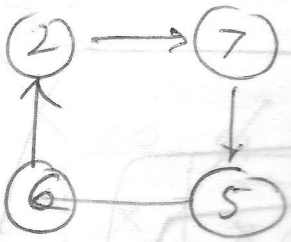
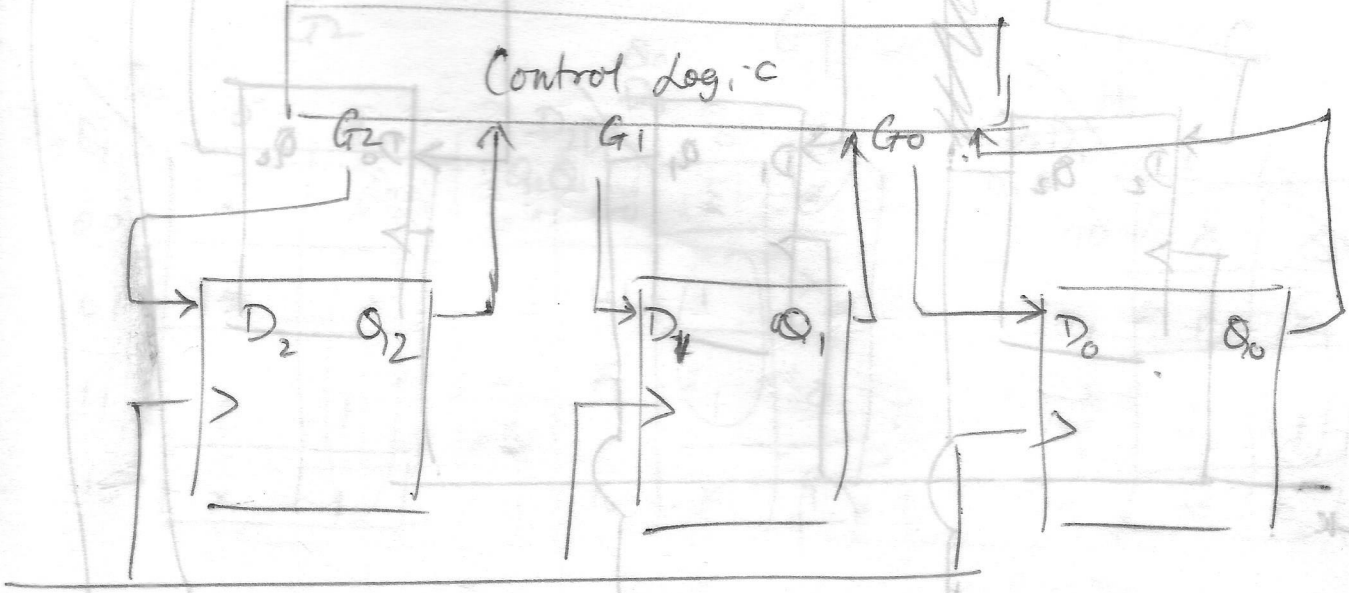
