Creative Making: Advanced physical computing

Firework installation

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Welcome to this creative project I made for term one. It is an electrical firework installation with out using real fire to lit. It is based on the background that in Chinese, these days in most city, people are not allowed to set off fireworks because it will polluting the air and may cause fire hazard, however it is our tradition to set fireworks to celebrate new year. So I want to make an electrical fireworks installation so that people can enjoy any time any where.

Final video link
https://youtu.be/C87QbsIlhBA

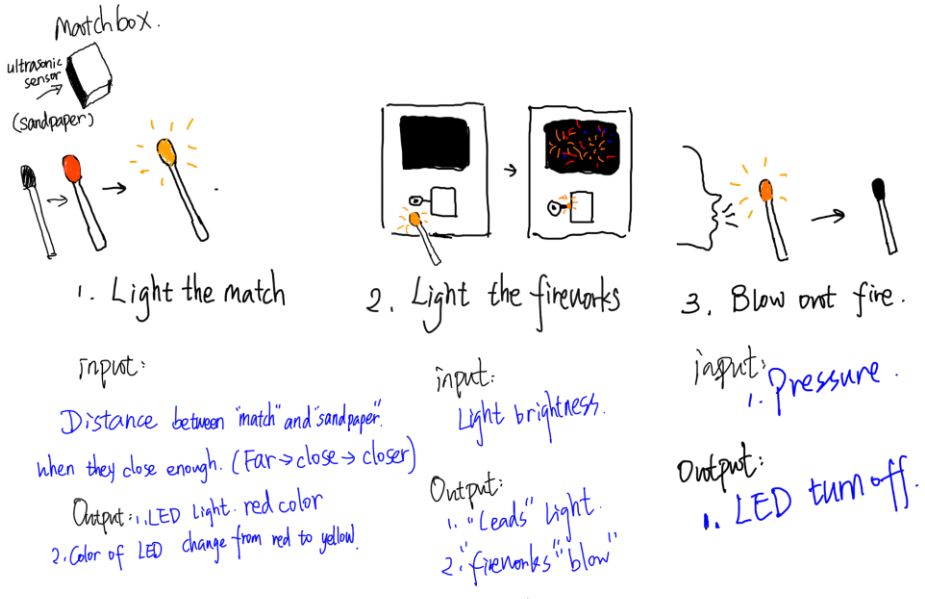
Link towards Github and blog
https://github.com/ZIqinGX/UAL-CCI--Advanced-Physical-Computing-portfolio-of-work.git

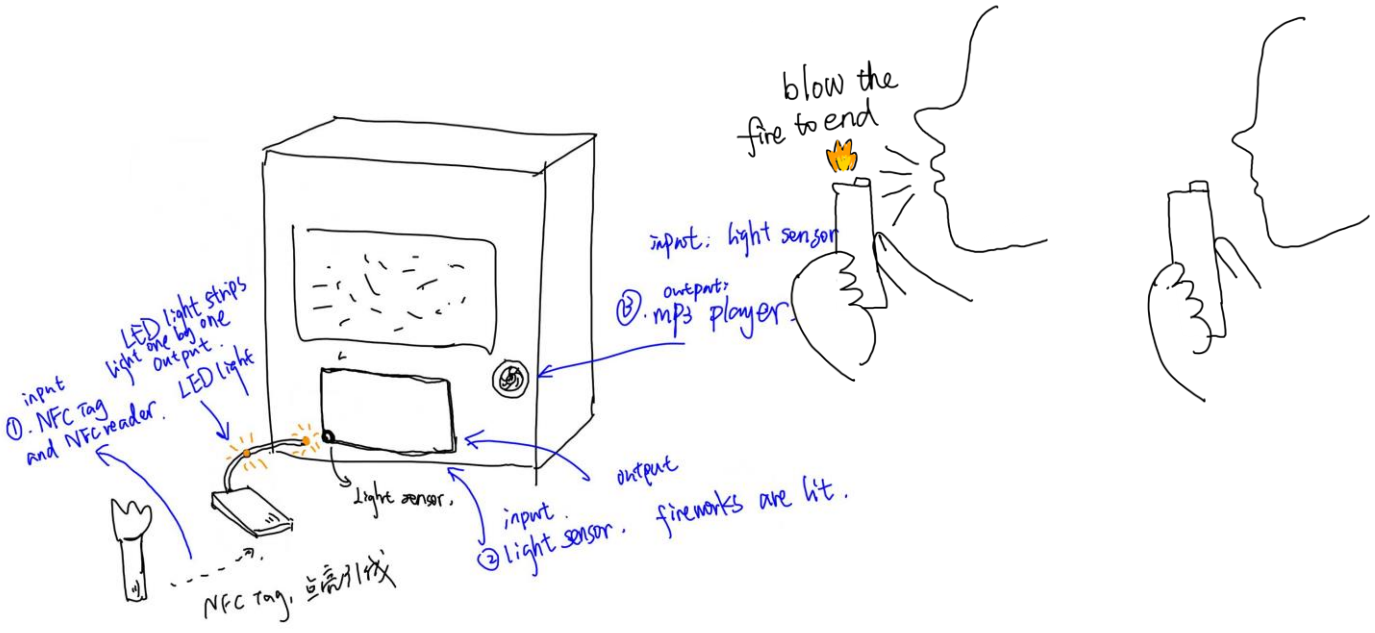
Design objects:

