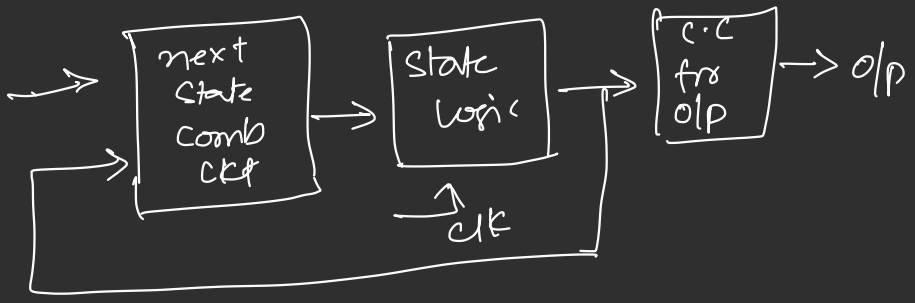
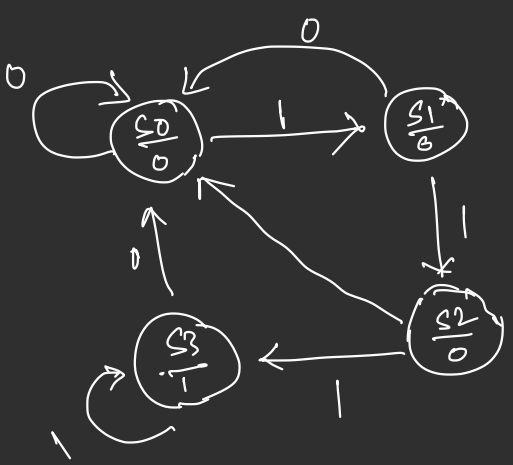
Design a sequence detector which detects three consecutive 1's using moore model:-

moore model:-



step 1: obtain state diagram



step 2: assign binary values to all states

$S_0 = 00$

$S_1 = 01$

$S_2 = 10$

$S_3 = 11$

Step3: obtain state table

P.S	N.S (x=0)	N.S (x=1)	o/p (x=0)	o/p (x=1)
Q_1 Q_0	Q_1Q_0	Q_1Q_0		
0 0 (S_0)	0 0 (S_0)	0 1 (S_1)	0	0
0 1 (S_1)	0 0 (S_0)	1 0 (S_2)	0	0
1 0 (S_2)	0 0 (S_0)	1 1 (S_3)	0	0
1 1 (S_3)	0 0 (S_0)	1 1 (S_3)	1	1

Step 4:- Choose F/F : J-K flip flop

Step5:- Excitation table

P.S	N.S	FF		o/p(y)
x Q_1 Q_0	Q_1Q_0	J_1K_1	J_0K_0	
0 0 0	0 0	0 X	0 X	0
0 0 1	0 0	0 X	X 1	0
0 1 0	0 0	X 1	0 X	0
0 1 1	0 0	X 1	X 1	1
1 0 0	0 1	0 X	1 X	0
1 0 1	1 0	1 X	X 1	0
1 1 0	1 1	X 0	1 X	0
1 1 1	1 1	X 0	X 0	1

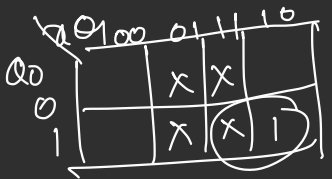
Excitation table

T.T J-K Flip flop

J K	Q_n	Q_{n+1}	J K
0 0	0	0	Q_n Q_{n+1} J K
0 0	1	1	0 0 0 X
0 1	0	0	0 1 1 X
0 1	1	0	1 0 X 1
1 0	0	1	1 1 X 0
1 0	1	1	
1 1	0	1	
1 1	1	0	

Step 6: obtain FF i/p fn & o/p function

$J_1 = \Sigma m(5) + \Sigma d(2,3,6,7)$



$K_1 = \Sigma m(2,3) + \Sigma d(0,1,4,5)$

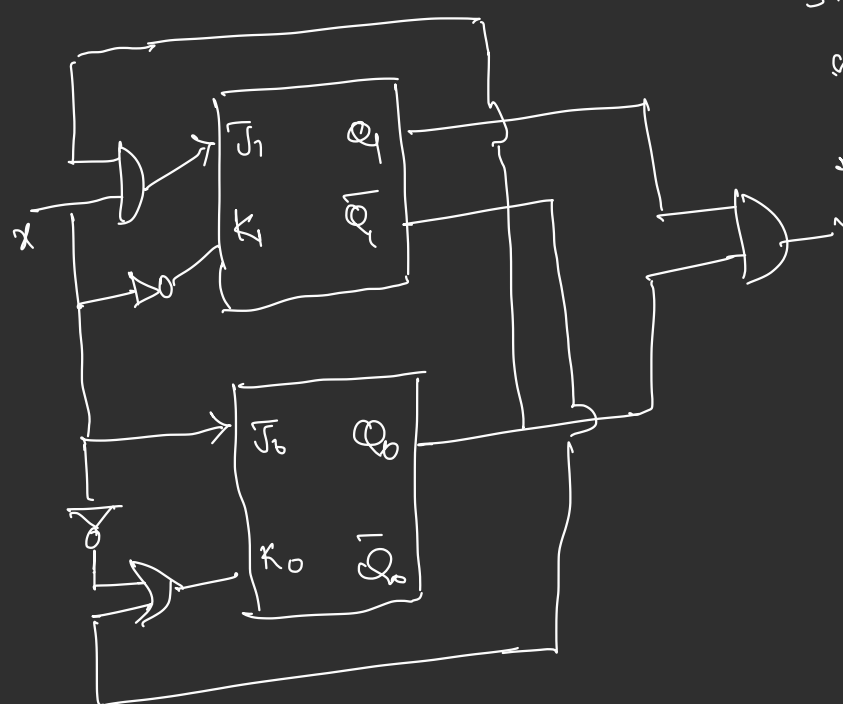
$K_1 = \bar{x}$

$J_1 = x Q_0$

Ily $J_0 = x$, $K_0 = \bar{x} + \bar{Q}_1 = \overline{x Q_1}$

$y = \bar{x} Q_1 Q_0 + x Q_1 Q_0 = Q_1 Q_0$

Step 7: logic diagram



step 8:
write verilog code for JK FF then instantiate it in our design