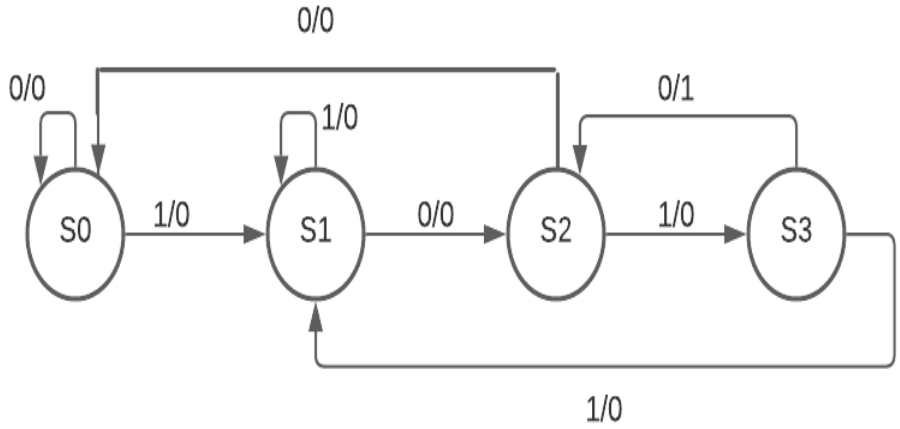
1010 Sequence Detector

State Diagram:



Transition and Output Table:

Current State	Input	Next State	Output
S0	0	S0	0
S0	1	S1	0
S1	0	S2	0
S1	1	S1	0
S2	0	S0	0
S2	1	S3	0
S3	0	S2	1
S3	1	S1	0

Assign the states as:

S0 = 1'b 00

S1 = 1'b 01

S2 = 1'b 10

S3 = 1'b 11

The above table changes as:

Current State	Input	Next State	Output
00	0	00	0
00	1	01	0
01	0	10	0
01	1	01	0
10	0	00	0
10	1	11	0
11	0	10	1
11	1	01	0

Excitation Table:

Current State		Input	Next State		D F/F Inputs		Output
A	B	In	A*	B*	D1	D2	Out
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	0
0	1	0	1	0	1	0	0
0	1	1	0	1	0	1	0
1	0	0	0	0	0	0	0
1	0	1	1	1	1	1	0
1	1	0	1	0	1	0	1
1	1	1	0	1	0	1	0

K Map:

A \ B X	00	01	11	10
0	0	0	0	1
1	0	1	0	1

$D1 = A\overline{B}X + B\overline{X}$

A \ B X	00	01	11	10
0	0	1	1	0
1	0	1	1	0

]

D2 = In

A \ B X	00	01	11	10
0	0	0	0	1
1	0	1	1	1

Out = $AB\overline{Z}$

Circuit Diagram: