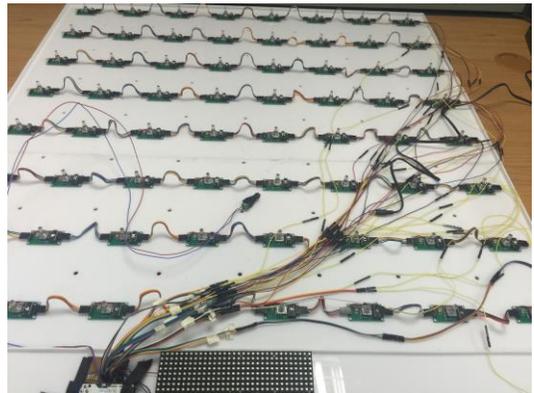
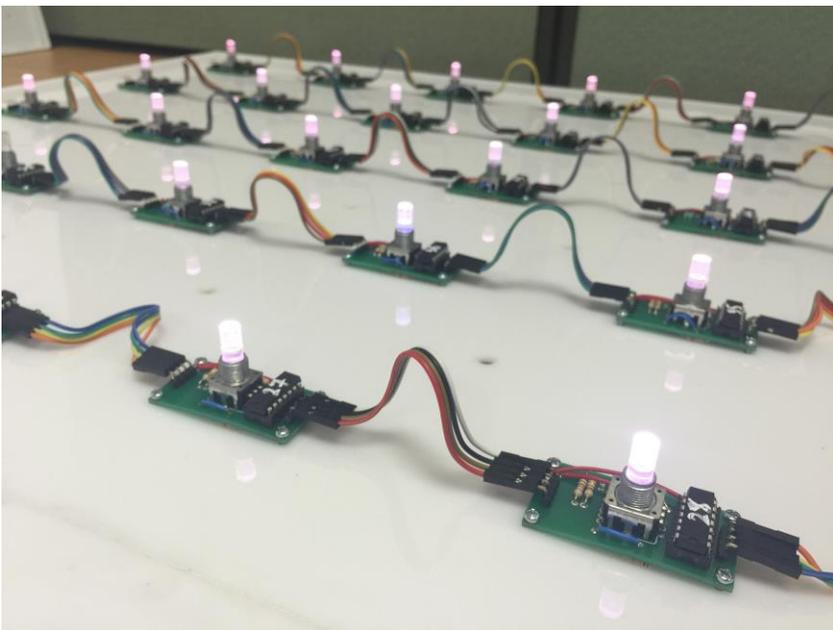
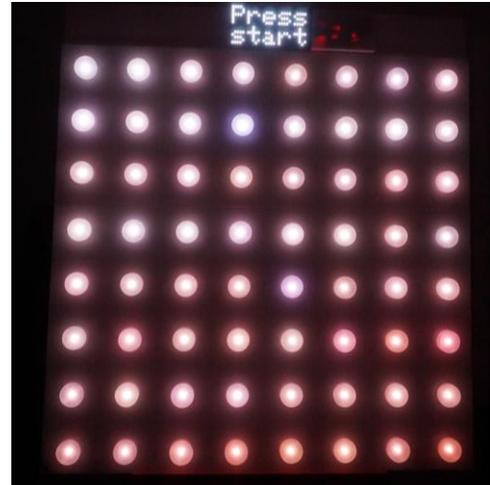