Simulate how people set fireworks in real life

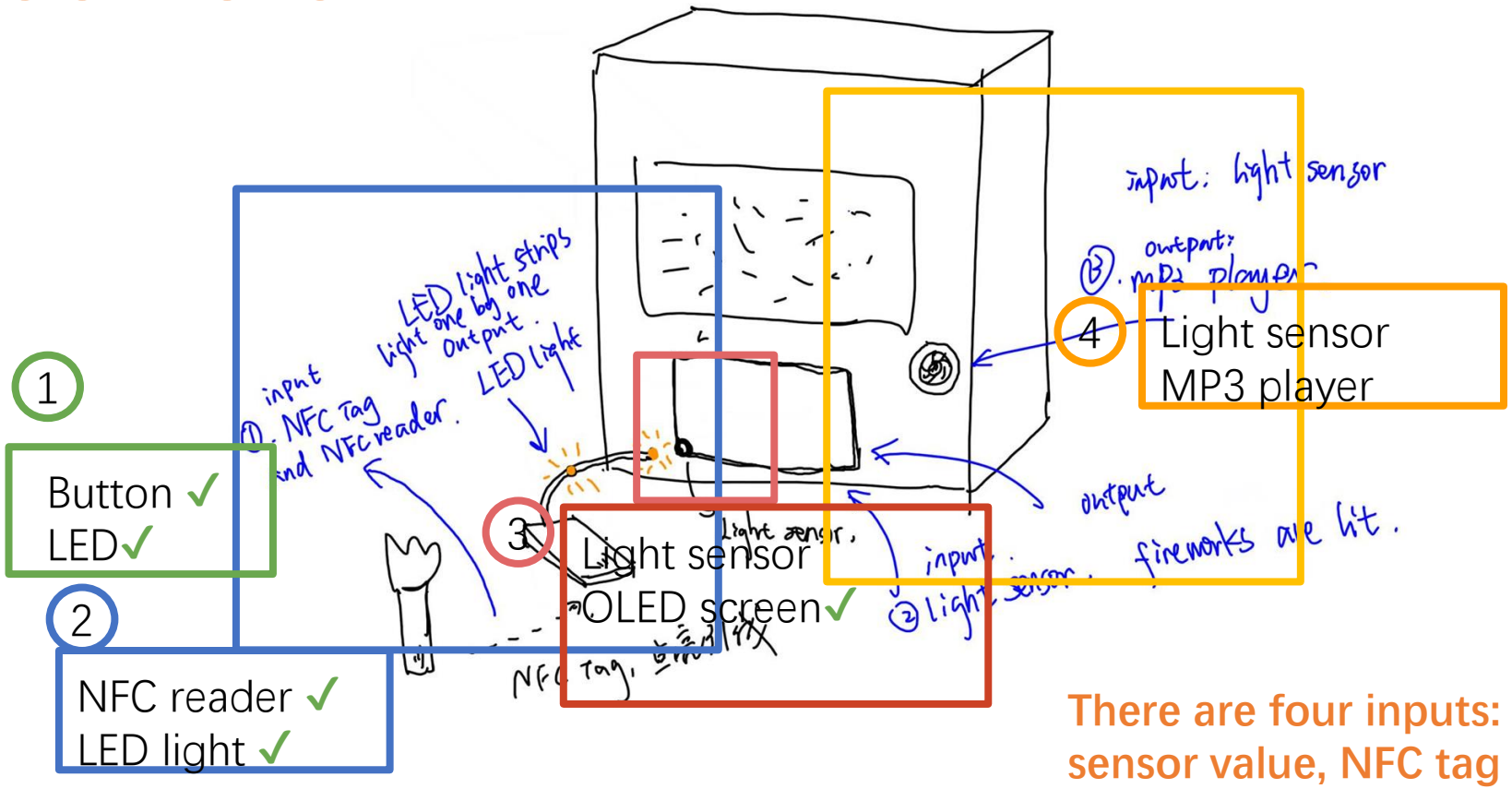
Objects Briefing:

