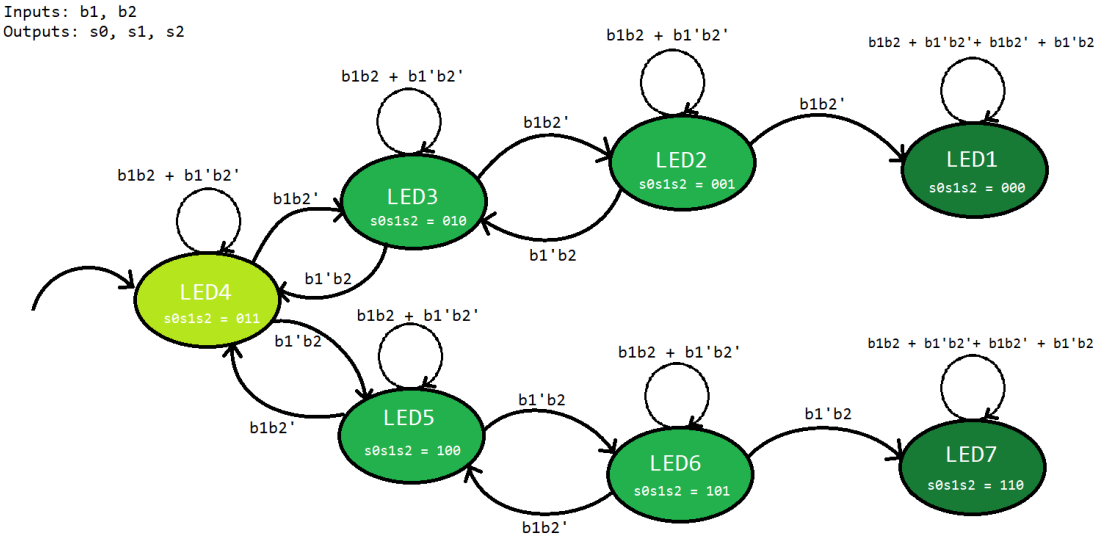
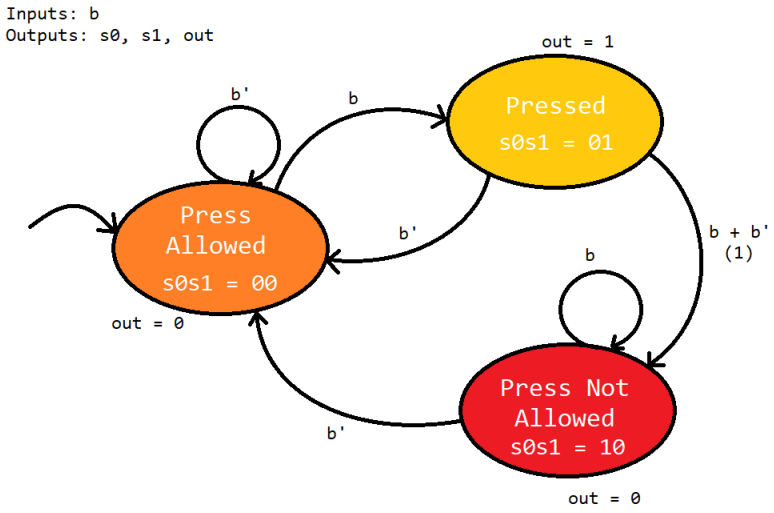
LED GAME

1. State Diagrams

Main FSM:



Button Manager FSM:



2. Truth Tables

Main:

