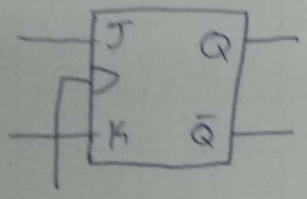
7-3-19

J-K flip flop synthesis of FSM :-

J-K flip flop :-



J	K	Q	Q^+
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

$$Q^+ = J\bar{Q} + \bar{K}Q$$

Q	Q^+	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

→ table represents what value J and K should take, for a given present and next state

J_Q

Q \ Q^+	0	1
0	0	1
1	X	X

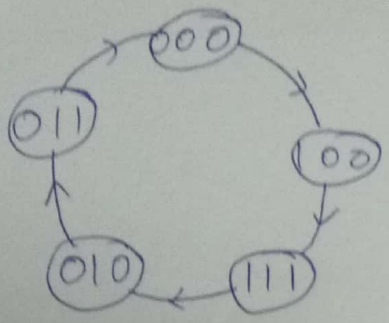
$J_Q = Q^+$

K_Q

Q \ Q^+	0	1
0	X	X
1	1	0

$K_Q = \overline{Q^+}$

State machine:



A	B	C	A^+	B^+	C^+	J_A	K_A	J_B	K_B	J_C	K_C
0	0	0	1	0	0	1	X	0	X	0	X
0	0	1	X	X	X	X	X	X	X	X	X
0	1	0	0	1	1	0	X	X	0	1	X
0	1	1	0	0	0	0	X	X	1	X	1
1	0	0	1	1	1	X	0	1	X	1	X
1	0	1	X	X	X	X	X	X	X	X	X
1	1	0	X	X	X	X	X	X	X	X	X
1	1	1	0	1	0	X	1	X	0	X	1

A^+ $J_A = B'$

BC \ A	0	1
00	1	1
01	X	X
11	0	0
10	0	X

$A^+ = \bar{B}$

J_A

BC \ A	0	1
00	1	X
01	X	X
11	0	X
10	0	X

$J_A = \bar{B}$

K_A

BC \ A	0	1
00	X	0
01	X	X
11	X	1
10	X	X

$K_A = C$

It can be observed that for Q=0 K is don't care and for Q=1 J is Don't care.

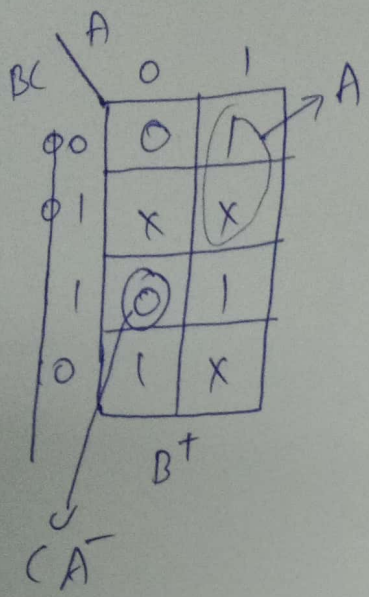
so to determine J_A → remove A, look at A=0 sub k map of A^+; Derive J_A

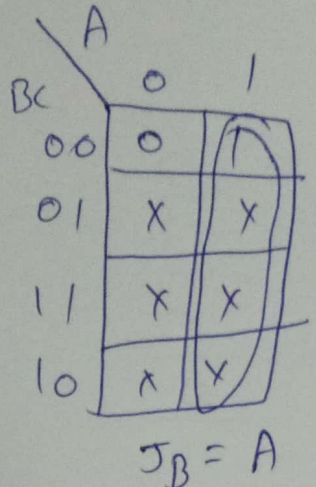
K_A → remove A, look at A=1 sub k-map of A^+, read 0's to get K_A

A^+ $J_A = B'$

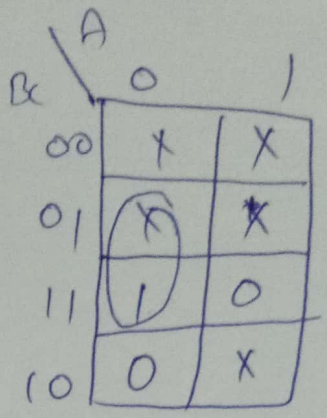
BC \ A	0	1
00	1	1
01	X	X
11	0	0
10	0	X

→ $K_A = C$

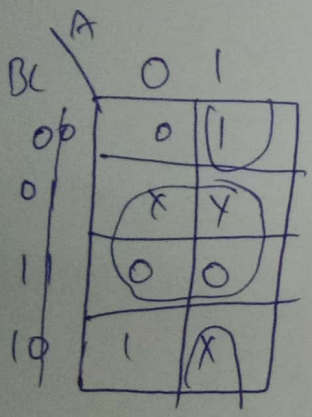




$J_B = A$



$K_B = \bar{A}C$



$K_C = 1$

$J_C = B + A$