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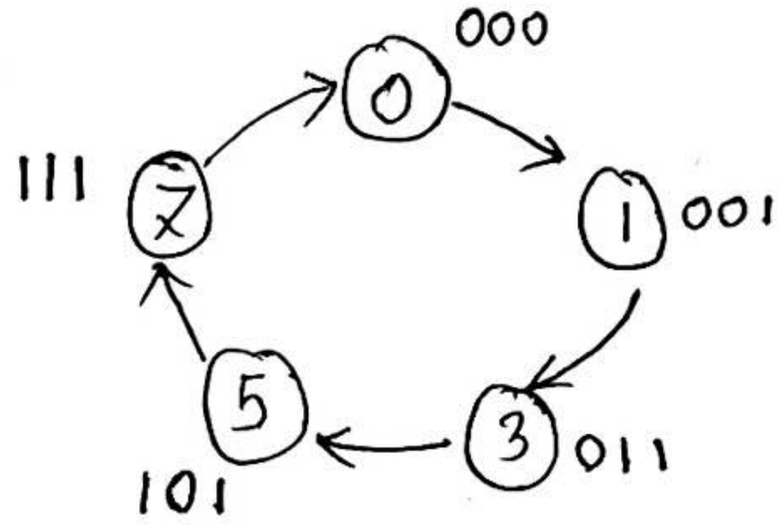
Counter with irregular count sequence: (0, 1, 3, 5, 7)

→ Using JK flip flop to design a counter with count sequence.

Step 1:



∴ flip flop required = 3

Step 2:

Next state table:

	Present state			Next state		
	Q_2	Q_1	Q_0	Q_2	Q_1	Q_0
0	0	0	0	0	0	1
1	0	0	1	0	1	1
3	0	1	1	1	0	1
5	1	0	1	1	1	1
7	1	1	1	0	0	0

J_2 k_2	J_1 K_1	J_0 k_0
0 X	0 X	1 X
0 X	1 X	X 0
1 X	X 1	X 0
X 0	1 X	X 0
X 1	X 1	X 1

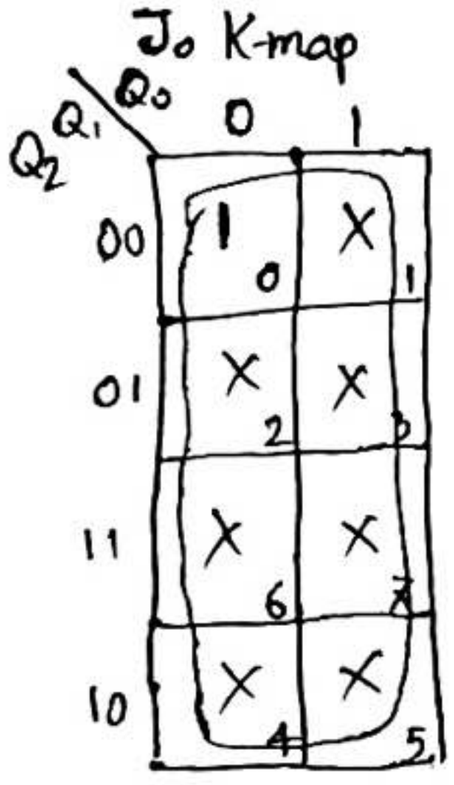
All other state's are dont care.

Step 3: transition table for J-K flip flop

Q_N	Q_{N+1}	Flip Flop Inputs J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

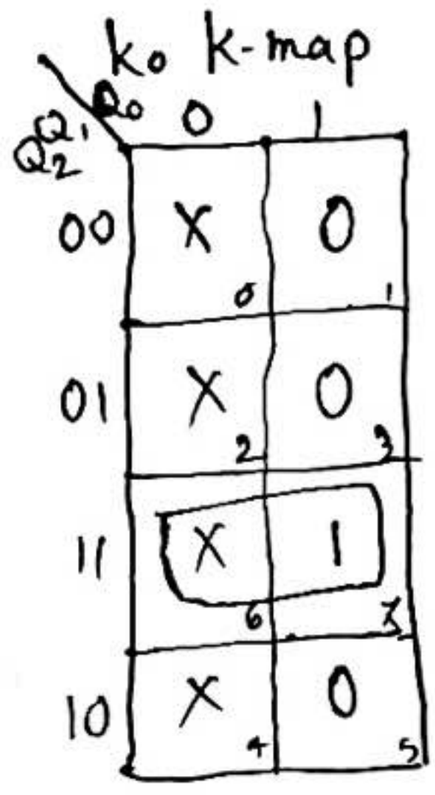
Step 4: K-map for $J_0, J_1, J_2, K_0, K_1, K_2$