	Inputs					Outputs		
	b1	b2	s0	s1	s2	n0	n1	n2
0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	1
2	0	0	0	1	0	0	1	0
3	0	0	0	1	1	0	1	1
4	0	0	1	0	0	1	0	0
5	0	0	1	0	1	1	0	1
6	0	0	1	1	0	1	1	0
7	0	0	1	1	1	1	1	1
8	0	1	0	0	0	0	0	0
9	0	1	0	0	1	0	1	0
10	0	1	0	1	0	0	1	1
11	0	1	0	1	1	1	0	0
12	0	1	1	0	0	1	0	1
13	0	1	1	0	1	1	1	0
14	0	1	1	1	0	1	1	0
15	0	1	1	1	1	1	1	0
16	1	0	0	0	0	0	0	0
17	1	0	0	0	1	0	0	0
18	1	0	0	1	0	0	0	1
19	1	0	0	1	1	0	1	0
20	1	0	1	0	0	0	1	1
21	1	0	1	0	1	1	0	0
22	1	0	1	1	0	1	1	0
23	1	0	1	1	1	1	1	0
24	1	1	0	0	0	0	0	0
25	1	1	0	0	1	0	0	1
26	1	1	0	1	0	0	1	0
27	1	1	0	1	1	0	1	1
28	1	1	1	0	0	1	0	0
29	1	1	1	0	1	1	0	1
30	1	1	1	1	0	1	1	0
31	1	1	1	1	1	1	1	1

Button Manager:

Inputs			Outputs		
b	s0	s1	out	n0	n1
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	1	0	1
1	0	1	0	1	0
1	1	0	0	1	0
1	1	1	0	0	0

3. Deriving Boolean Expressions

Main:

n0 = b1'b2's0s1's2' + b1'b2's0s1's2 + b1'b2's0s1s2' + b1'b2's0s1s2 +
b1'b2s0's1s2 + b1'b2s0s1's2' + b1'b2s0s1's2 + b1'b2s0s1s2' + b1'b2s0s1s2 +
b1b2's0s1's2 + b1b2's0s1s2' + b1b2's0s1s2 +
b1b2s0s1's2' + b1b2s0s1's2 + b1b2s0s1s2' + b1b2s0s1s2

n1 = b1'b2's0's1s2' + b1'b2's0's1s2 + b1'b2's0s1s2' + b1'b2's0s1s2 +
b1'b2s0's1's2 + b1'b2s0's1s2' + b1'b2s0s1's2 + b1'b2s0s1s2' + b1'b2s0s1s2 +
b1b2's0's1s2 + b1b2's0s1's2' + b1b2's0s1s2' + b1b2's0s1s2 +
b1b2s0's1s2' + b1b2s0's1s2 + b1b2s0s1s2' + b1b2s0s1s2

n2 = b1'b2's0's1's2 + b1'b2's0's1s2 + b1'b2's0s1's2 + b1'b2's0s1s2 +
b1'b2s0's1s2' + b1'b2s0s1's2' +
b1b2's0's1s2' + b1b2's0s1's2' +
b1b2s0's1's2 + b1b2s0's1s2 + b1b2s0s1's2 + b1b2s0s1s2

Simplified expressions:

n0 = b1's0 + s0s2 + s0s1 + b2s0 + b1'b2s1s2

n1 = s0s1 + b1'b2's1 + b2s1s2' + b1s1s2 + b1'b2s1's2 + b1b2's0s2'

n2 = b1'b2's2 + b1b2s2 + b1'b2s0's1s2' + b1'b2s0s1's2' + b1b2's0's1s2' + b1b2's0s1's2'

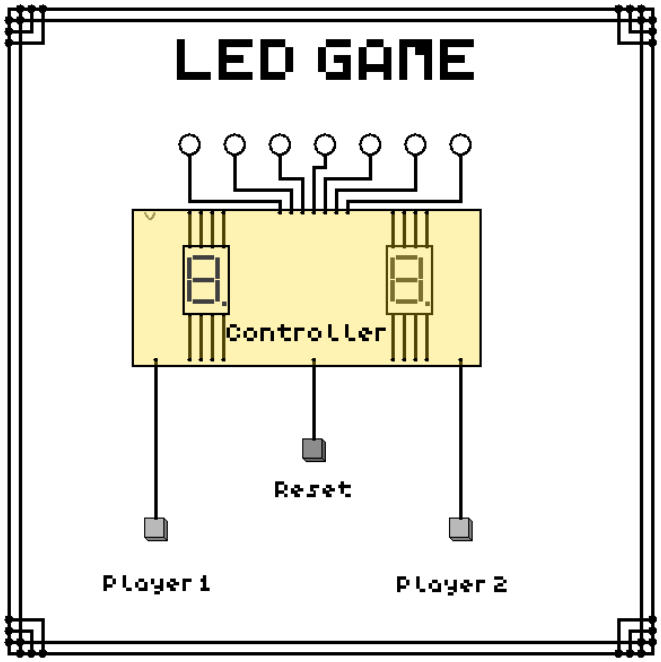
Button Manager:

out = bs0's1'

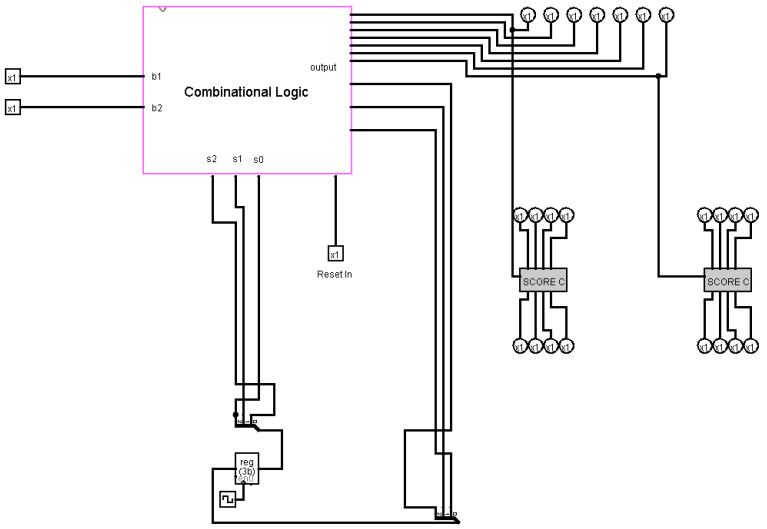
n0 = bs0's1 + bs0s1'

n1 = bs0's1'

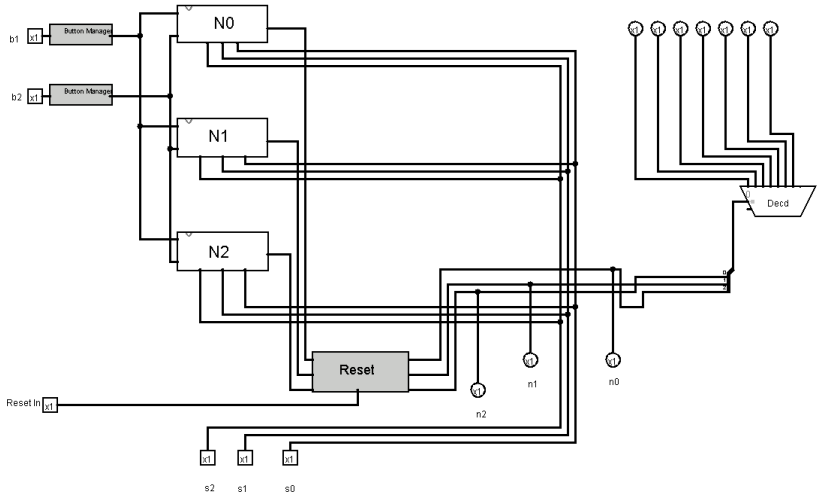
4. Circuits:
   Main:



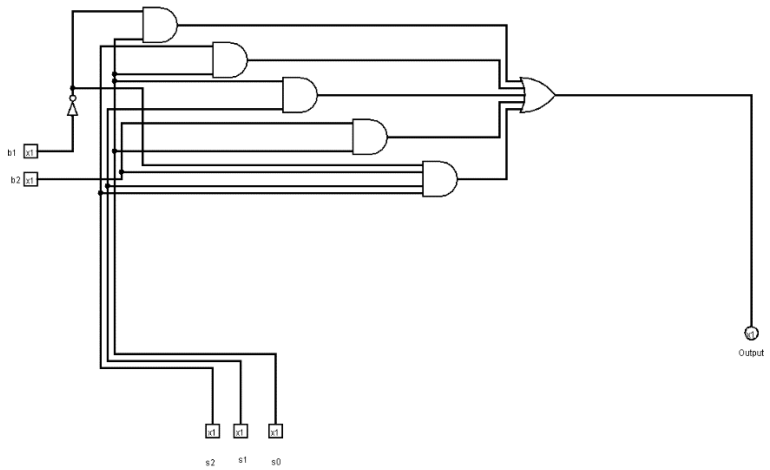
Controller:



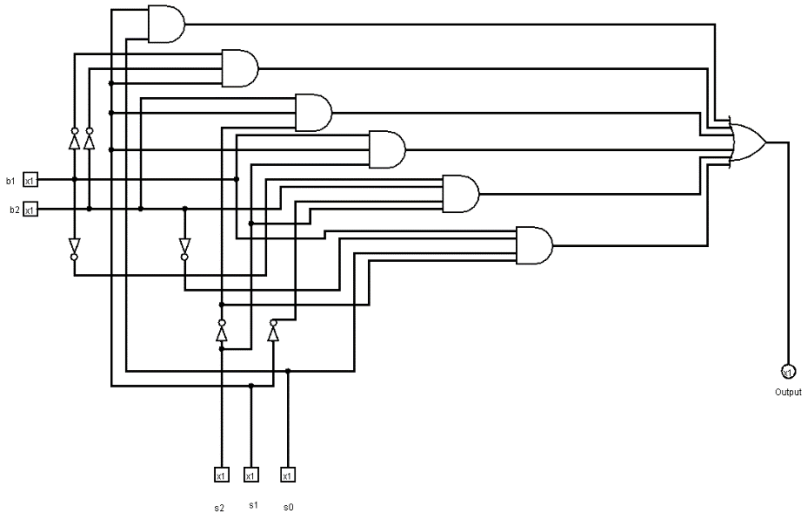
Combinational Logic:



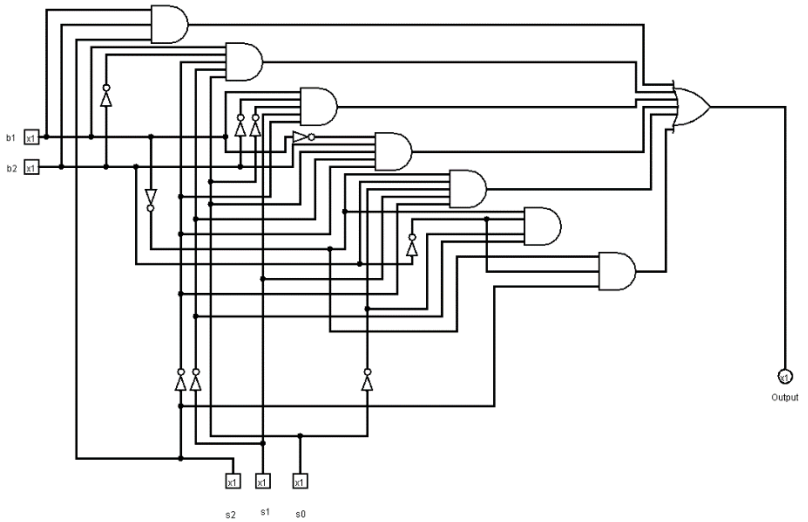
N0:



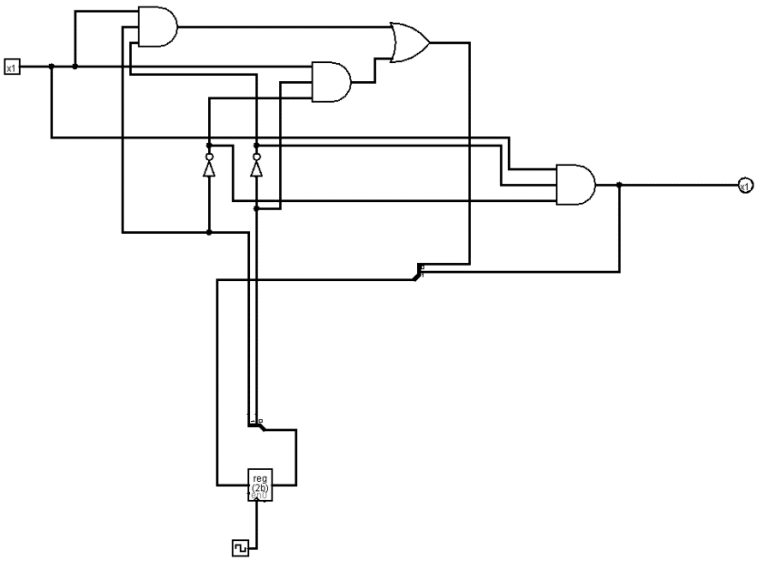
N1:



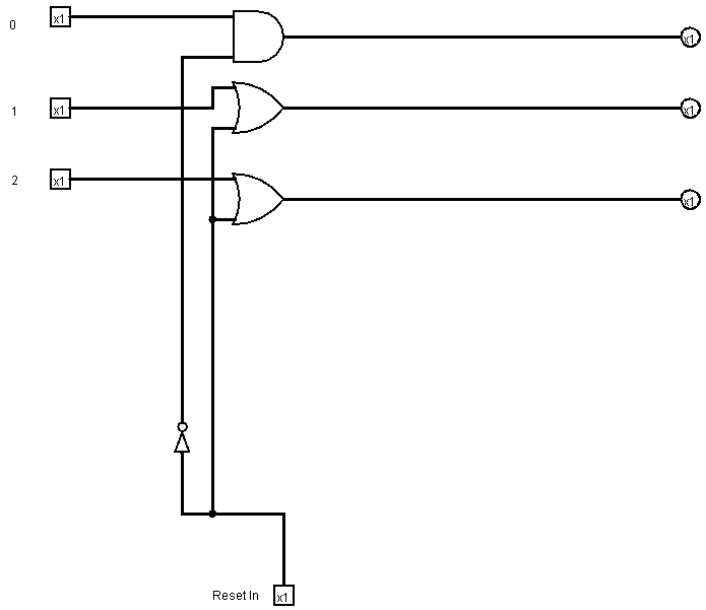
N2:



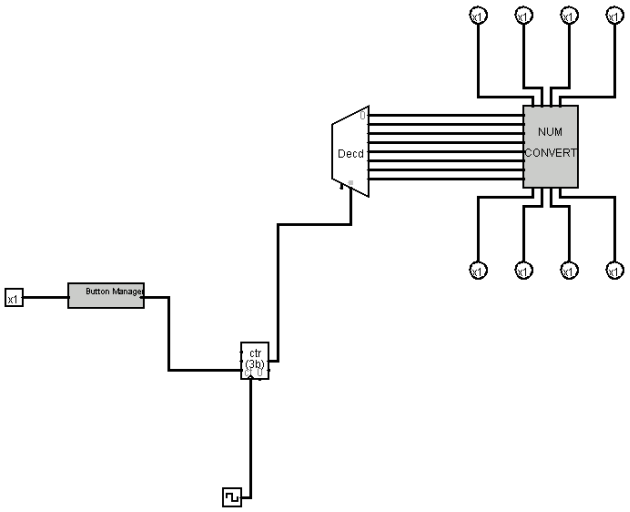
Button Manager:



Reset:



Score Counter:



Number Converter: