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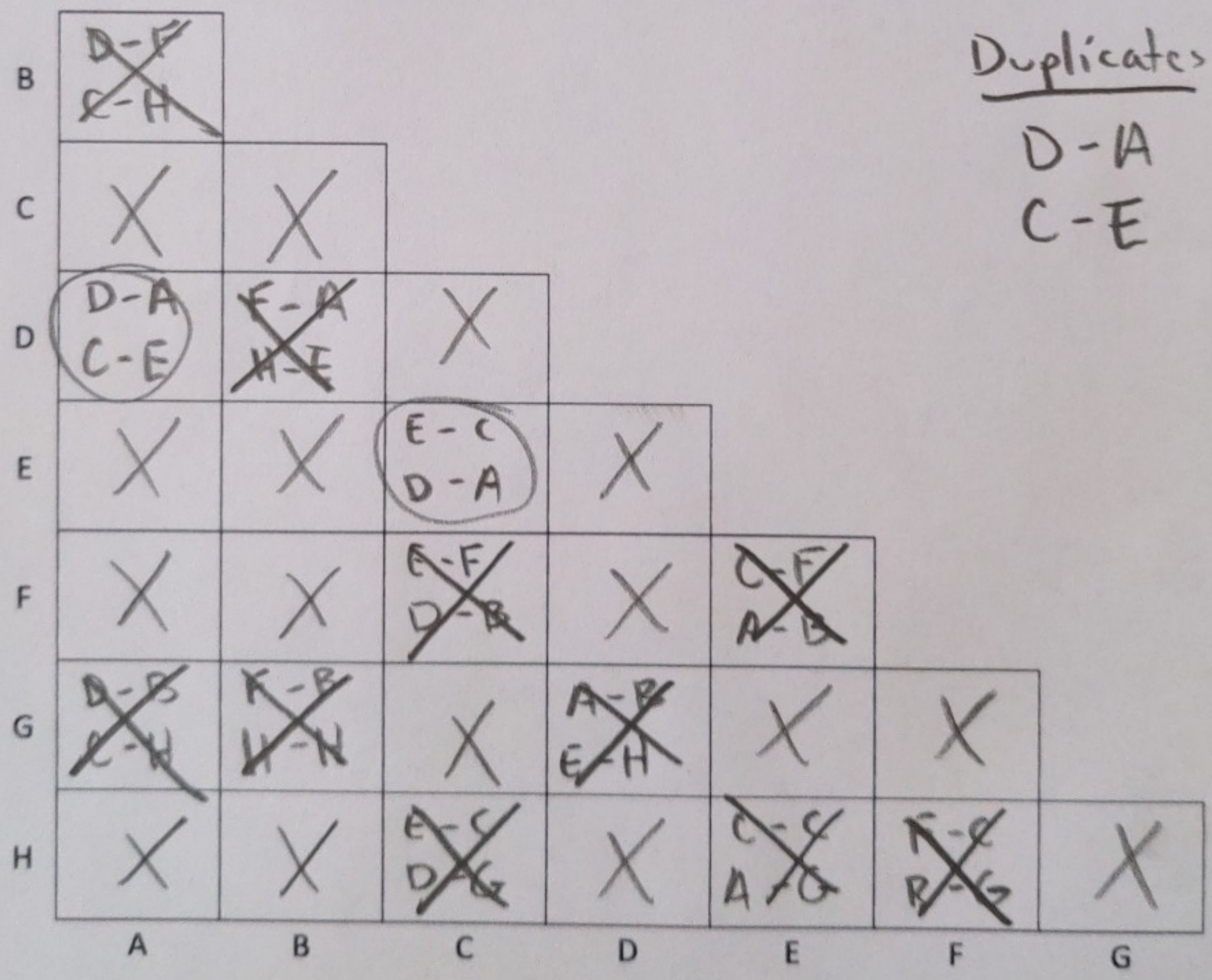
1.) Reduce the state table to the minimum number of states by using the Implication table.

Current State	Next State		Outputs
	X=0	X=1	
A	~~D~~ A	C	0
B	F	H	0
C	~~E~~ C	~~D~~ A	1
~~D~~	~~A~~	~~E~~	~~0~~
~~E~~	~~C~~	~~A~~	~~1~~
F	F	B	1
G	B	H	0
H	C	G	1