J_0 K-map



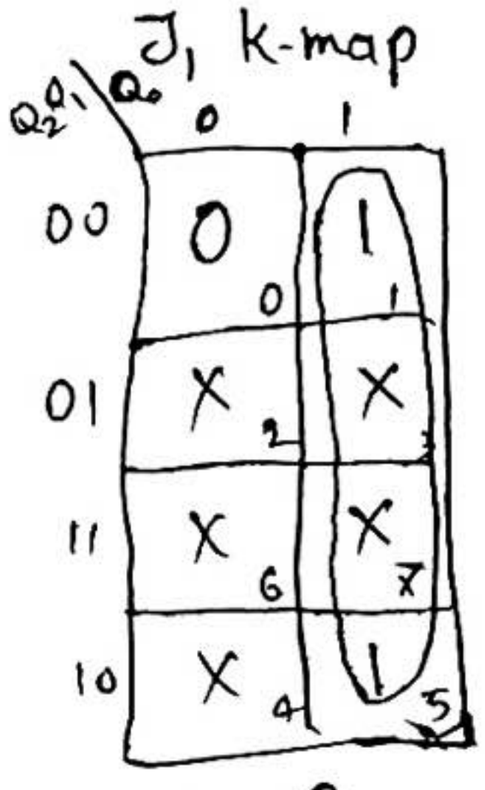
$\therefore J_0 = 1$

k_0 k-map



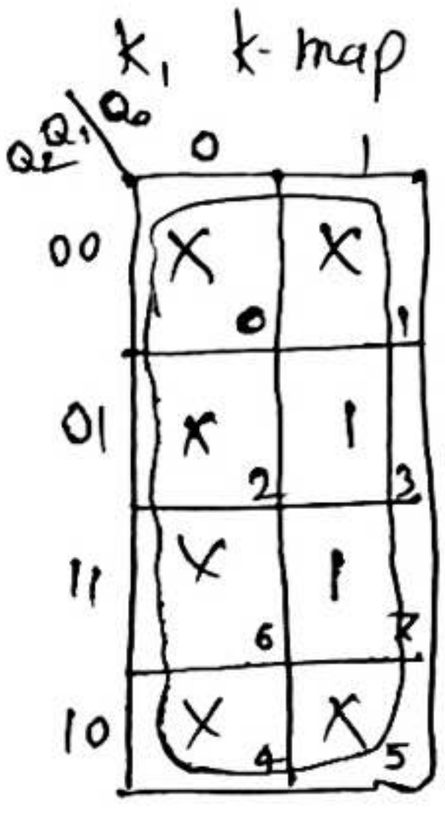
$\therefore k_0 = Q_1 Q_2$

J_1 k-map



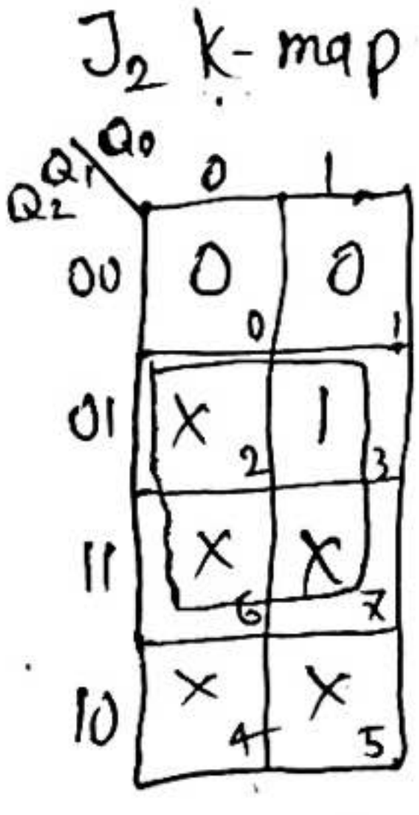
$J_1 = Q_0$

