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**Problem Set # 6 Solution**

1)

R	S3	S2	S1	N3	N2	N1
1	-	-	-	0	0	0
0	0	0	0	0	0	1
0	0	0	1	0	1	1
0	0	1	1	0	1	0
0	0	1	0	1	1	0
0	1	1	0	1	1	1
0	1	1	1	1	0	1
0	1	0	1	1	0	0
0	1	0	0	0	0	0

		N3			
		00	01	11	10
S1 R	S3S2	0	1	1	0
	00	0	0	0	0
	01	0	0	0	0
	11	0	0	0	0
10	0	0	1	1	

		N1			
		00	01	11	10
S1 R	S3S2	1	0	1	0
	00	0	0	0	0
	01	0	0	0	0
	11	0	0	0	0
10	1	0	1	0	

		N2			
		00	01	11	10
S1 R	S3S2	0	1	1	0
	00	0	0	0	0
	01	0	0	0	0
	11	0	0	0	0
10	1	1	0	0	

The logic for the counter are as follow:

$$N1 = S2'S3'R' + S2S3R'$$

$$N2 = S1S3'R' + S1'S2R'$$

$$N3 = S1'R'S2 + S1S3R'$$

2)

The idea is to fill in the undefined state to match one of the defined states.

S3	S2	S1	N3	N2	N1
0	0	0	0	0	1
0	0	1	0	1	1
0	1	0	1	0	0
0	1	1	1	1	1
1	0	0	0	0	1
1	0	1	0	1	1
1	1	0	1	0	0
1	1	1	1	1	0

The logic are:

$$N1 = S2' + S1S3'$$

$$N2 = S1$$

$$N3 = S2$$

S3S2		N3			
		00	01	11	10
S1	0	0	1	1	0
	1	0	1	1	0

S3S2		N2			
		00	01	11	10
S1	0	0	0	0	0
	1	1	1	1	1

		N1			
		00	01	11	10
	0	0	0	0	0
	1	1	1	1	1

3a)

INPUTS: UP, DOWN, FIRST, SECOND

OUTPUTS: MOVEDOWN, MOVEUP, OPEN, CLOSE

STATES: 000: FIRST FLOOR

001: SECOND FLOOR

b) Assume no buttons can be pressed simultaneously.

