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Secret Code: 00100101

Files:
ReadMe
Lab3_370.clf
Lab3CS370.cct
Lab3CS370.bak

Overview:

The goal for this circuit was to create a Finite State Machine that detected a certain eight digit binary sequence in a continuous serial input stream. When the correct sequence is detected, the single output signal is logical true, in all other cases it is logical false. This circuit has a shut off switch. If 16 bits are toggled in without the secret code being observed, the system shuts off. There is also a reset switch that when pressed allows the system to again accept input bits.

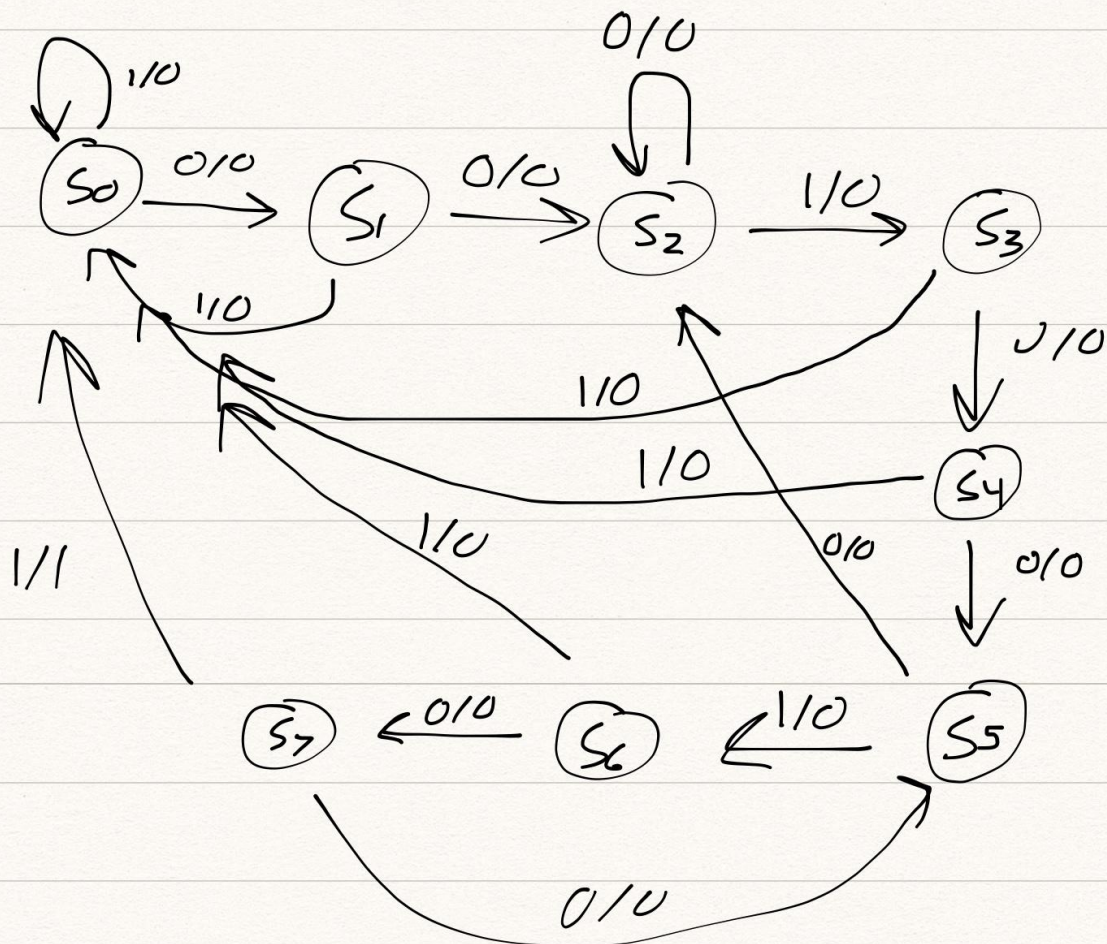
Users should use the buttons to input their desired bits. If the secret code of 00100101 is inputted within 16 bits, the output will display 1. If the secret code is not inputted within 16 bits, the system will lock and the user must reset the system if they want it to output 1.

components of secret code:

This file takes in the 2 inputs of 0 or 1 and puts them through an SR latch. This allows the system to "remember" which button was just pressed and the output of this latch is the input. There is also a pulse that is created by ORing the two input buttons, This creates a "clock" for the flip flops. This pulse is also used within the lock to detect when 16 bits have been inputted. One feature of the lock is that it resets when the secret code has been inputted 16 times. In order to accomplish this I ORed the output of z, with the reset switch. This allows the lock to be reset when the code is observed OR the switch is hit.