# JOB DESCRIPTION

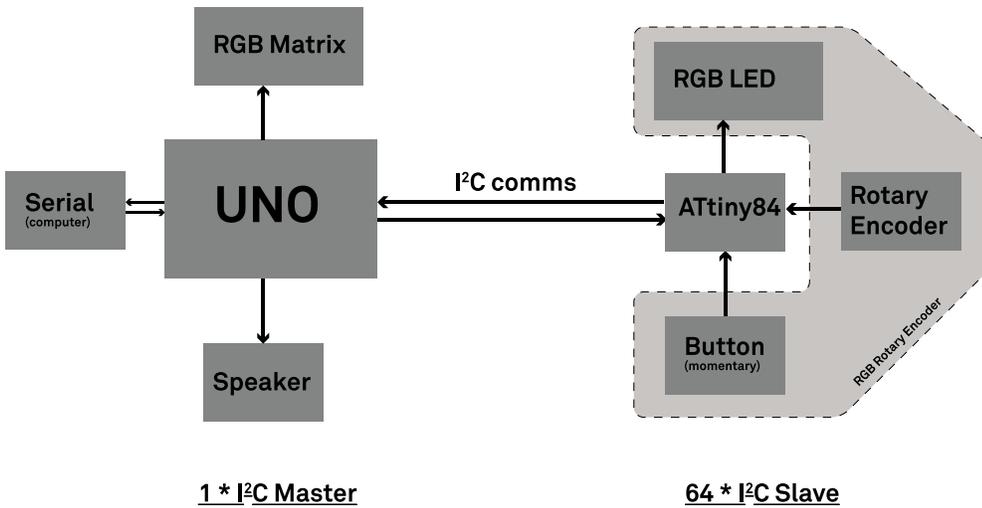
## AIM

Developing two LED gaming systems using LED rotary encoders

## PROTOTYPE DESCRIPTION

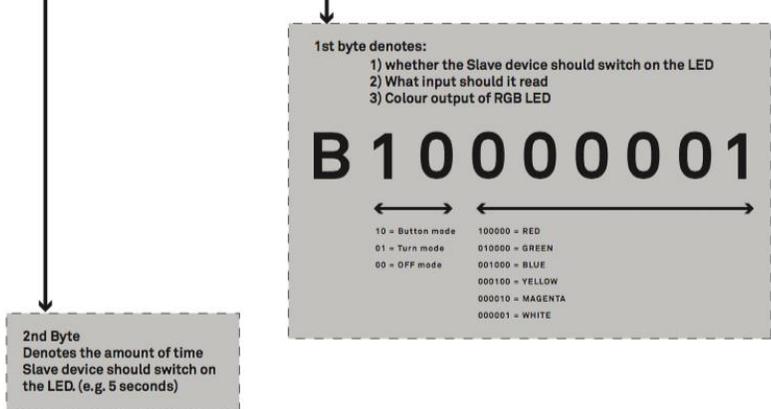


We've built two prototypes for now. On each board, an Arduino Uno board and 64 rotary encoders 64 attiny 84 were used. You may find the pictures above and diagrams below for your references. Our main purpose is to develop a game board by controlling the color/speed/pattern of the leds, player will be required to press/turn the rotary encoder to play the game (sample game descriptions are given below). Two game boards will be linked together to allow two-player to play together.

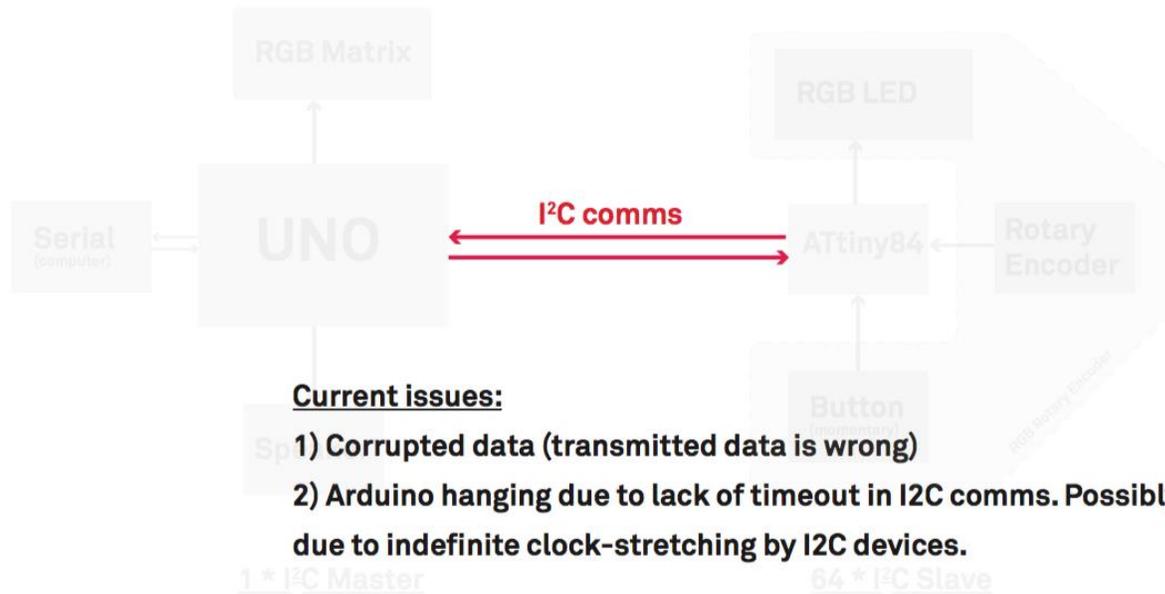


**Current method of data transmission from UNO to I2C slave devices**

```
Wire.beginTransmission(2); // transmit to device #2
Wire.write(B10000001); // on/off push/turn led colour setting
Wire.write(5); // timing byte
Wire.endTransmission(); // stop
```



However, we've faced some problems while developing the prototypes, some of the problems are:



Materials used:

- (1) Rotary encoder - illuminated (RGB)
- (2) Arduino Uno
- (3) ATtiny84 I2C

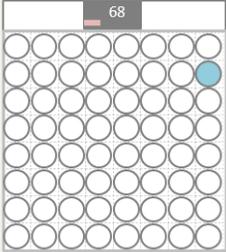
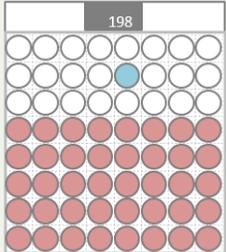
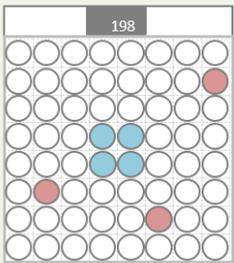
## TASKS

### Hardware

- to fix the problems with the current prototypes
- to optimize the game systems and to procure & assemble appropriate components into a working system.
- testing the board systems to ensure proper functioning.

### Programming

programming **five LED games** (each with three game mode: single-player, two-player competition, two-player cooperation) to run on the system according to given requirements. The final game design is still to be confirmed. Below is the game description of the single-player game design to give you an idea on what kind of game we are trying to develop:

Once at a time		<ul style="list-style-type: none"> <li>▪ Each led is lighten up for 5s</li> <li>▪ Press/turn the illuminated LED to score</li> <li>▪ No penalty</li> <li>▪ Score as high score as possible within 5 minutes</li> </ul>
Speedo		<ul style="list-style-type: none"> <li>▪ Press/turn the illuminated LED to score</li> <li>▪ Miss 2 led lead to a penalty row from the bottom</li> <li>▪ Hit 5 led continuously to clear one penalty row</li> <li>▪ Lose the game once all the rows turn red</li> <li>▪ Win the game by playing 5 mins</li> </ul>
Space Invader		<p>Protecting your home (blue area) by defeating the invading red invaders</p> <ul style="list-style-type: none"> <li>▪ Each red led is lighten up for 5 seconds and move to the next block</li> <li>▪ Turn the red LED off before they reach the blue area</li> <li>▪ Win the game by defeating all the invaders</li> <li>▪ Lose the game once the blue area is attacked by the red invaders</li> </ul>

### [Requirements]

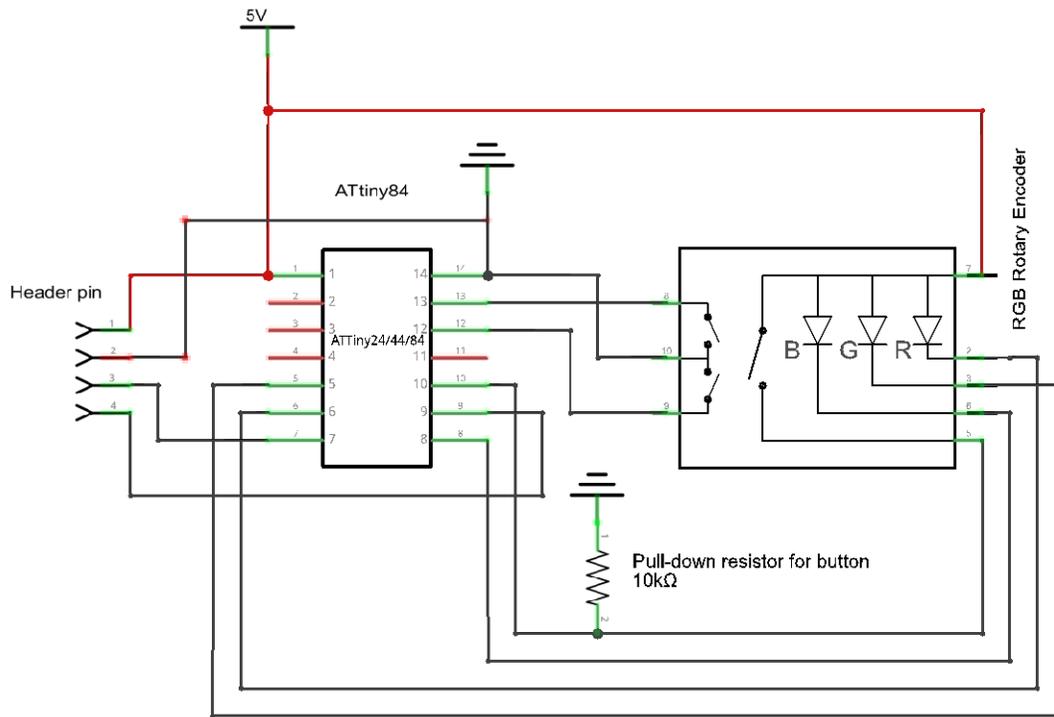
- Testing the games to ensure the games can smoothly run on the system
- Preparing game codes which are compatible with the software we are developing to control the system. (software is going to be developed by another programmer, game codes will need to be prepared separately according the software design)
- Adjustment on game difficulties may be needed based on the user testing results.

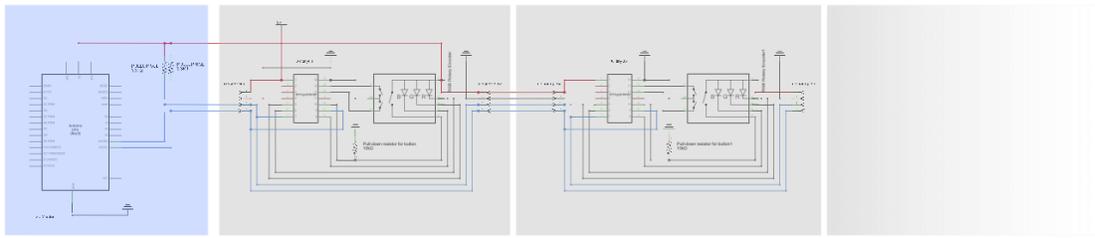
### INTERVIEW

We may want to know the following few aspects during the interview:

- (1) Give a work plan on how long you are planning to finish this project
- (2) Briefly introduce how are you gonna solve the above-mentioned issues of the current prototypes

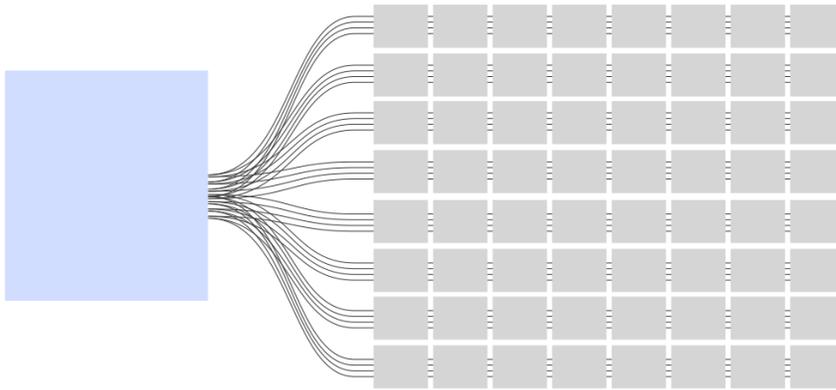
References:





**1 x UNO I2C  
(Master)**

**64 x ATtiny84 I2C (Slave)**



**I2C slave devices are linked up in sets of 8.**

**All 8 sets share 4 lines in a parallel configuration - 5V, GND, SDA, SCL**