First is how to light the fake fire.
Second is how to show fireworks.
Finally, how to extinguish the fake fire





INPUTS
OUTPUTS

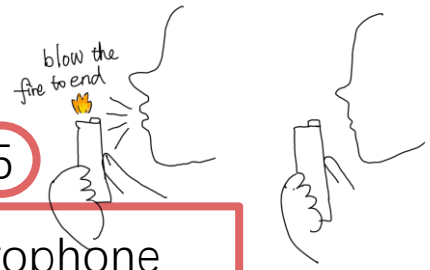


1
Button ✓
LED✓

2
NFC reader ✓
LED light ✓

3
Light sensor
OLED screen✓

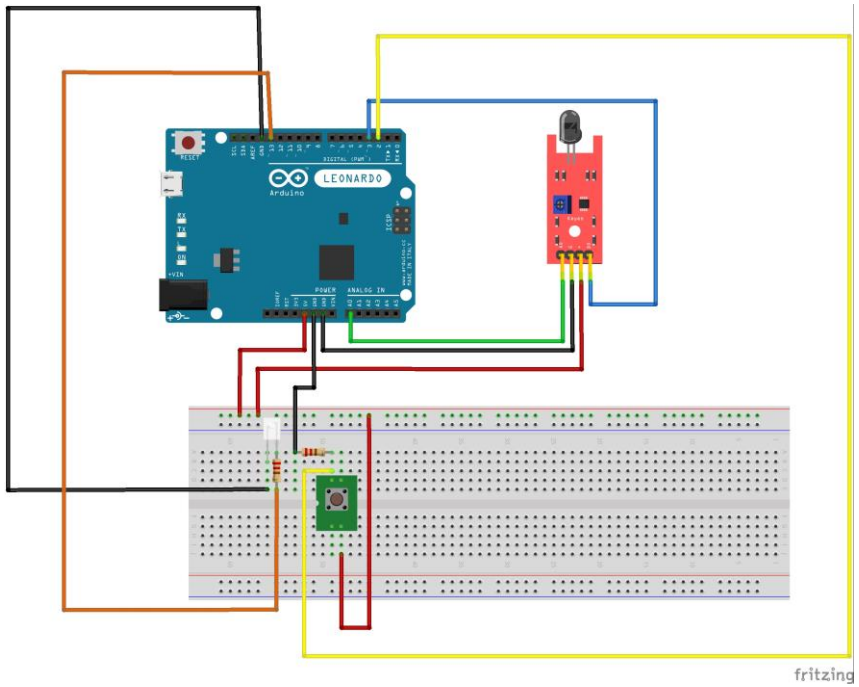
4
Light sensor
MP3 player



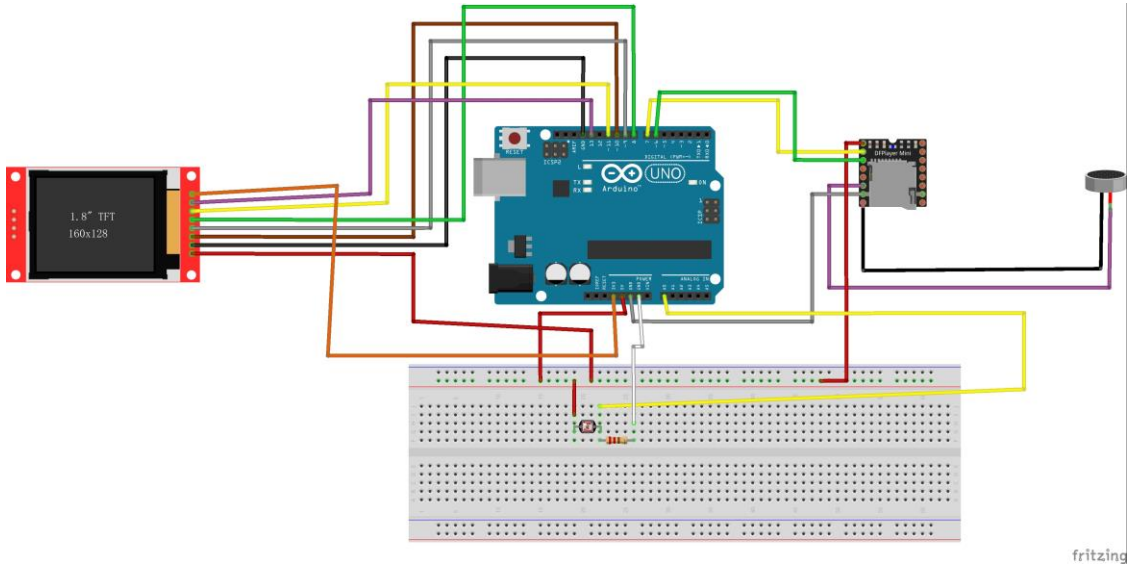
5