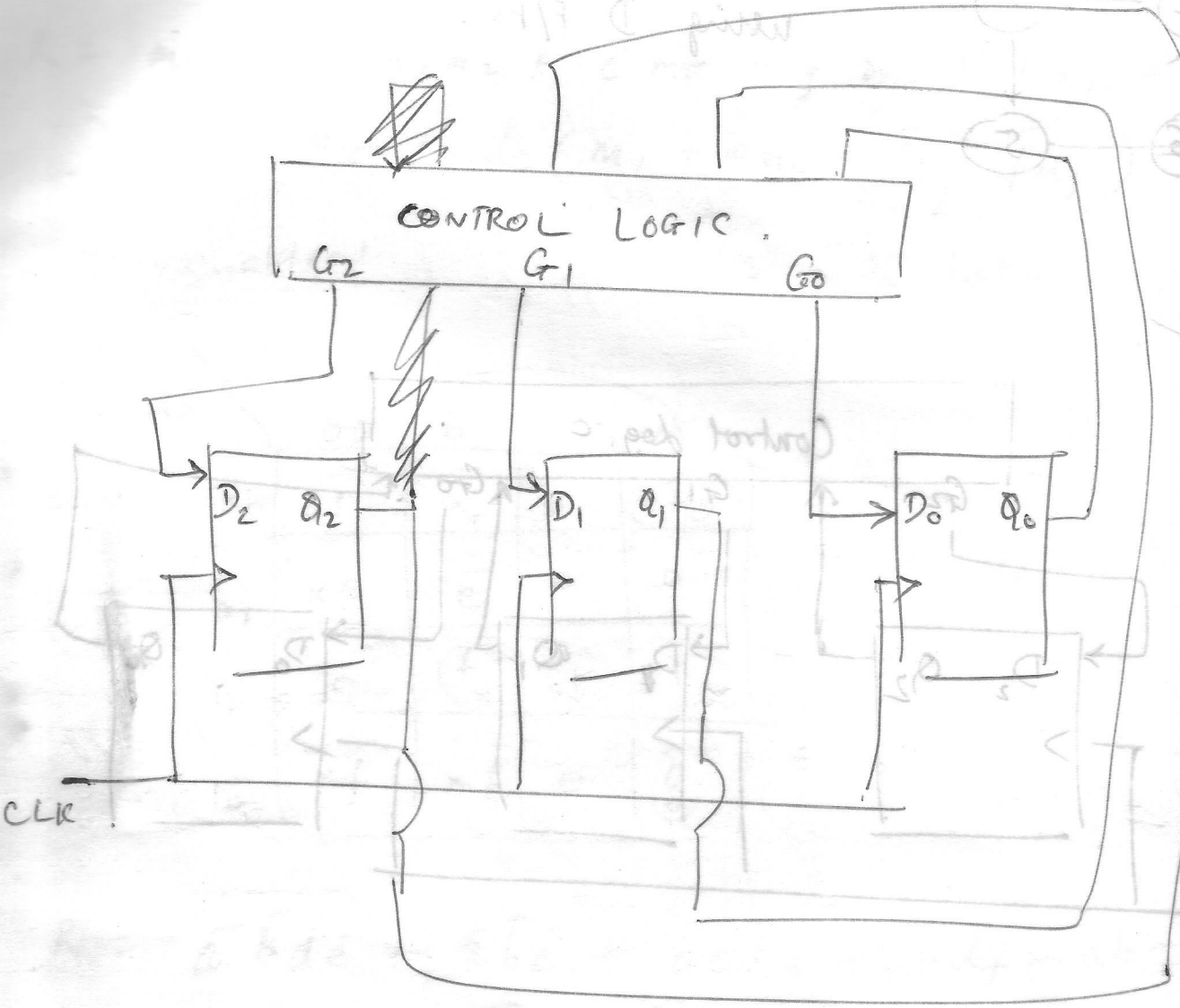
Sequence Generator using D F/Fs.



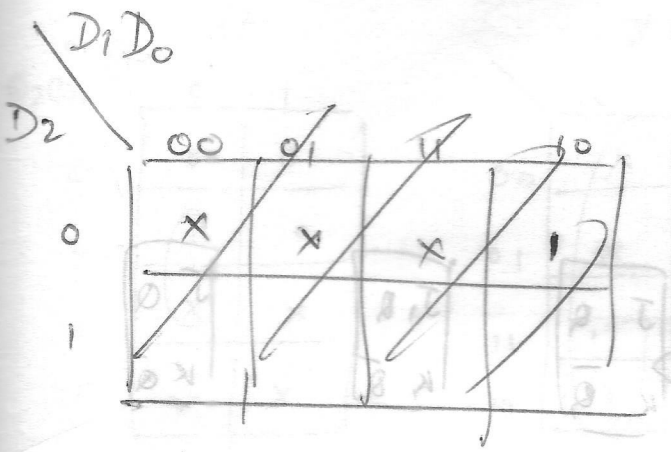
eg 2

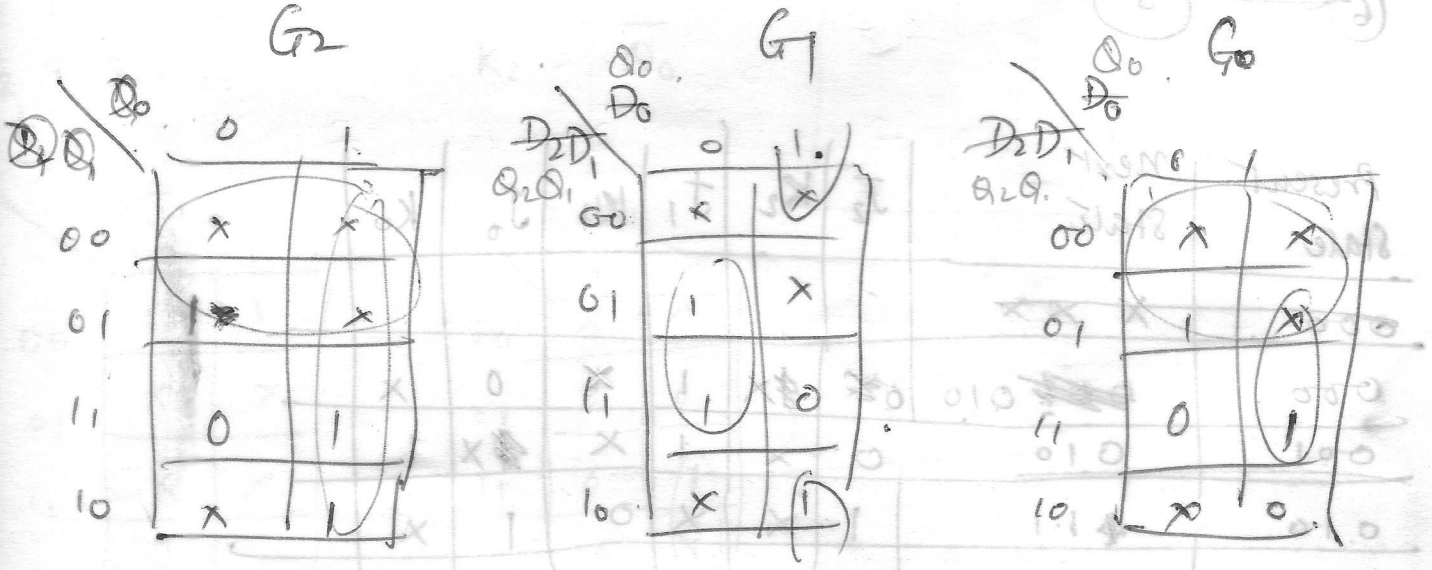


x	x	x	0	0	0
x	x	x	1	0	0
1	1	1	0	1	0
x	x	x	1	1	0
x	x	x	0	0	1
0	*	*	1	0	1
0	*	0	0	1	1
*	0	1	1	1	1



D_2	D_1	D_0	G_2	G_1	G_0
0	0	0	x	x	x
0	0	1	x	x	x
0	1	0	1	1	1
0	1	1	x	x	x
1	0	0	x	x	x
1	0	1	*	*	0
1	1	0	0	0	0
1	1	1	1	0	0

