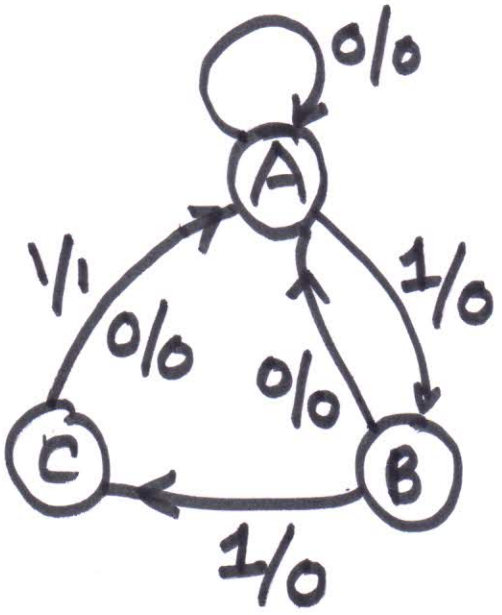
2. A Mealy system with one input x and one output z such that z=1 iff x has been 1 for three consecutive clocks, but inputs are nonoverlapping.

x: 0 1 0 1 1 1 1 1 0 0 1 1 1 0 1

z: 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0



A: no 1's

B: only one 1

C: Two no. of 1's ~~one~~ more

State Transition table

Present States	Next states x=0	Next states x=1	output(z) x=0	output(z) x=1
A	A	B	0	0
B	A	C	0	0
C	A	A	0	1

q_1 q_0

A → 0 0

B → 0 1

C → 1 1

Present states		I/p	Next States		I/p to D-FF		O/p
q_1	q_0	x	q_1^+	q_0^+	d_1	d_0	(z)
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	0
0	1	0	0	0	0	0	0
0	1	1	1	1	1	1	0
1	0	0	x	x	x	x	0
1	0	1	x	x	x	x	0
1	1	0	0	0	0	0	0
1	1	1	0	0	0	0	1

$d_1 =$

q_1q_0 \ x	0	1
00		
01		1
11		
10	x	x

$d_1 = \bar{q}_1 q_0 x$

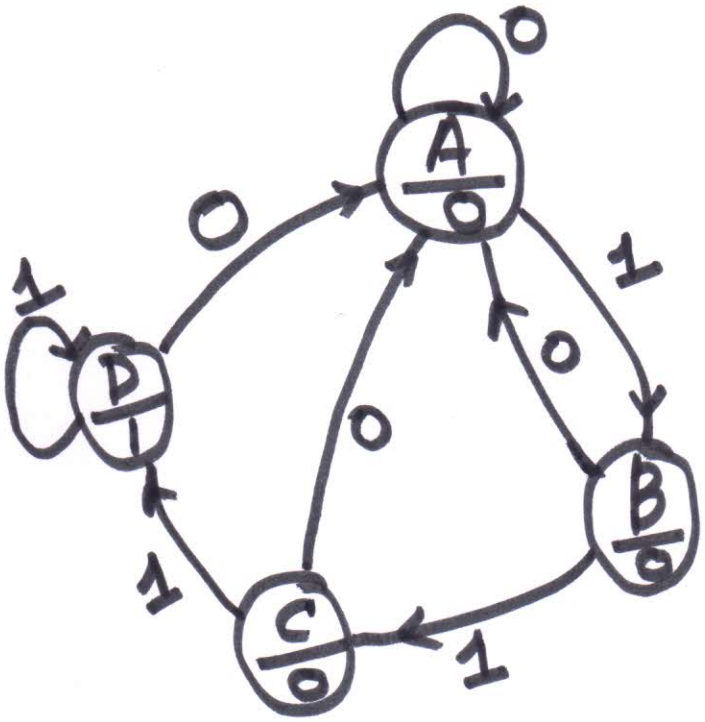
$d_0 =$

q_1q_0 \ x	0	1
00		1
01		1
11		
10	x	x

$d_0 = \bar{q}_1 x$

$z = q_1 q_0 x$

3. Design a Moore system with an output of 1 iff the input has been 1 for at least three consecutive clocks.



A : no 1's

B : One 1

C : Two 1's

D : Three or more 1's

	q_1 q_0
A :	0 0
B :	0 1
C :	1 0
D :	1 1

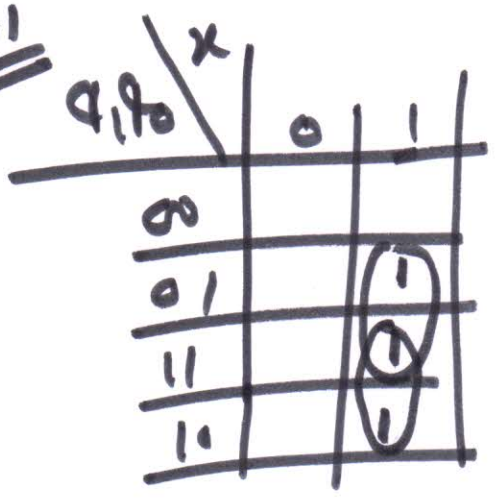
State Transition table

Present States	Next States		output(z)
	x=0	x=1	
A	A	B	0
B	A	C	0
C	A	D	0
D	A	D	1

TT

Present States q_1 q_0	I/p x	Next states q_1^+ q_0^+	I/p to D-FF d_1 d_0	output (z)
0 0	0	0 0	0 0	0
0 0	1	0 1	0 1	0
0 1	0	0 0	0 0	0
0 1	1	1 0	1 0	0
1 0	0	0 0	0 0	0
1 0	1	1 1	1 1	0
1 1	0	0 0	0 0	1
1 1	1	1 1	1 1	1

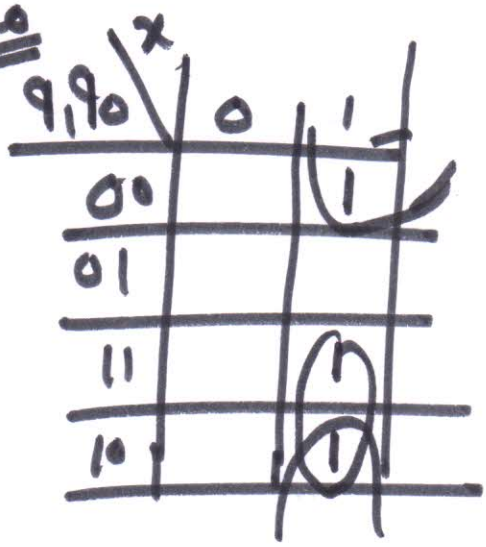
d_1



$d_1 = q_0x + q_1x$

$= (q_0 + q_1)x$

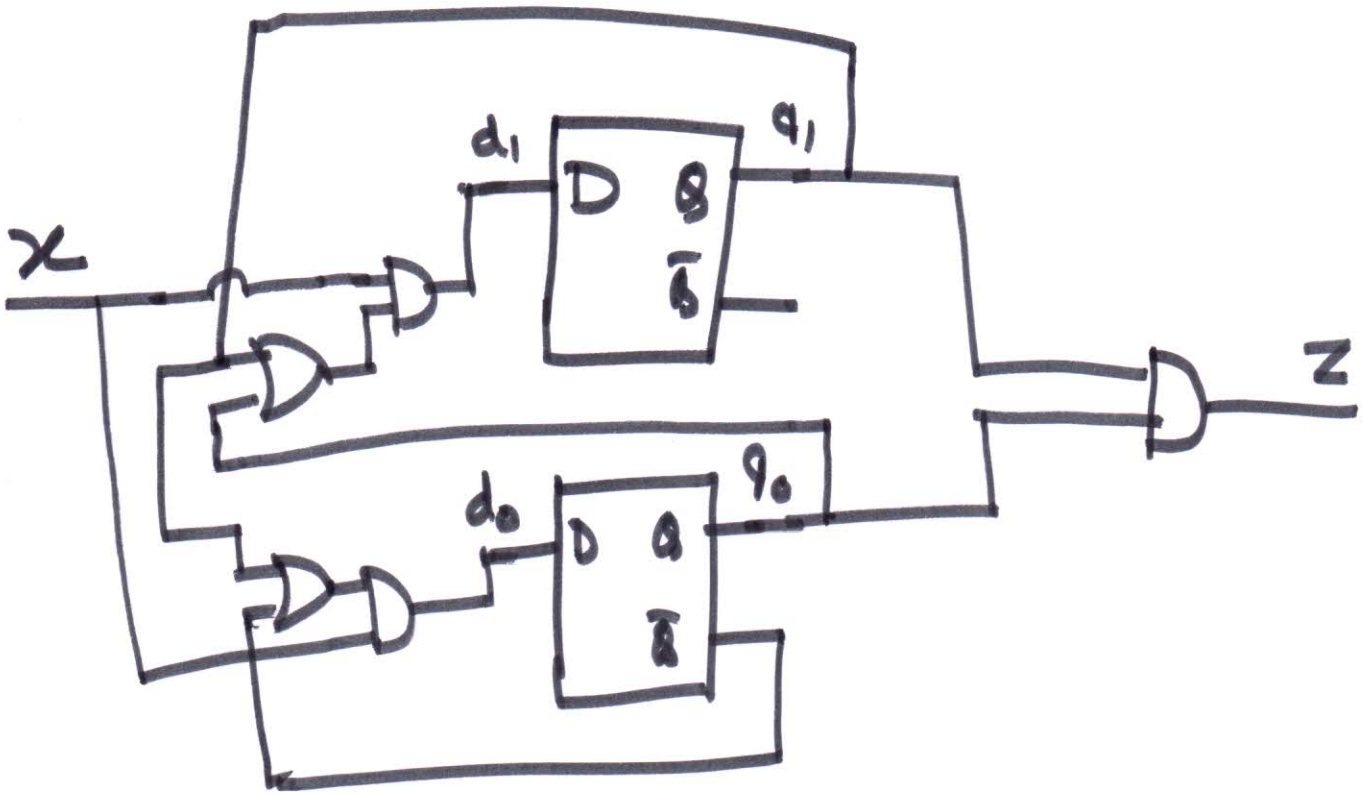
d_0



$d_0 = q_1x + \bar{q}_0x$

$= (q_1 + \bar{q}_0)x$

$z = q_1q_0$



x: 0 1 0 0 1 1 1 0 0 0 0

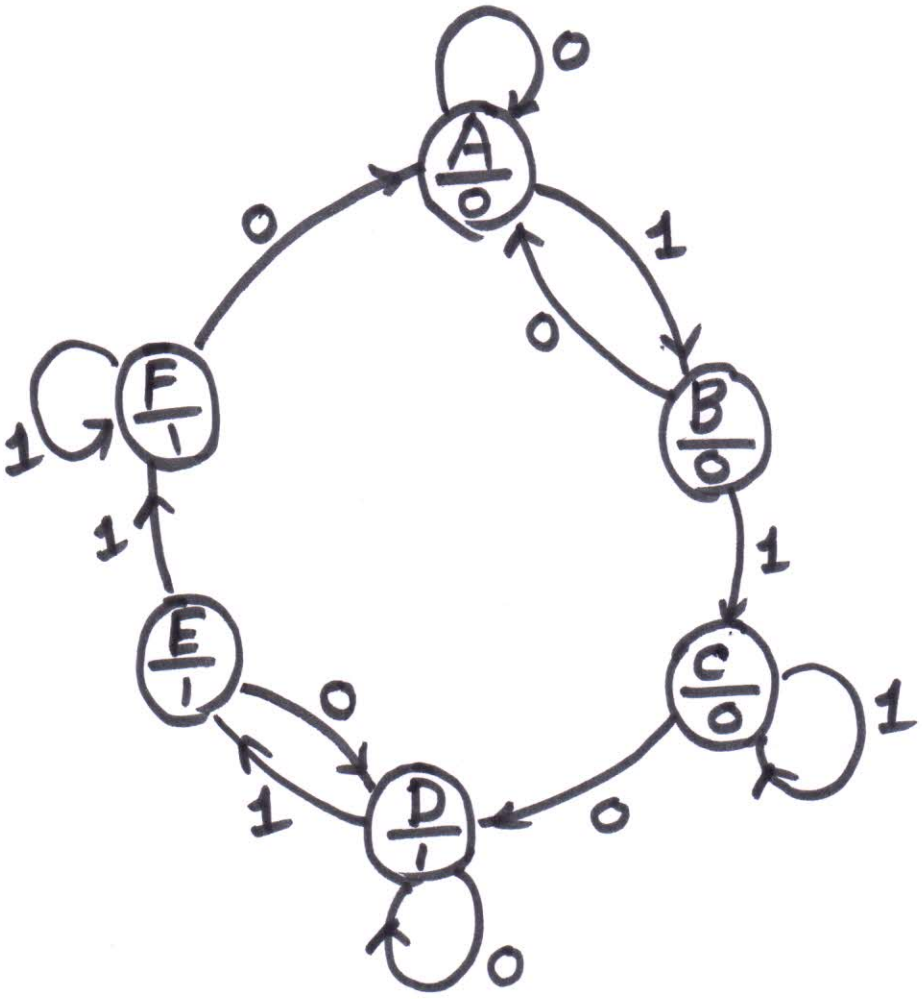
z: 0 0 0 0 0 0 0 1 1 0 0 0

4. Design a Moore system whose output changes whenever it detects a sequence 110. (Assume that initially the output is 0.)

Ex

x: 0 1 1 0 0 0 1 0 1 1 0 0 1 0

z: 0 0 0 0 1 1 1 1 1 1 1 0 0 0



A: Initial state with output 0.