Duplicates

D-A

C-E

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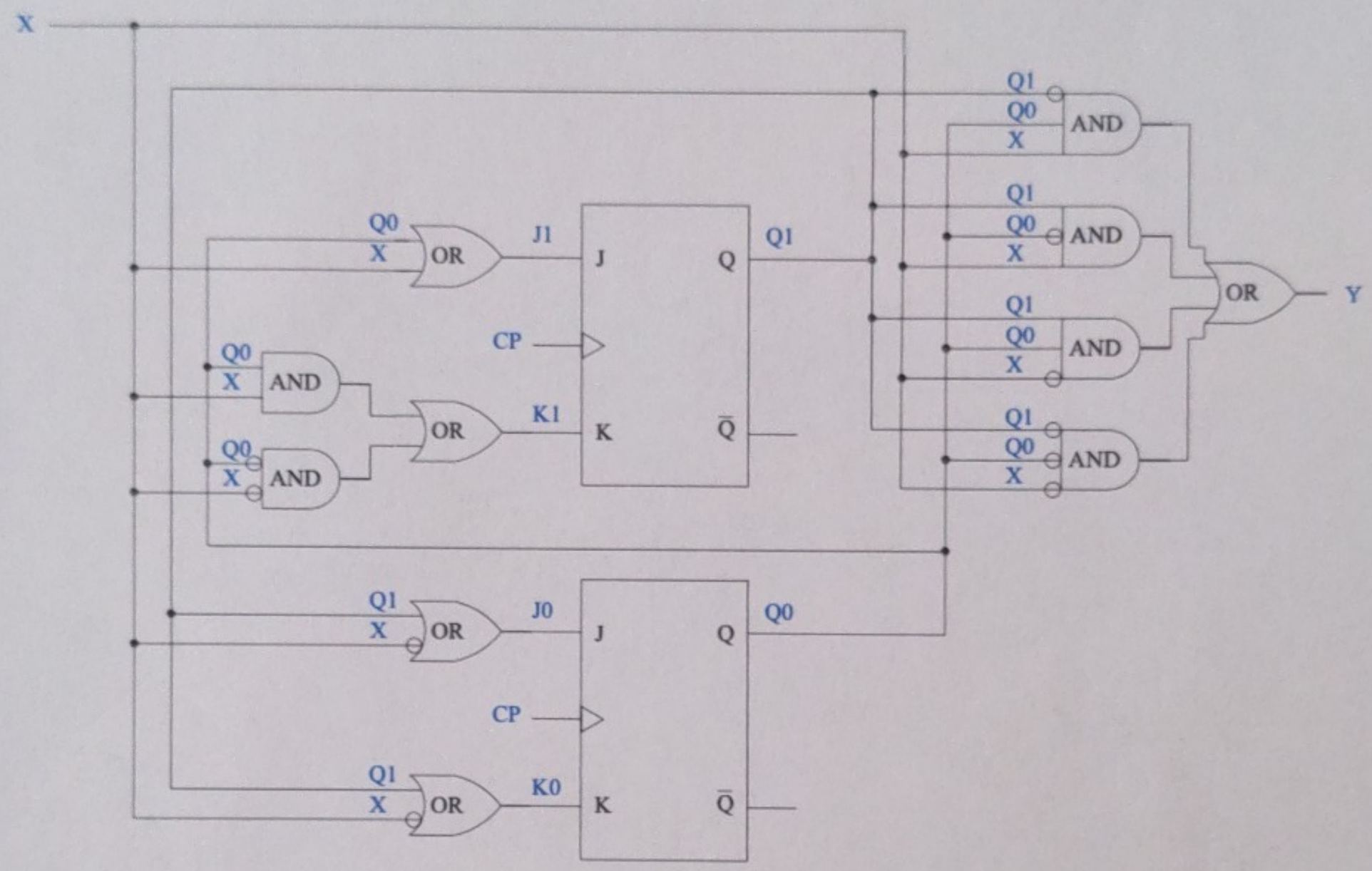
2.) Deriving the state transition diagram from the schematic below.



a.) What type of state machine is this?

This is a Mealy Machine

b.) Write the Boolean equations for the output and the input to the flip-flops

$Y = \overline{Q1} \cdot Q0 \cdot X + Q1 \cdot \overline{Q0} \cdot X + Q1 \cdot Q0 \cdot \bar{X} + \overline{Q1} \cdot \overline{Q0} \cdot \bar{X}$

$J1 = Q0 + X \qquad K1 = Q0 \cdot X + \overline{Q0} \cdot \bar{X}$

$J0 = Q1 + \bar{X} \qquad K0 = Q1 + \bar{X}$

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c.) Create next state and output tables.

Q(t)	Q(t+1)	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

Current State			Input	Next State			Outputs	Flip Flop Inputs			
State Name	Q1	Q0	X	State Name	Q1(t+1)	Q0(t+1)	Y	J1	K1	J0	K0
A	0	0	0	C	1	0	1	1	X	0	X
A	0	0	1	C	1	0	0	1	X	0	X
B	0	1	0	A	0	0	0	0	X	X	0
B	0	1	1	C	1	0	1	1	X	X	0
C	1	0	0	B	0	1	0	X	1	1	X
C	1	0	1	B	0	1	1	X	1	1	X
D	1	1	0	C	1	0	1	X	0	X	0
D	1	1	1	A	0	0	0	X	1	X	0

d.) Draw the state transition diagram.