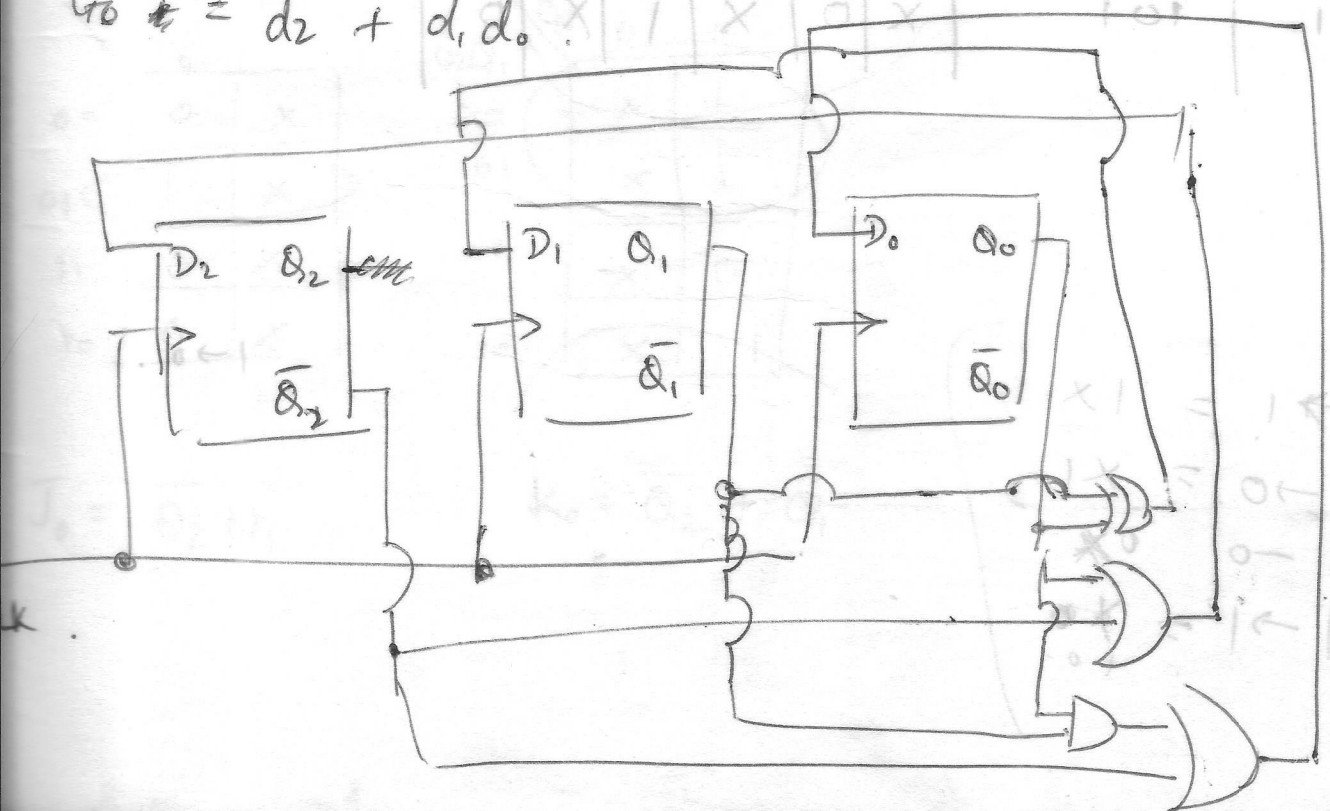




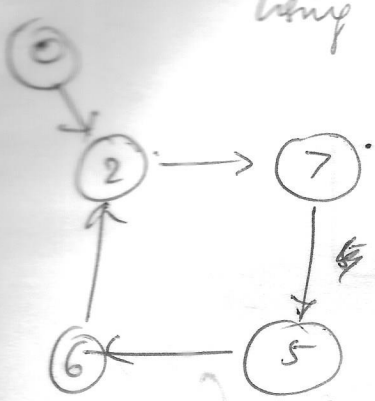
$G_2 = \overline{d_2} d_0 + d_2 \overline{d_0}$

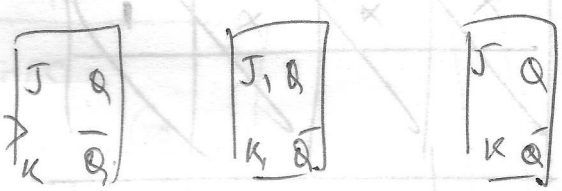
$G_1 = d_0 \overline{d_1} + d_1 \overline{d_0}$

$G_0 = \overline{d_2} + d_1 d_0$



Sequence Generator using JK F/F





Present State	Next State	J_2	K_2	J_1	K_1	J_0	K_0
~~000~~	X X X						
000	~~000~~ 010	0	X	1	X	0	X
001	010	0	X	1	X	X	1
010	111	1	X	X	0	1	X
011	~~100~~ 010	0	X	X	0	X	1
100	~~101~~ 010	X	1	0	X	0	X
101	110	X	0	1	X	X	1
110	010	X	1	X	0	0	X
111	101	X	0	X	1	X	0

$0 \to 1 = 1X$

$1 \to 0 = X1$

$0 \to 0 = 0X$

$1 \to 1 = X0$

$1 \to 0$

J_2

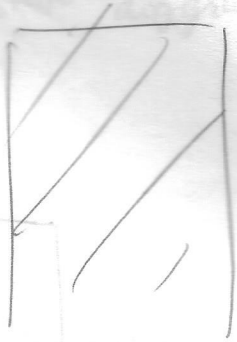
Q_2Q_1 \ Q_0	0	1
00	0	0
01	1	0
11	x	x
10	x	x