-Microphone sensor
-LED turn black

There are four inputs: Button status, Microphone sensor value, NFC tag UID number and light value read by light conrolled resistor.
The outputs includes LED, wss2818b LED strip, ST7735 screen, DF MP3 palyer.

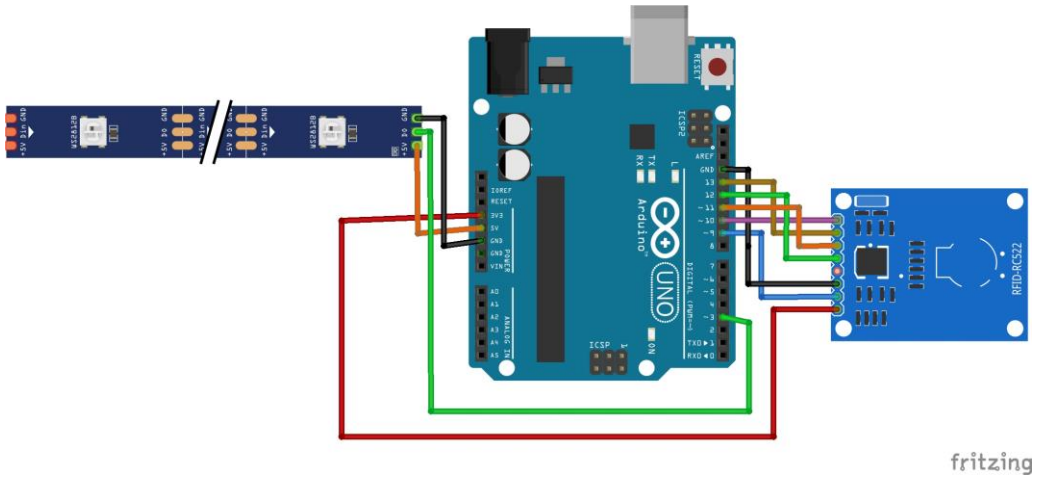
Circuits



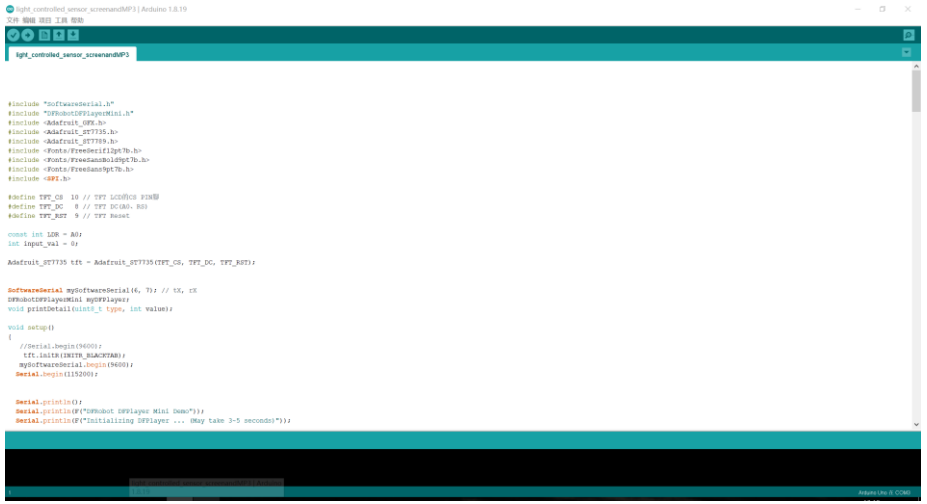
Button and Microphone sensor control LED

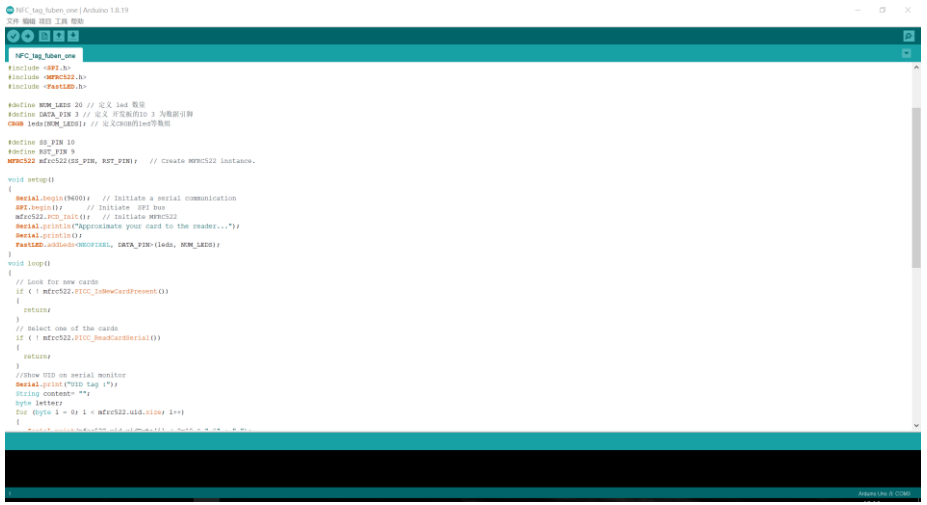


Light controlled resistor controls TF7735 screen and DF player

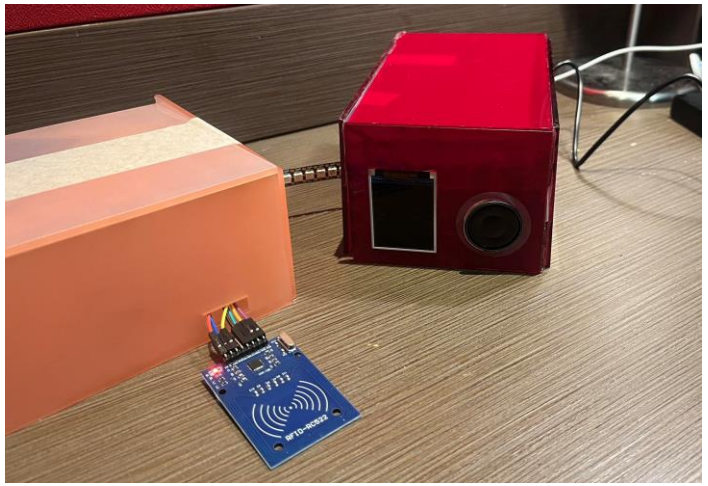


RFID reader controls WS2818b strip

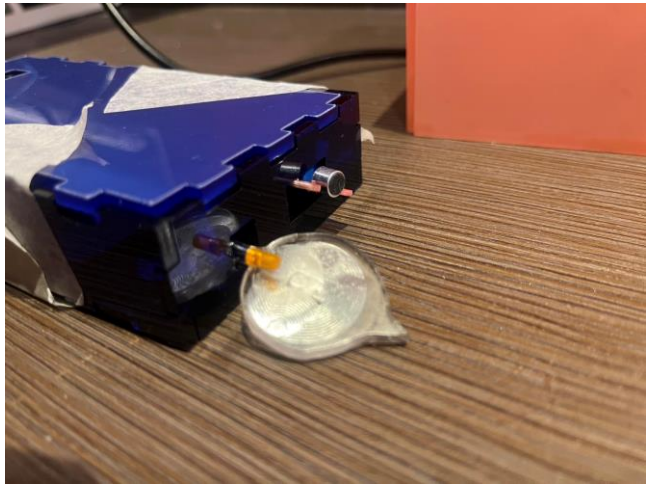


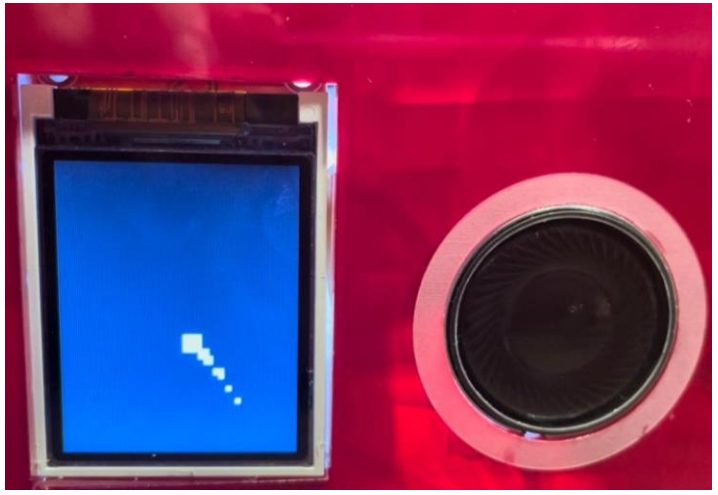


Link to code
https://github.com/ZIqinGX/UAL-CCI--Advanced-Physical-Computing-portfolio-of-work.git



Exhibition





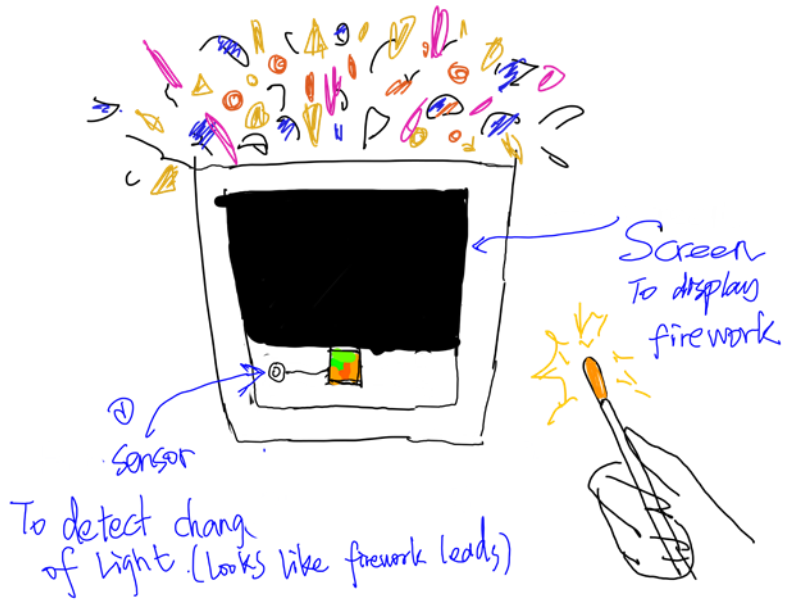
What problem I met for Week 7 :

1.the NFC tag is too big for a match, if I use the former plan,it will be not as decent as I planed.

2.After change the interaction progress， the progress can be divided into 3 parts.

How do I solve:

1.Change the former design plan from people hold the fake electrical match into audience hold the fake fire source and get closer to fireworks lead.



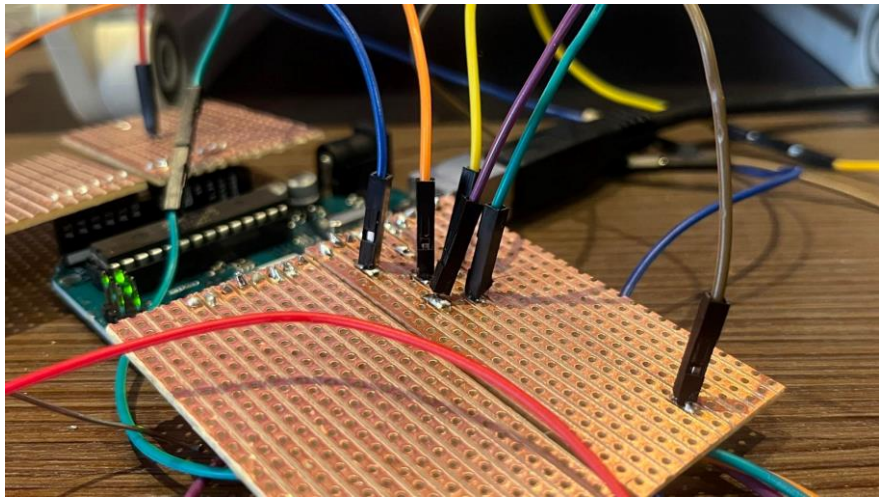
What problem I met for Week 8 :

1. RFIC reader do not work. It cann't show the UID number of NFC tags.
2. Screen can not show gif

How do I solve:

1.Change the code.Find code can work for UNo R3.But it turned out to be the problem of soldering

2.Program pixels to form animation



What problem I met for Week 9 :

1.When connect MP3 player with light resistor circuit, it can not play

2. MP3 player will keep playing but won't stop

3.Button is not pressed, Microphone sensor keep led light.

How do I solve:

1.This problem shows because gnd line and vcc line of MP3 player is contacted. So use plastic cover to prevent

2.Use" while" and "if" statement

3.Use "switch" statement

Future Possibility

This project still requires a lot of work to improve.

First is in the future, I want to change the way it shows fireworks from screen into projection because it looks more overwhelming.

Besides, I am going to change my animation programming so that fireworks can be more random.

Third, I am going to add more inputs such as ultrasonic sensor and color sensor to make it more interactive and more flexible. Finally, the size of installation should be reconsidered based on different using scenario.

In the future, it can be used both entertainment and a replacement of real fireworks to memorize people we care and release environment burden.

Part one: Button and LED and Microphone sensor

Code reference:

https://create.arduino.cc/projecthub/krivanja/working-with-an-led-and-a-push-button-71d8c1
https://www.jianshu.com/p/c06d7057edab

Part two: RFID-522 and Strips

Code reference:

https://forum.arduino.cc/t/rfid-mfrc522-h-wont-work-with-new-arduino-uno-wifi-rev2/560861\

https://howtomechatronics.com/tutorials/arduino/how-to-control-ws2812b-individually-addressable-leds-using-arduino/

https://lingshunlab.com/book/arduino/arduino-uno-turn-on-ws2812b-color-leds

https://www.qutaojiao.com/24170.html

Part three: Light controlled resistor and ST7735 and DF player

Code reference:

http://programmermagazine.github.io/201401/htm/article1.html
https://www.electronics-lab.com/project/using-st7735-1-8-color-tft-display-arduino/
https://blog.jmaker.com.tw/arduino-st7735/
https://blog.csdn.net/weixin_43031092/article/details/108712833
https://sensorkit.joy-it.net/en/sensors/ky-037
https://electropeak.com/learn/interfacing-ky-037-sound-sensor-with-arduino/
https://circuitdigest.com/microcontroller-projects/interfacing-sound-sensor-with-arduino
https://www.arduino.cc/reference/en/language/structure/control-structure/switchcase/

Final video link

https://youtu.be/C87QbsIIhBA

Link towards Git hub which contain blog and code

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Blog in Google slides:

https://docs.google.com/presentation/d/1KdxvPymvaqiQX5y0VnkpLMqww9D4Unvbx4qmmSv8cF4/edit?usp=sharing

Videos for testing:

Test coding of firworks for the first time：
https://youtu.be/ImLY48aQbZg
https://youtu.be/dE99hSx0ZcE

Test coding for MP3 player:
https://youtu.be/kd95pXxf7qw

Microphone sensor testing
https://youtu.be/yWdwkDjdv20

Test microphone sensor with LED：
https://youtu.be/vtuazbwwS_c

button-microphone-led test
https://youtu.be/NisM9_UwT3Q

RFID –LED strip
https://youtu.be/ZMogIVy8eSI