k_1 k-map



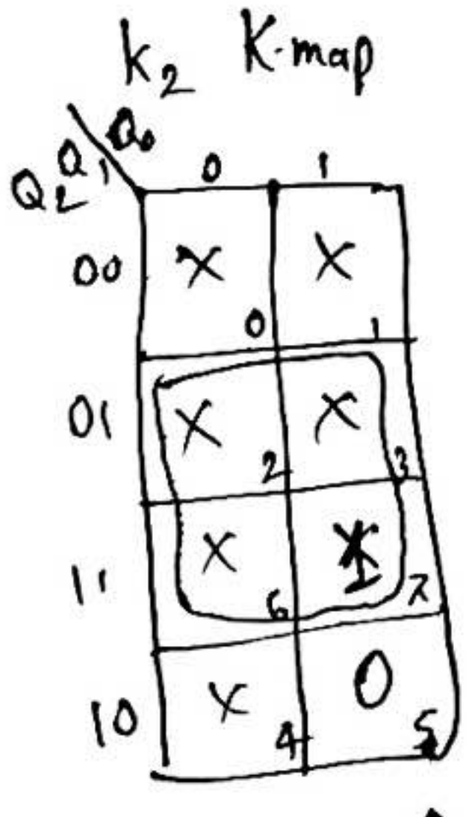
$K_1 = 1$

J_2 k-map

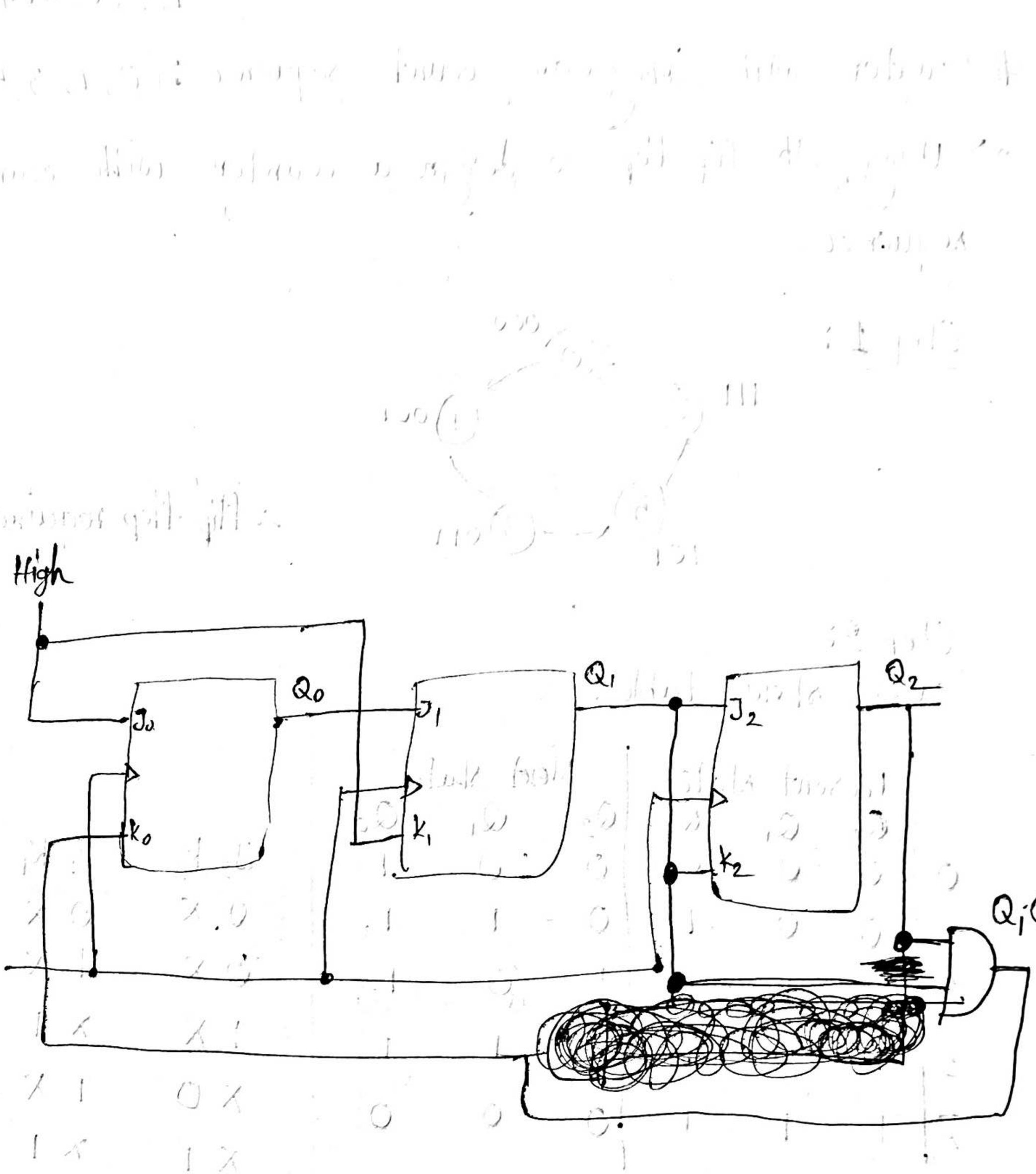


$\therefore J_2 = Q_1$

k_2 K-map



$\therefore k_2 = Q_1$


High
J_0
K_0
Q_0
J_1
K_1
Q_1
J_2
K_2
Q_2
Q_1Q_2
clk