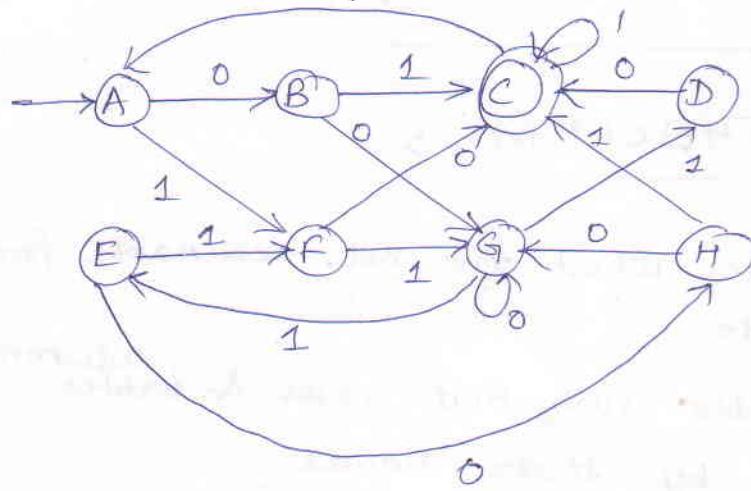


eg1) Construct a minimized DFA for the following



↳ Transition Table

States	Inputs	
	0	1
A	B	F
B	G	C
C	A	C
E	H	F
F	C	G
G	G	E
H	G	C

"D" is removed from transition table as it is a dead state.

↳ Box Table

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

→ first to second last

All states in which one state is C i.e. final state & other is non-final are crossed

1) cell (A, B)

$$\delta(A, 0) = B$$

$$\delta(B, 0) = G$$

(B, G) is not marked.

$$\delta(A, 1) = F$$

$$\delta(B, 1) = C$$

(F, C) is marked so (A, B) is also crossed.

2) cell (A, E)

$$\delta(A, 0) = B$$

$$\delta(E, 0) = H$$

(B, H) is not marked,

$$\delta(A, 1) = F \quad \text{so } \cancel{(A, E)}^{\text{(F, F)}} \text{ is not crossed}$$

$$\delta(E, 1) = F, \quad \text{so } \cancel{(A, E)}^{\text{(E, F)}} \text{ is also crossed.}$$

3) cell (A, F)

$$\delta(A, 0) = B$$

$$\delta(F, 0) = C$$

Since (B, C) is crossed, cell (A, F) is also crossed.

4) cell (A, H)

$$\delta(A, 0) = B$$

$$\delta(H, 0) = G$$

(B, G) is not crossed.

$$\delta(A, 1) = F$$

$$\delta(H, 1) = C$$

(F, C) is crossed, so (A, H) is also crossed.

5) cell (A, G)

$$\delta(A, 0) = B$$

$$\delta(G, 0) = G$$

(B, G) is not crossed

$$\delta(G, 1) = E$$

$$\delta(A, 1) = F$$

(F, E) is not crossed, thus (A, G) unmarked.

6) Cell (B, E)

$$\delta(B, 0) = G$$

$$\delta(E, 0) = H$$

(G, H) is not crossed, thus

$$\delta(B, 1) = C$$

$$\delta(E, 1) = F$$

(F, C) is crossed, thus (B, E) is crossed.

7) (B, F)

$$\delta(B, 0) = G$$

$$\delta(F, 0) = C$$

(G, C) is crossed, thus (B, F) is crossed.

8) (B, G)

$$\delta(B, 0) = G$$

$$\delta(G, 0) = G$$

$$\delta(B, 1) = C$$

$$\delta(G, 1) = E$$

(C, E) is crossed, thus (B, G) is crossed.

9) (B, H)

$$\delta(B, 0) = G$$

$$\delta(H, 0) = G$$

$$\delta(B, 1) = C$$

$$\delta(H, 1) = C$$

10) (E, F)

$$\delta(E, 0) = H$$

$$\delta(F, 0) = C$$

(H, C) is marked, thus (E, F) is also crossed.

11) (E, G)

$$\delta(E, 0) = H \quad (G, H) \text{ is not marked}$$

$$\delta(G, 0) = G$$

$$\delta(E, 1) = F$$

$$\delta(G, 1) = E$$

(E, F) is crossed so (E, G) is also crossed.

(E, H)

$$\delta(E, 0) = H$$

$$\delta(H, 0) = G$$

(G, H) is not marked.

$$\delta(E, 1) = F$$

$$\delta(H, 1) = C$$

(F, C) is marked, thus (E, H) is marked.

13) (F, G)

$$\delta(F, 0) = C$$

$$\delta(G, 0) = G$$

(G, C) is marked, thus (F, G) is also marked.

14) (F, H)

$$\delta(F, 0) = C$$

$$\delta(H, 0) = G$$

(C, G) is marked, hence (F, H) is marked.

15) (G, H)

$$\delta(G, 0) = G$$

$$\delta(H, 0) = G$$

$$\delta(G, 1) = E$$

$$\delta(H, 1) = C$$

(E, C) is marked, hence (G, H) is marked.

Now after 1 iteration, we again check for all unmarked cells.

We find that cell (A, G) gets marked as (F, E) gets crossed later.

cell  $(B, H)$  is not marked thus  $B$  is equivalent to  $H$  and they can be combined to form a composite state  $[B H]$

cell  $(A, E)$  is not marked, thus  $A$  is equivalent to  $E$  & can be combined to form a composite state  $[A E]$

Thus, minimized DFA is

	0	1
→ $[A E]$	$[B H]$	$F$
$[B H]$	$G$	$C$
$C$	$[A E]$	$C$
$F$	$C$	$G$
$G$	$G$	$[A E]$

