2017-11405 방승원

4. 가

Up/Down Counter

State Encoding

S0 : CS = [0, 0, 0] -> OUT = [0, 0, 0]

S1 : CS = [0, 0, 1] -> OUT = [0, 0, 1]

S2 : CS = [0, 1, 0] -> OUT = [0, 1, 0]

S3 : CS = [1, 0, 1] -> OUT = [1, 0, 1]

State Transition Table

CS[2]	CS[1]	CS[0]	IN	NS[2]	NS[1]	NS[0]
0	0	0	0	1	0	1
0	0	0	1	0	0	1
0	0	1	0	0	0	0
0	0	1	1	0	1	0
0	1	0	0	0	0	1
0	1	0	1	1	0	1
1	0	1	0	0	1	0
1	0	1	1	0	0	0

Output Table

NS[2]	NS[1]	NS[0]	OUT[2]	OUT[1]	OUT[0]
0	0	0	0	0	0
0	0	1	0	0	1
0	1	0	0	1	0
1	0	1	1	0	1

NS[2] = CS[1]' CS[0]' IN' + CS[1] IN

CS[2] CS[1] / CS[0] IN	00	01	11	10
00	1	0	X	X
01	0	1	X	X
11	0	X	X	0
10	0	X	X	0

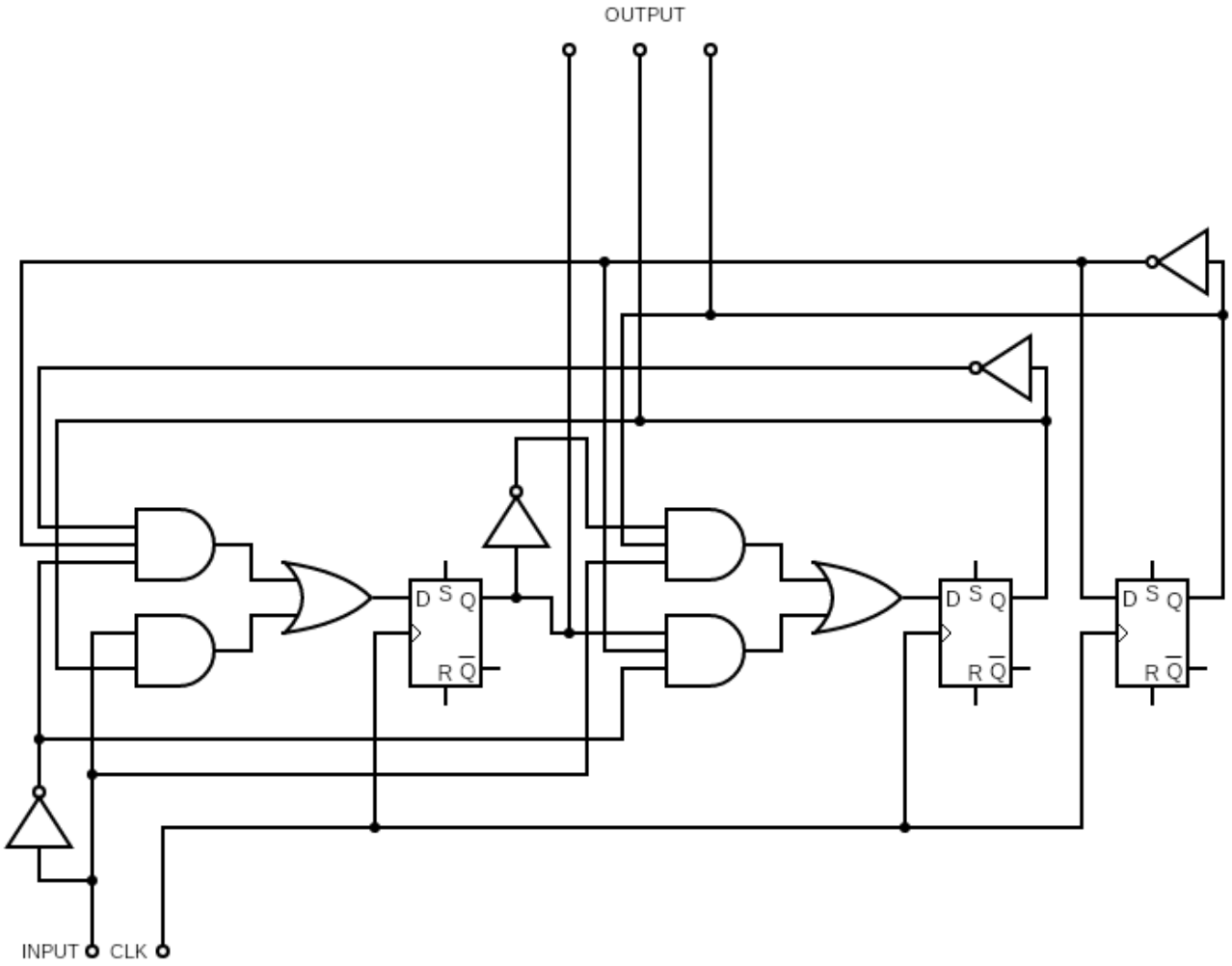
NS[1] = CS[2]' CS[0] IN + CS[2] CS[0] IN'

