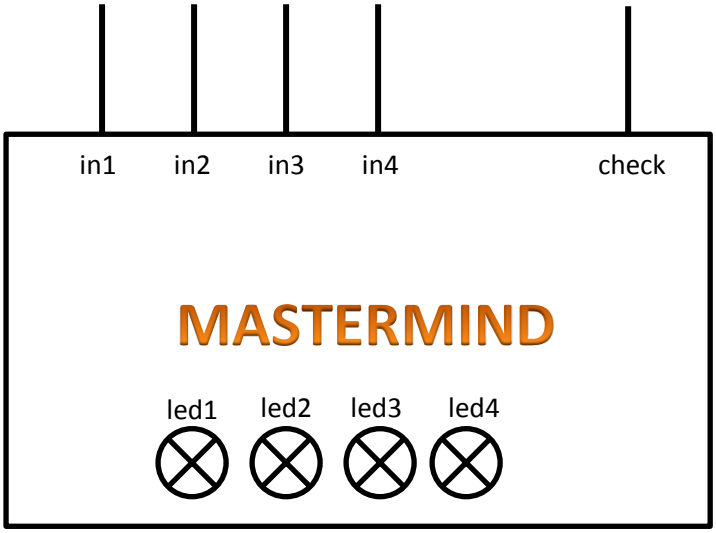
CSE 433 Embedded Systems

Project 1 – Mastermind Game

Due date: October 30, Monday 23:55

In this project you will design an FSM that implements one iteration of the mastermind game. https://www.youtube.com/watch?v=XwuwWTH39ac



Each color has a corresponding code:

red	000	(0)
blue	001	(1)
yellow	010	(2)
green	011	(3)
magenta	100	(4)
pink	101	(5)
brown	110	(6)
black	111	(7)

The user enters 4 3-bit inputs each corresponding to a color and then makes check signal high. If an entered color is right in terms of both location and color with the secret sequence then a red led is turned on, if only the color is right but the location is wrong then a white led is turned on, otherwise if both are wrong led is turned off.

The secret sequence will be selected randomly. For instance it can be selected according to the user input from a number of alternatives.

For instance assume a two dimensional array as secret_alternatives as below:

```
int secret_alternatives[][4] = {{0, 2, 5, 6},
                                {4, 5, 5, 2},
                                {7, 7, 6, 6},
                                {3, 2, 2, 2},
                                {1, 7, 1, 2},
                                {4, 4, 7, 6},
                                {7, 3, 6, 1}};
```

1. **Write a C code to implement the mastermind function.**
2. **Sketch the FSM state diagram according to your C code.**
3. **Sketch the datapath needed by the diagram in 2.**
4. **Update the diagram according to your datapath.**
5. **Write down State transition table and extract Boolean expressions.**
6. **Design your circuit in Logisim and simulate.**

In your project report, each output of the 6 items above must be clearly shown.

If you do not implement and simulate your design at Logisim you cannot get more than 40pts even all other missions are completed correctly.

You will explain your logisim design according to the schedule announced at Moodle.

It is not a group project. Any cheating results in -100.

Each day after the due date, you lose 25pts.

Designs without FSM can get at most 25pts even if they work.