$J_2 = Q_1 \cdot \overline{Q_0}$

K_2

Q_2Q_1 \ Q_0	0	1
00	x	x
01	x	x
11	1	0
10	1	0

$K_2 = \overline{Q_0}$



J_1

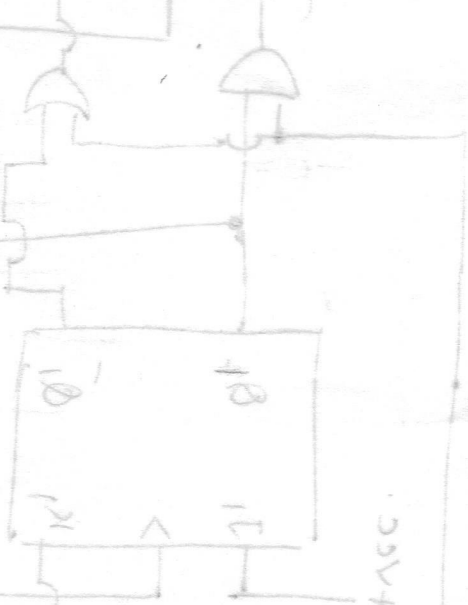
Q_2Q_1 \ Q_0	0	1
00	1	1
01	x	x
11	x	x
10	1	1

$J_1 = 1.$

K_1

Q_2Q_1 \ Q_0	0	1
00	x	x
01	0	0
11	0	1
10	x	x

$K_1 = Q_2 \cdot Q_0$



J_0

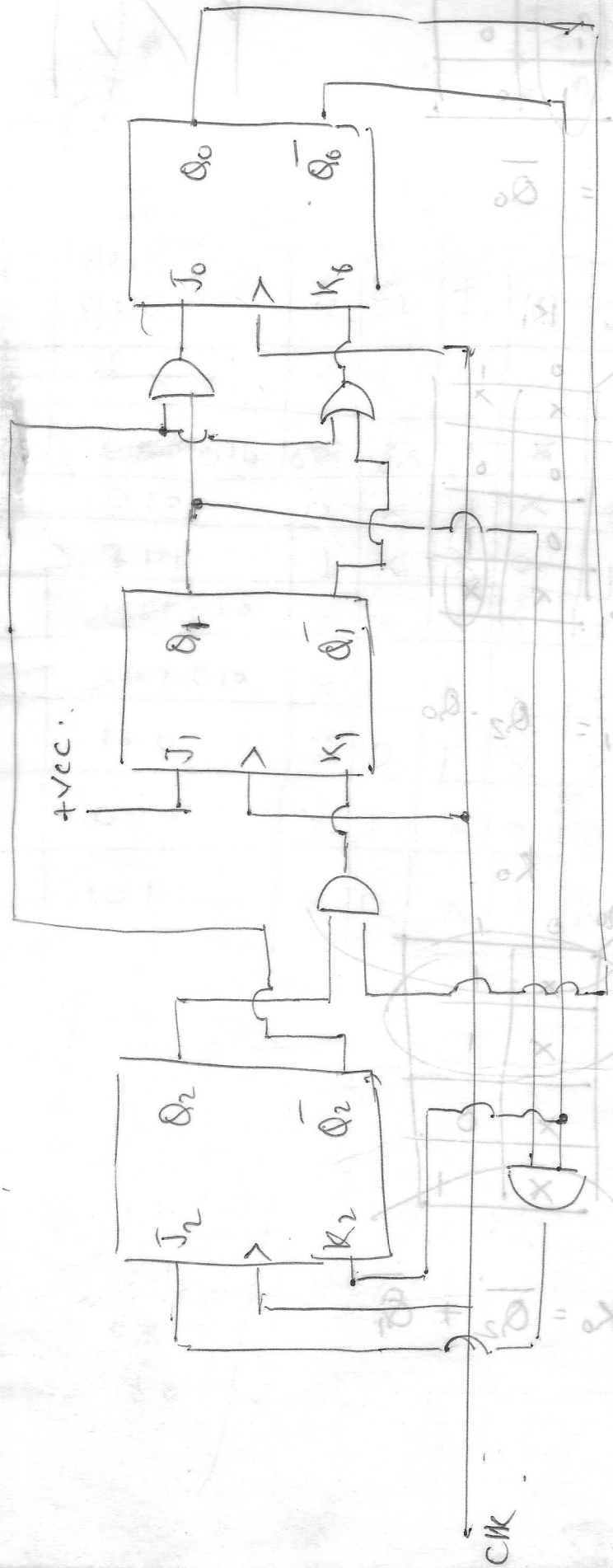
Q_2Q_1 \ Q_0	0	1
00	0	x
01	1	x
11	0	x
10	0	x

$J_0 = \overline{Q_2}\, Q_1$

K_0

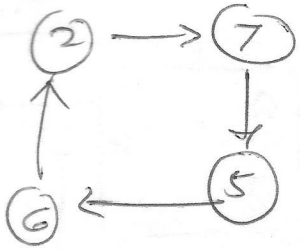
Q_2Q_1 \ Q_0	0	1
00	x	1
01	x	1
11	x	0
10	x	1

$K_0 = \overline{Q_2} + \overline{Q_1}$


Q_0
$\overline{Q_0}$
J_0
K_0
Q_1
$\overline{Q_1}$
J_1
K_1
+Vcc
Q_2
$\overline{Q_2}$
J_2
K_2
CLK

Illegal state Analysis of Non sequential counters (state diagram).

eg 1

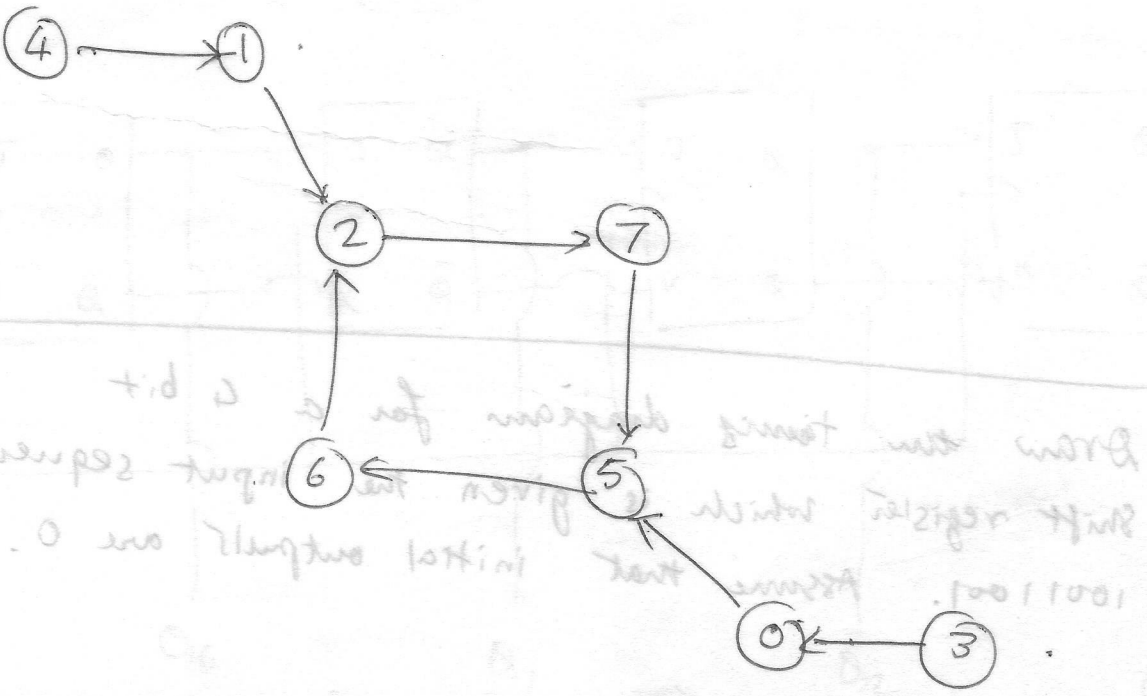


$G_2 = Q_0\bar{}$

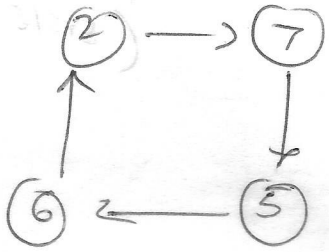
$G_1 = Q_0$

$G_0 = \bar{Q_2} + \bar{Q_1}$

Present state						Next state		
Q_2	Q_1	Q_0	G_2	G_1	G_0	Q_2	Q_1	Q_0
0	0	0	1	0	1	1	0	1
0	0	1	0	1	1	0	1	0
0	1	0	1	0	1	1	1	1
0	1	1	0	1	1	0	0	0
1	0	0	1	0	1	0	0	1
1	0	1	0	1	1	1	1	0
1	1	0	1	0	0	0	1	0
1	1	1	0	1	0	1	0	1



eg2



$G_2 = \bar{d}_2$

Draw the timing diagram for a 4 bit shift register which is given the input sequence 10011001. Assume that initial outputs are 0.