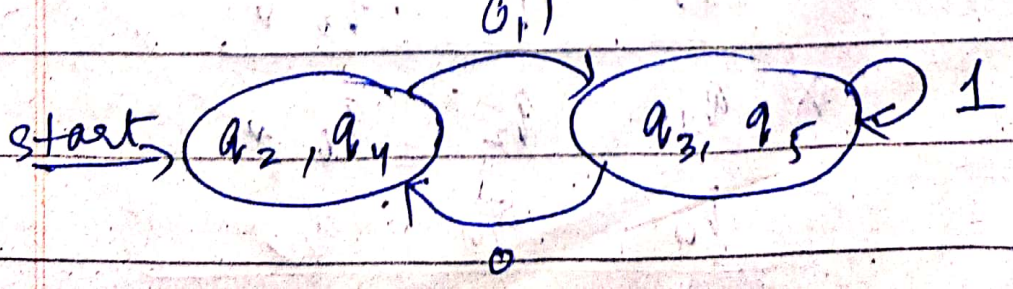
δ	0	1
→ q_1	q_2	q_3 *
q_2	q_3 *	q_5 *
* q_3	q_4	q_3 *
q_4	q_3 *	q_5 *
* q_5	q_2	q_5 *

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

	0	1
X	q_1	q_2 q_3*
	q_2	q_3* q_5*
X	q_1	q_2 q_3*
	q_4	q_3* q_5*
✓	q_2	q_3* q_5*
	q_4	q_3* q_5*
✓	*q_3	q_4 q_3*
	*q_5	q_2 q_5*

Hence the remaining pairs are.

(q_2, q_4) (q_3, q_5)



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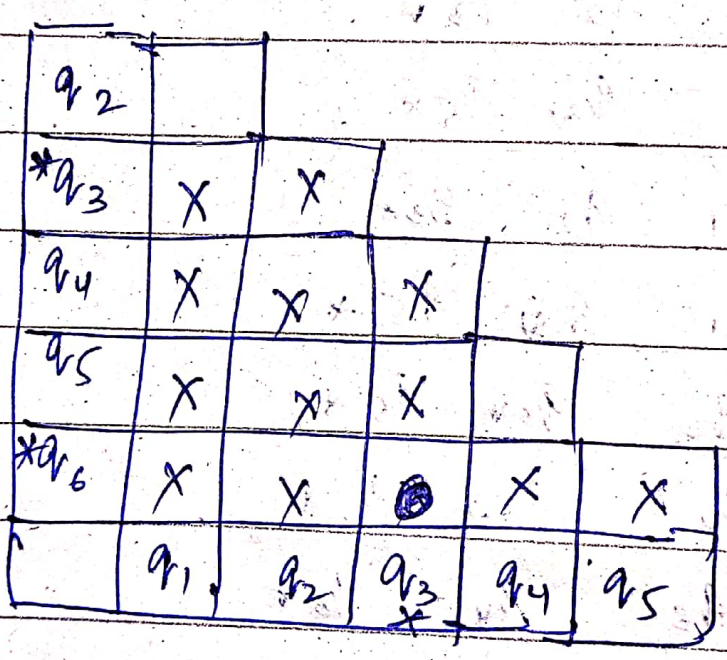
3.

δ	0	1
$\rightarrow q_1$	q_2	q_6 *
q_2	q_1	q_3 *
* q_3	q_2	q_4
q_4	q_4	q_2
q_5	q_4	q_5
* q_6	q_5	q_4



	0	1
q_1	q_2	q_6 *
q_2	q_1	q_3 *
X q_1	q_2	q_6 *
q_4	q_4	q_2

	0	1
X	q_1	q_2 q_6 *
	q_5	q_4 q_5
*	q_2	q_1 q_3 *
	q_4	q_4 q_2
X	q_2	q_1 q_3 *
	q_5	q_4 q_5
✓	* q_3	q_2 q_4
	* q_6	q_5 q_4
✓	q_4	q_4 q_2
	q_5	q_4 q_5

Remaining pairs are.

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