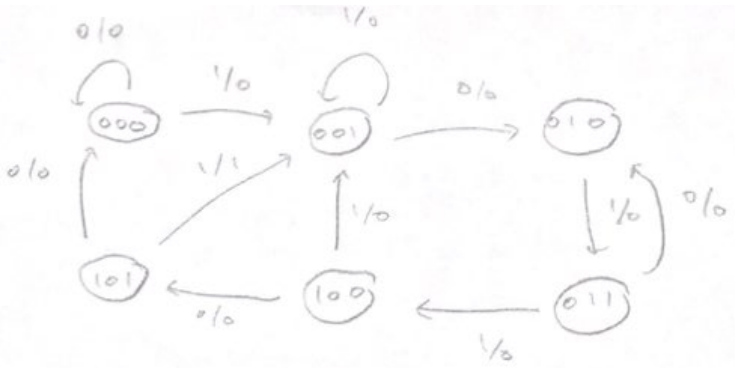
101101 Bit Detector



$Q_2 Q_1 Q_0$	$Q_{2n} Q_{1n} Q_{0n}$ I = 0	I = 1	Output I=0	I=1
0 0 0	0 0 0	0 0 1	0	0
0 0 1	0 1 0	0 0 1	0	0
0 1 0	0 0 0	0 1 1	0	0
0 1 1	0 1 0	1 0 0	0	0
1 0 0	1 0 1	0 0 1	0	0
1 0 1	0 0 0	0 0 1	0	1

Output = $I \cdot Q_2 \cdot \bar{Q}_1 \cdot Q_0$

D_2

$Q_2 Q_1$ \ $Q_0 I$	00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	X	X	X	X
10	1	0	0	0

$D_2 = Q_2 \bar{Q}_0 \bar{I} + Q_1 Q_0 I$

D_1

$Q_2 Q_1$ \ $Q_0 I$	00	01	11	10
00	0	0	0	1
01	0	1	0	1
11	X	X	X	X
10	0	0	0	0

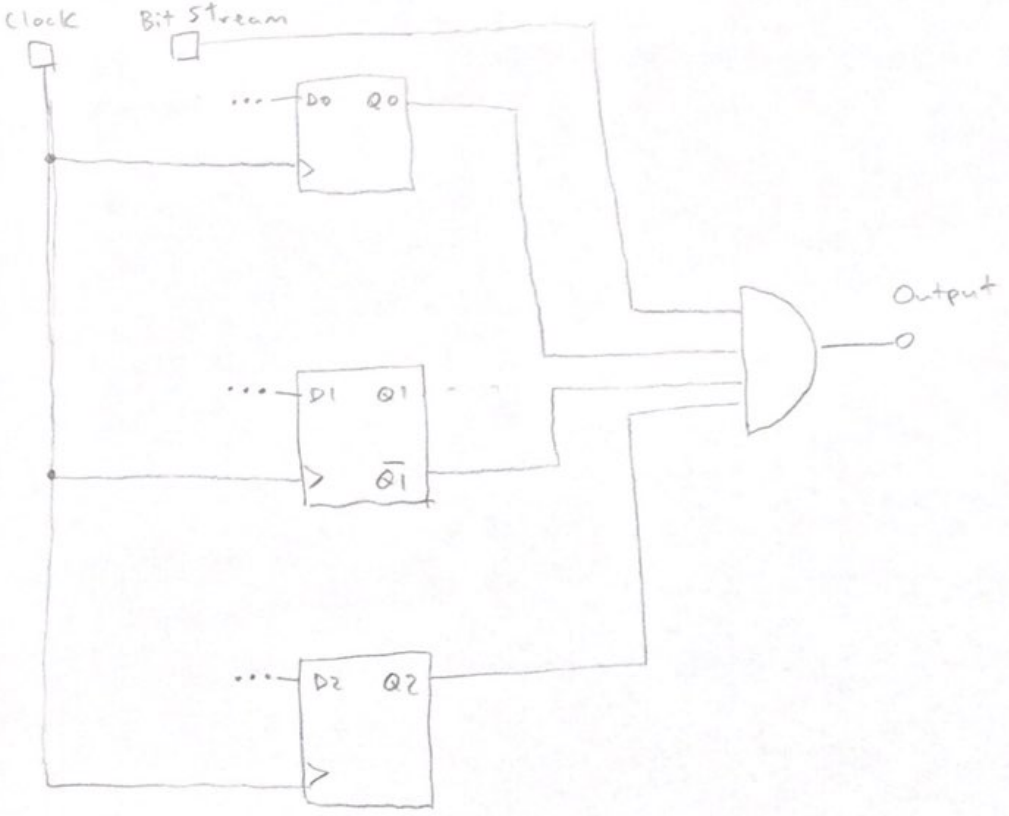
$D_1 = Q_1 \bar{Q}_0 I + \bar{Q}_2 Q_0 \bar{I}$

D_0

$Q_2 Q_1$ \ $Q_0 I$	00	01	11	10
00	0	1	1	0
01	0	1	0	0
11	X	X	X	X
10	1	1	1	0

$D_0 = Q_2 \bar{Q}_0 + \bar{Q}_0 I + \bar{Q}_2 \bar{Q}_1 I + Q_2 \bar{I}$

Design Diagram



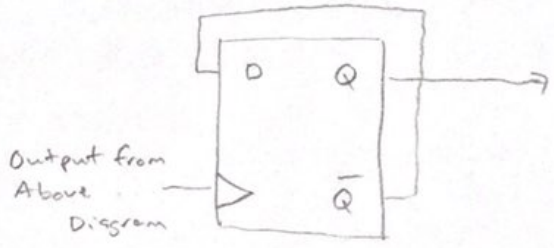
(Logic for D0, D1, D2 on prev. page)

Bit String Modification

- Have output serve as the clock signal for another flip-flop that, whenever it is clocked, will switch its value. So whenever 101101 is detected, it will switch from a 1 to a 0 or vice versa.

Q	Q_n	D
0	1	1
1	0	0

$D = \bar{Q}$



This bit will be read at every clock signal to the above diagram so the output will be 000000111111...