GTU Department of Computer Engineering
CSE 232 - Spring 2020

PROJECT 1 REPORT

(updated)

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The subject of the project is ; designing an FSM controller using Logisim program. It is a game implementation project.

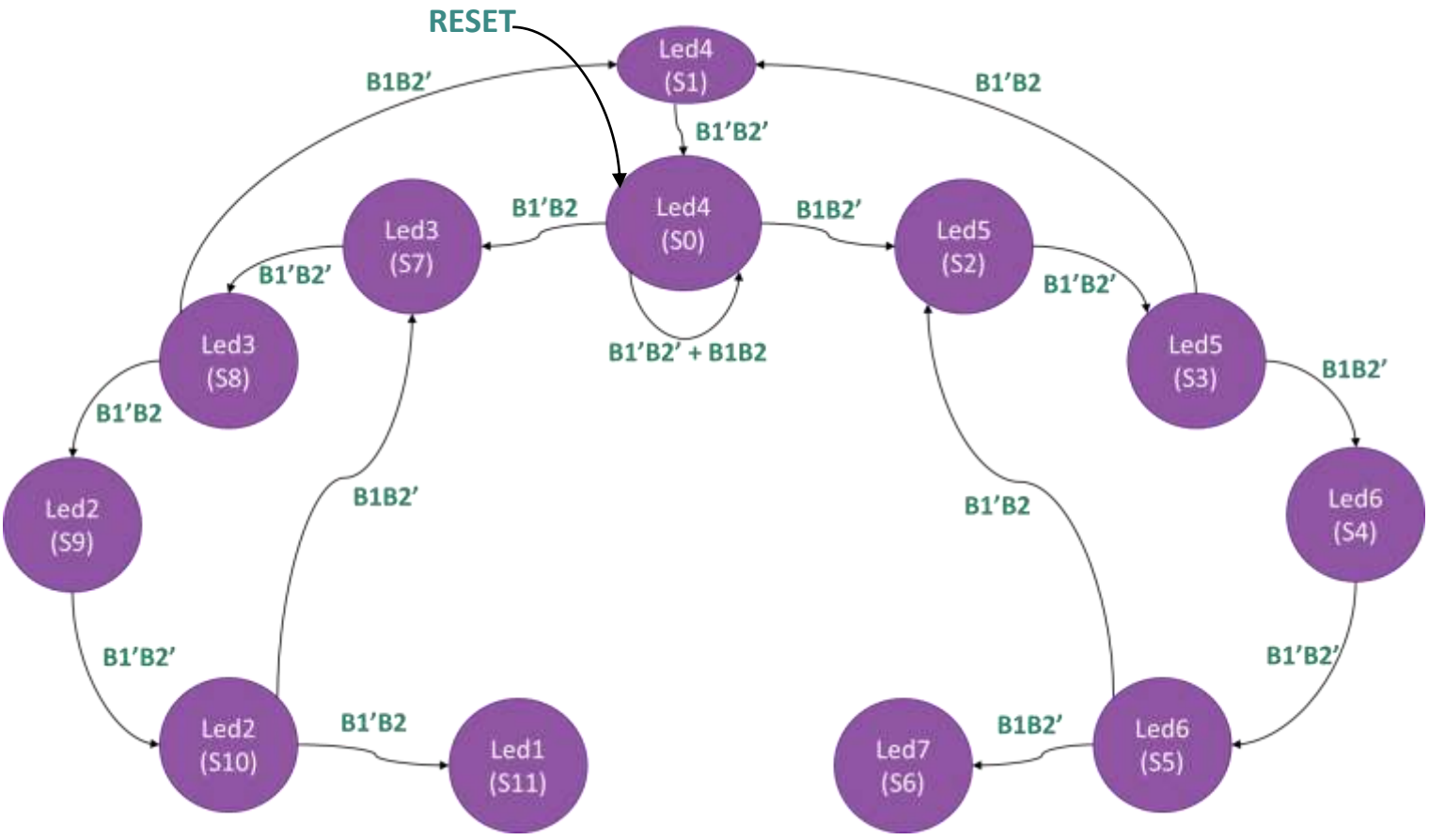
In this game , there are 7 LEDs and there are two buttons for two players. There is also a reset button for two players to reset at any time.

1. Decide states and draw the state diagram for your FSM controller.

Encode the states :

S0 = 0000
S1 = 0001
S2 = 0010
S3 = 0011
S4 = 0100
S5 = 0101
S6 = 0110
S7 = 0111
S8 = 1000
S9 = 1001
S10 = 1010
S11 = 1011

Inputs: B1, B1, RESET
Outputs: Led1, Led2, Led3, Led4, Led5, Led6, Led7



2. Draw truth table.

	Present State (PS) s3 s2 s1 s0	Inputs B1 B2	Next State (NS) n3 n2 n1 n0
S0	0000	00 01 10 11	0000 0111 0010 0000
S1	0001	00 01 1-	0000 0001 0001
S2	0010	00 01 1-	0011 0010 0010
S3	0011	00 01 10 11	0011 0001 0100 0011
S4	0100	00 01 1-	0101 0100 0100
S5	0101	00 01 10 11	0101 0010 0110 0101
S6	0110	--	0110
S7	0111	00 01 1-	1000 0111 0111
S8	1000	00 01 10 11	1000 1001 0001 1000

S9	1001	00 01 1-	1010 1001 1001
S10	1010	00 01 10 11	1010 1011 0111 1010
S11	1011	--	1011

Truth table for outputs

PS	Led1	Led2	Led3	Led4	Led5	Led6	Led7
S0	0	0	0	1	0	0	0
S1	0	0	0	1	0	0	0
S2	0	0	0	0	1	0	0
S3	0	0	0	0	1	0	0
S4	0	0	0	0	0	1	0
S5	0	0	0	0	0	1	0
S6	0	0	0	0	0	0	1
S7	0	0	1	0	0	0	0
S8	0	0	1	0	0	0	0
S9	0	1	0	0	0	0	0
S10	0	1	0	0	0	0	0
S11	1	0	0	0	0	0	0

3. Derive Boolean expressions from the truth table.

Simplified expressions;

➔ n3 = s3s2'B1' + s3s2'B2 + s3s2's0 + s3's2s1s0B1'B2'

➔ n2 = s3's2s0' + s3's2B1 + s3's2s1'B2' + s3's2s1B2 + s3's1's0'B1'B2 + s3's1s0B1B2' + s3s2's1s0'B1B2'

➔ n1 = s3's1s0' + s3s2's1 + s2's1B1'B2' + s3's1B1B2 + s3's2's0'B1'B2 + s3's2's0'B1B2' + s3's2s0B1'B2 + s3's2s0B1B2' + s3s2's0B1'B2'

➔ n0 = s3s2's1s0 + s3s2'B1'B2 + s3s2'B1B2' + s3's1s0B2 + s2's1's0B1 + s2's1'B1'B2 + s3's0B1B2 + s3's2s1s0B1 + s3's2s1'B1'B2' + s3's2's1B1'B2'

➔ Led1 = S11

➔ Led2 = S9 + S10

➔ Led3 = S7 + S8

➔ Led4 = S0 + S1

➔ Led5 = S2 + S3

➔ Led6 = S4 + S5

➔ Led7 = S6

4. Draw the circuit on Logisim.

   - You can see in 171044046.circ file

5. Simulate and see whether it works. If it does not turn back to previous stages and check each carefully.

   - It works.

P.S.

I added a hexadecimal digit display.