Diagrams, Tables, K maps, Equations:

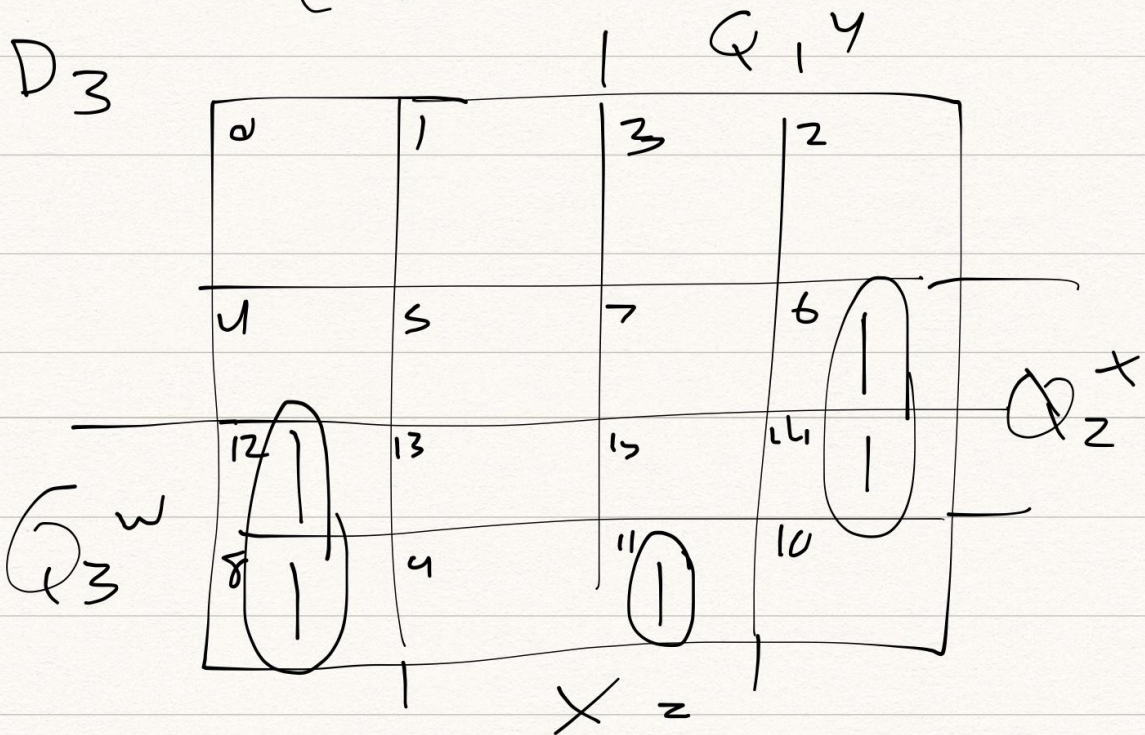
code: 00/00101



	Present	Input	Next	Out
1	S0	0	S1	0
	S0	1	S0	0
2	S1	0	S2	0
	S1	1	S0	0
3	S2	0	S2	0
	S2	1	S3	0
4	S3	0	S4	0
	S3	1	S0	0
e	S4	0	S5	0
	S4	1	S0	0
f	S5	0	S2	0
	S5	1	S6	0
g	S6	0	S7	0
	S6	1	S0	0
	S7	0	S5	0
	S7	1	S0	1

Present		Input	Next		Out
Q_3	Q_2 Q_1	X	D_3 D_2 D_1		
0	000	0	001	0	0
	000	1	000	1	0
1	001	0	010	2	0
	001	1	000	3	0
2	010	0	010	4	0
	010	1	011	5	0
3	011	0	100	6	0
	011	1	000	7	0
4	100	0	101	8	0
	100	1	000	9	0
5	101	0	010	10	0
	101	1	110	11	0
6	110	0	111	12	0
	110	1	000	13	0
7	111	0	101	14	0
	111	1	000	15	1

map 68112



$$D_3 = w \bar{y} \bar{z} + w \bar{x} y z + \bar{w} x y \bar{z}$$

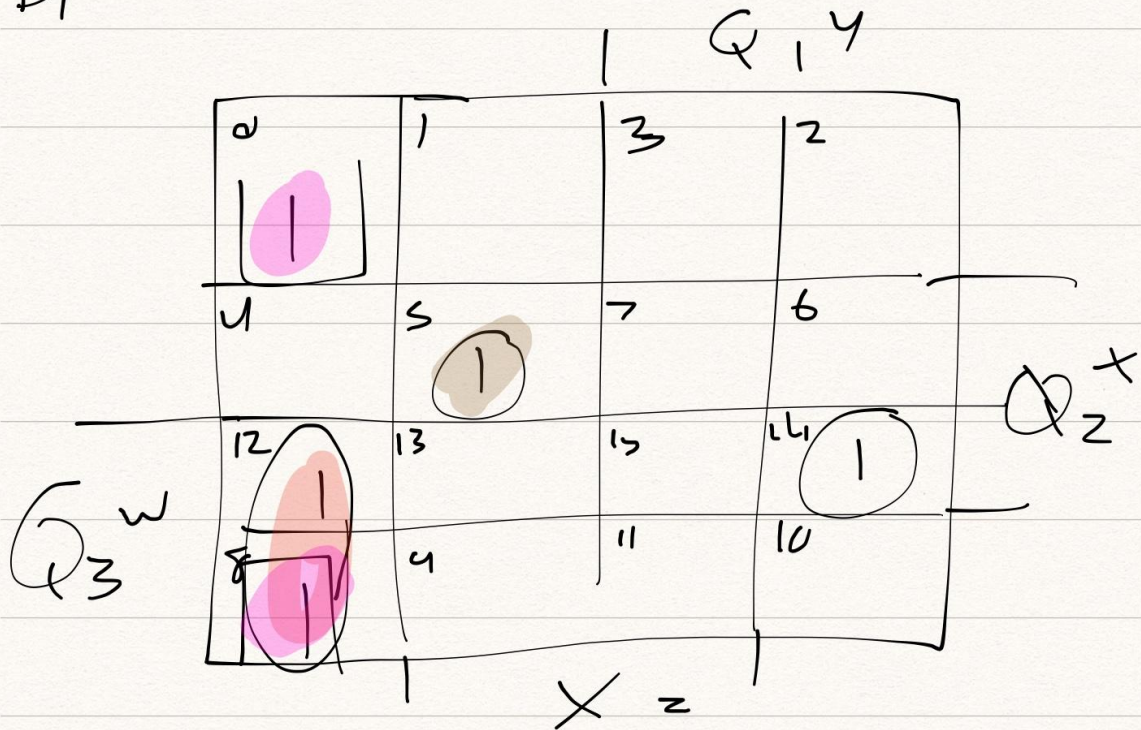
$$= Q_3 \bar{Q}_1 \bar{x} + Q_3 \bar{Q}_2 Q_1 x + Q_2 Q_1 \bar{x}$$

1 Q. 4



$$D_2 = Q_2 \overline{Q_1} \overline{X} + \overline{Q_3} Q_2 \overline{Q_1} + Q_3 \overline{Q_2} Q_1 + Q_3 Q_1 \overline{X} + \overline{Q_3} Q_1 \overline{X}$$

D_1



$$D_1 = Q_3 \overline{Q_1} \overline{X} + \overline{Q_2} \overline{Q_1} \overline{X} + \overline{Q_3} Q_2 \overline{Q_1} X + Q_3 Q_2 Q_1 \overline{X}$$

$$Z = Q_3 Q_2 Q_1 X$$