CS[2] CS[1] / CS[0] IN	00	01	11	10
00	0	0	X	X
01	0	0	X	X
11	1	X	X	0
10	0	X	X	1

NS[0] = CS[0]'

CS[2] CS[1] / CS[0] IN	00	01	11	10
00	1	1	X	X
01	1	1	X	X
11	0	X	X	0
10	0	X	X	0

Schematic Diagram



4. 나

String Pattern Recognizer

State Encoding (Explanation of states)

S0 : CS = [0, 0, 0] -> OUT = [0] (Initial State)

S1 : CS = [0, 0, 1] -> OUT = [0] (When 1 '1' is detected)

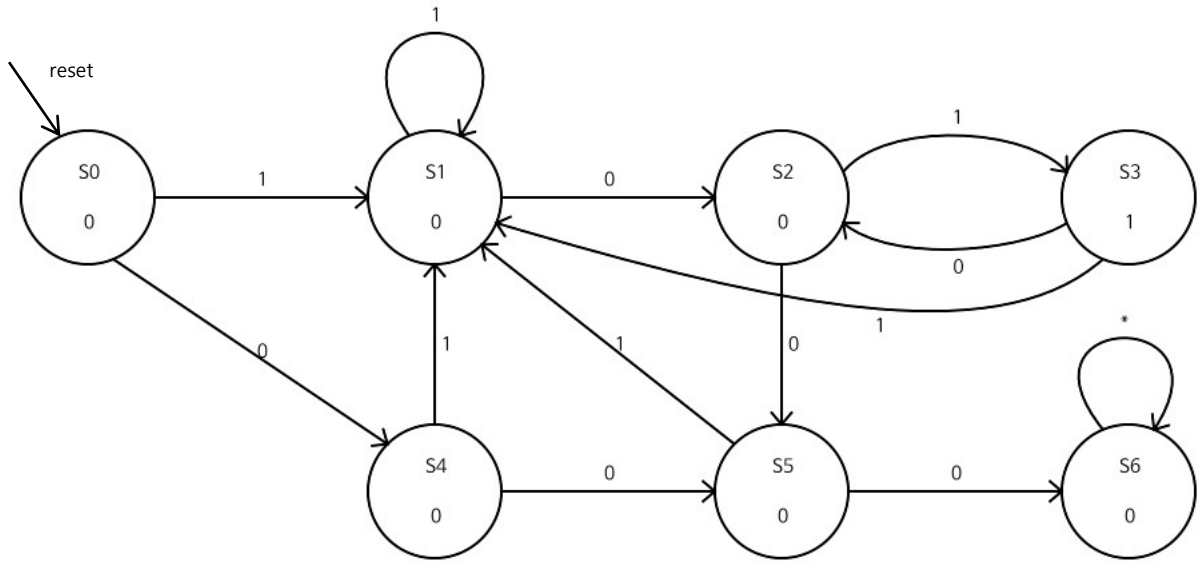
S2 : CS = [0, 1, 0] -> OUT = [0] (When a '10' is detected)

S3 : CS = [0, 1, 1] -> OUT = [1] (When a '101' is detected)

S4 : CS = [1, 0 ,0] -> OUT = [0] (When 1 '0' is detected, but not in '10' sequence)

S5 : CS = [1, 0, 1] -> OUT = [0] (When 2 '0's are detected)

S6 : CS = [1, 1, 0] -> OUT = [0] (When 3 '0's are detected, terminal state)



State Transition Table

CS[2]	CS[1]	CS[0]	IN	NS[2]	NS[1]	NS[0]
0	0	0	0	1	0	0
0	0	0	1	0	0	1
0	0	1	0	0	1	0
0	0	1	1	0	0	1
0	1	0	0	1	0	1
0	1	0	1	0	1	1
0	1	1	0	0	1	0
0	1	1	1	0	0	1
1	0	0	0	1	0	1
1	0	0	1	0	0	1
1	0	1	0	1	1	0
1	0	1	1	0	0	1
1	1	0	0	1	1	0
1	1	0	1	1	1	0

Output Table

CS[2]	CS[1]	CS[0]	OUT
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0

NS[2] = CS[2] CS[1] + CS[0]' IN' + CS[2] IN'

CS[0] IN \ CS[2] CS[1]	00	01	11	10
00	1	1	1	1
01	0	0	1	0
11	0	0	X	0
10	0	0	X	1

NS[1] = CS[0] IN' + CS[2] CS[1] + CS[1] CS[0]' IN

CS[0] IN \ CS[2] CS[1]	00	01	11	10
00	0	0	1	0
01	0	1	1	0
11	0	0	X	0
10	1	1	X	1

NS[0] = IN + CS[1] CS[0]' + CS[2] CS[0]'

CS[0] IN \ CS[2] CS[1]	00	01	11	10
00	0	1	1	1
01	1	1	1	1
11	1	1	X	1
10	0	0	X	0

OUT = CS[1] CS[0]

CS[0] \ CS[2] CS[1]	00	01	11	10
0	0	0	0	0
1	0	1	X	0

Schematic Diagram