Midterm Proposal

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Problem

Children's Toy

Children needs a fun and realistic toy for upcoming Christmas Day. Adults want to give a fantasy feeling to their children to celebrate their holiday. This project is about both fun and interactive "Tinker bell Jar." This Tinker bell Jar is coming with a music reactive LED light inside which increases the fairy tale mood. The background music of Tinkerbell will plays and the light will be follow the rhythm. Moreover, you can change your color of the light in mobile app. Kids can choose whatever color they want and display Tinker bell jar with different colors. Let Tinker bell presents children a fantasy!

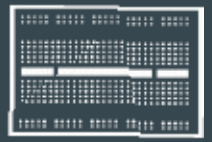
Tinkerbell Jar

- A laptop computer
- Arduino Uno R3
- USB cable
- 5V power supply
- RGB LED
- Sound Sensor
- Bluetooth HC-05
- Three Resistors
- Joint Cables
- Glass mason jar & other elaborative papers

Connectivity

laptop

Arduino



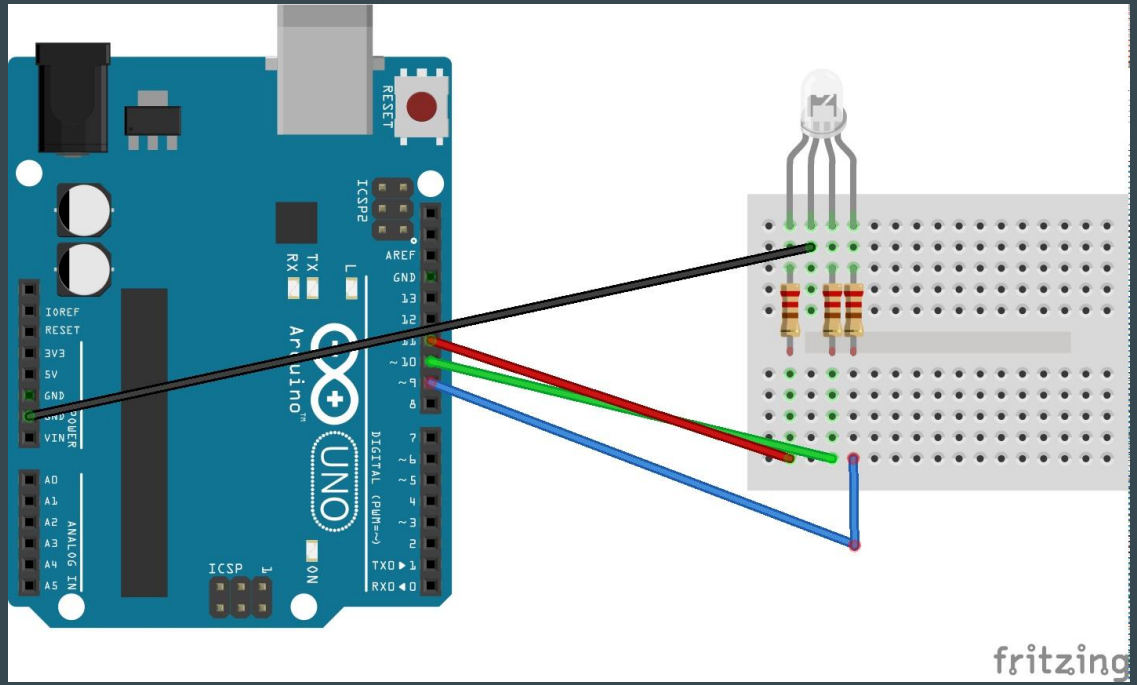
Bread Board

Sound Sensor

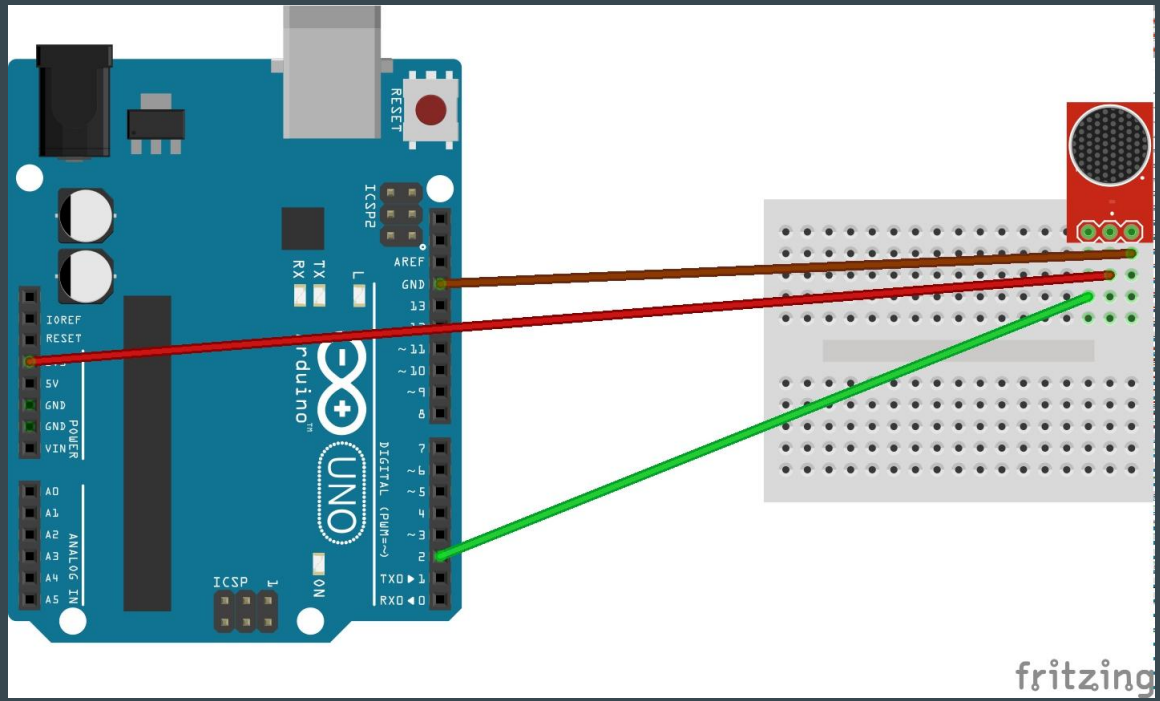
Jumpers

Bluetooth
HC-05

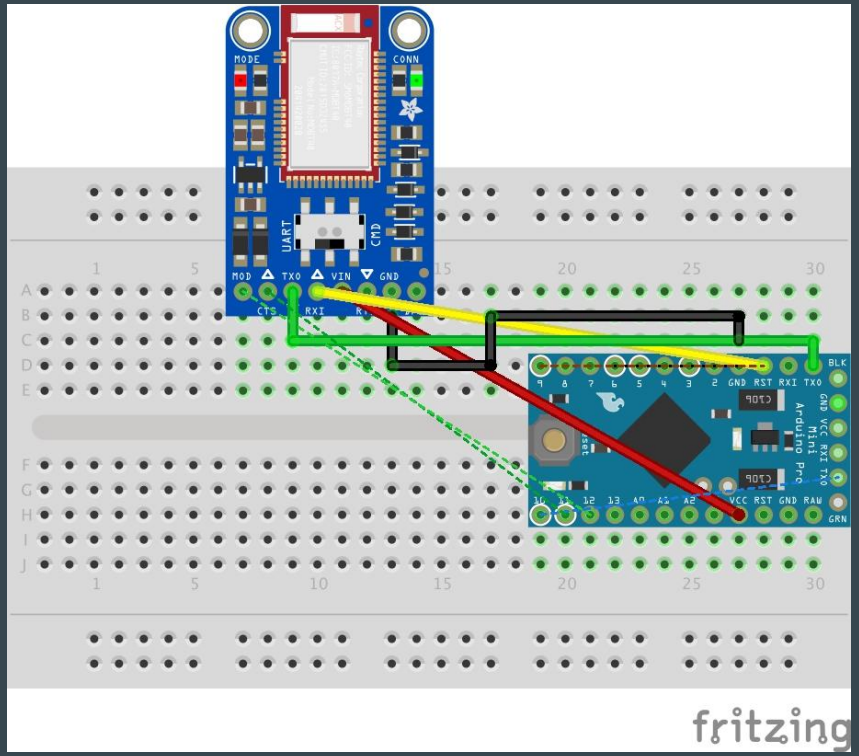
Low level hardware setup - LED



Low level hardware setup - Sound Sensor



Low level hardware setup - Bluetooth HC-05



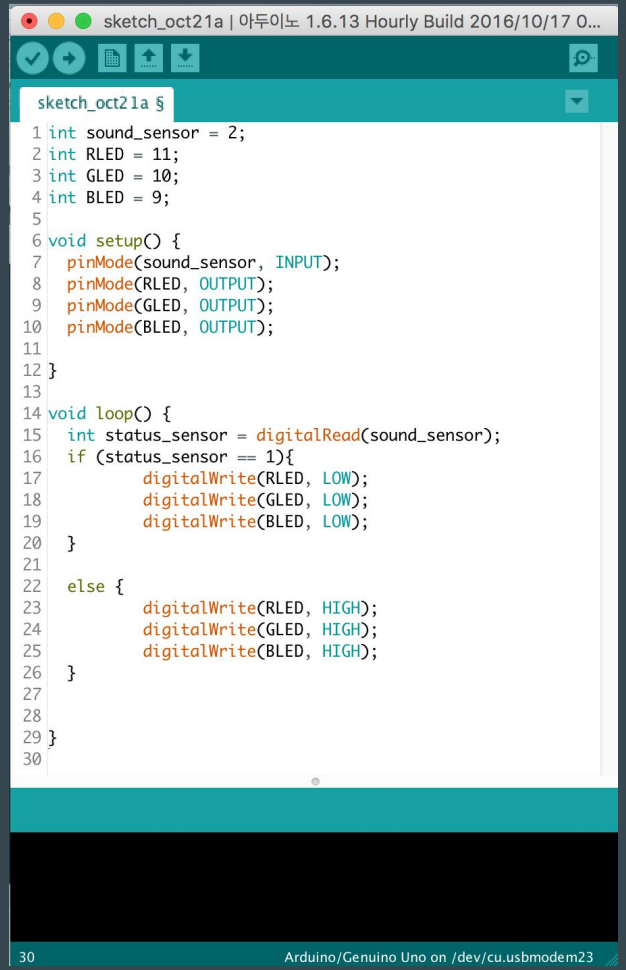
Steps Detail

1. Turn on Arduino
2. Lights RGB LED
3. Connects to the Sound Sensor
4. Connects to the Bluetooth
5. Combine all the three features

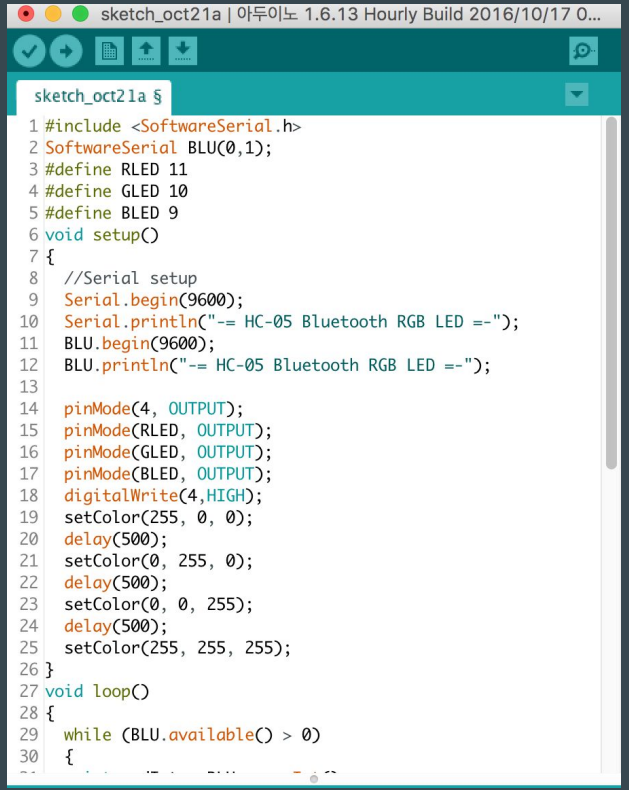
Code for LED


sketch_oct21a | 아두이노 1.6.13 Hourly Build
sketch_oct21a §
int greenPin = 10;
int bluePin = 9;
void setup()
{
pinMode(redPin, OUTPUT);
pinMode(greenPin, OUTPUT);
pinMode(bluePin, OUTPUT);
}
void loop()
{
setColor(255, 0, 0); // red
delay(1000);
setColor(0, 255, 0); // green
delay(1000);
setColor(0, 0, 255); // blue
delay(1000);
setColor(255, 255, 0); // yellow
delay(1000);
setColor(80, 0, 80); // purple
delay(1000);
setColor(0, 255, 255); // aqua
delay(1000);
setColor(0x4B, 0x0, 0x82);
delay(1000);
}
void setColor(int red, int green, int blue)
{
analogWrite(redPin, red);
analogWrite(greenPin, green);
analogWrite(bluePin, blue);
}
36

Code for Sound Sensor

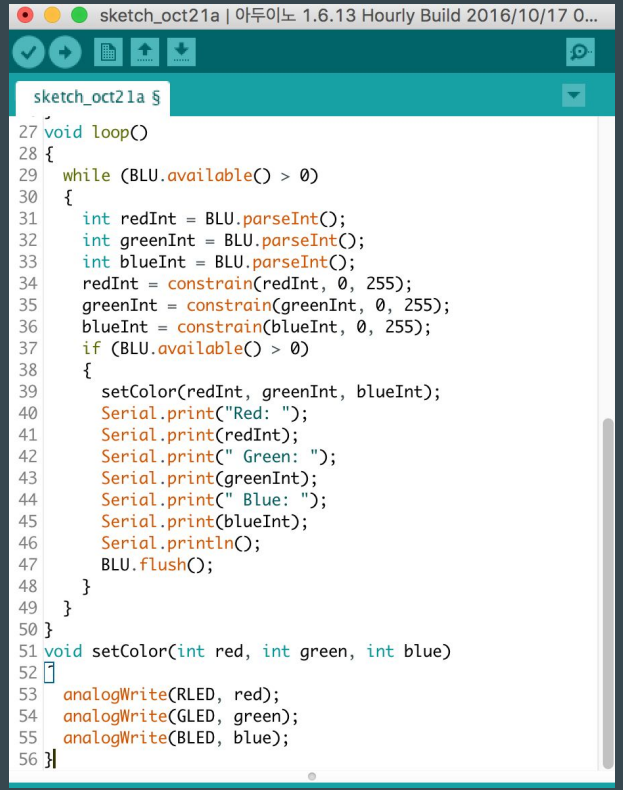


Code for BlueTooth




```
#include <SoftwareSerial.h>
SoftwareSerial BLU(0,1);
#define RLED 11
#define GLED 10
#define BLED 9
void setup()
{
  //Serial setup
  Serial.begin(9600);
  Serial.println("-= HC-05 Bluetooth RGB LED =-");
  BLU.begin(9600);
  BLU.println("-= HC-05 Bluetooth RGB LED =-");

  pinMode(4, OUTPUT);
  pinMode(RLED, OUTPUT);
  pinMode(GLED, OUTPUT);
  pinMode(BLED, OUTPUT);
  digitalWrite(4,HIGH);
  setColor(255, 0, 0);
  delay(500);
  setColor(0, 255, 0);
  delay(500);
  setColor(0, 0, 255);
  delay(500);
  setColor(255, 255, 255);
}
void loop()
{
  while (BLU.available() > 0)
  {
```




```
void loop()
{
  while (BLU.available() > 0)
  {
    int redInt = BLU.parseInt();
    int greenInt = BLU.parseInt();
    int blueInt = BLU.parseInt();
    redInt = constrain(redInt, 0, 255);
    greenInt = constrain(greenInt, 0, 255);
    blueInt = constrain(blueInt, 0, 255);
    if (BLU.available() > 0)
    {
      setColor(redInt, greenInt, blueInt);
      Serial.print("Red: ");
      Serial.print(redInt);
      Serial.print(" Green: ");
      Serial.print(greenInt);
      Serial.print(" Blue: ");
      Serial.print(blueInt);
      Serial.println();
      BLU.flush();
    }
  }
}
void setColor(int red, int green, int blue)

  analogWrite(RLED, red);
  analogWrite(GLED, green);
  analogWrite(BLED, blue);
}
```

Code for Combination

sketch_oct21b | 아두이노 1.6.13 Hourly Build 2016/10/17 0...

sketch_oct21b §

```
  delay(500);
  setColor(0, 0, 255);
  delay(500);
  setColor(255, 255, 255);


}

void loop() {

   while (BLU.available() > 0)
  {
    int redInt = BLU.parseInt();
    int greenInt = BLU.parseInt();
    int blueInt = BLU.parseInt();
    redInt = constrain(redInt, 0, 255);
    greenInt = constrain(greenInt, 0, 255);
    blueInt = constrain(blueInt, 0, 255);
    if (BLU.available() > 0)
    {
      setColor(redInt, greenInt, blueInt);
      Serial.print("Red: ");
      Serial.print(redInt);
      Serial.print(" Green: ");
      Serial.print(greenInt);
      Serial.print(" Blue: ");
      Serial.print(blueInt);
      Serial.println();
      BLU.flush();
    }
```

sketch_oct21b | 아두이노 1.6.13 Hourly Build 2016/10/17 0...

sketch_oct21b §

```
  delay(500);
  setColor(0, 0, 255);
  delay(500);
  setColor(255, 255, 255);


}

void loop() {

   while (BLU.available() > 0)
  {
    int redInt = BLU.parseInt();
    int greenInt = BLU.parseInt();
    int blueInt = BLU.parseInt();
    redInt = constrain(redInt, 0, 255);
    greenInt = constrain(greenInt, 0, 255);
    blueInt = constrain(blueInt, 0, 255);
    if (BLU.available() > 0)
    {
      setColor(redInt, greenInt, blueInt);
      Serial.print("Red: ");
      Serial.print(redInt);
      Serial.print(" Green: ");
      Serial.print(greenInt);
      Serial.print(" Blue: ");
      Serial.print(blueInt);
      Serial.println();
      BLU.flush();
    }
```

sketch_oct21b | 아두이노 1.6.13 Hourly Build 2016/10/17 0...

sketch_oct21b §

```
      Serial.print(blueInt);
      Serial.println();
      BLU.flush();
    }
   }

  int status_sensor = digitalRead(sound_sensor);
  if (status_sensor == 1){
            digitalWrite(4,LOW);
            digitalWrite(BLED, LOW);
            digitalWrite(GLED, LOW);
            digitalWrite(BLED, LOW);


  }

  else {
            digitalWrite(4,HIGH);
            digitalWrite(BLED, HIGH);
            digitalWrite(RLED, HIGH);
            digitalWrite(GLED, HIGH);
  }

}

void setColor(int red, int green, int blue)
{
  analogWrite(RLED, red);
  analogWrite(GLED, green);
  analogWrite(BLED, blue);
}
```

Second_Attempt - Color Change

color_change_new

```
#include <SoftwareSerial.h>
#include <Wire.h>//Include libraries: SoftwareSerial & Wire
SoftwareSerial BT(11,12); //Define PIN11 & PIN12 as RX and TX pins

//RGB LED Pins
int R_LED = 8;
int G_LED = 10;
int B_LED = 9;
//RED LED at Pin 13
int RED_LED = 13;
String RGB = ""; //store RGB code from BT
String RGB_Previous = "255.255.255)"; //preserve previous RGB color
String ON = "ON"; //Check if ON command is received
String OFF = "OFF"; //Check if OFF command is received
boolean RGB_Completed = false;

void setup() {
  Serial.begin(9600); //Arduino serial port baud rate：9600
  BT.begin(9600);//My HC-05 module default baud rate is 9600
  RGB.reserve(30);

  pinMode(RED_LED, OUTPUT);
  //Set pin13 as output for LED,
}

void loop() {
  // put your main code here, to run repeatedly:

  //Read each character from Serial Port(Bluetooth)
  while(BT.available()){
    char ReadChar = (char)BT.read();

    // Right parentheses ) indicates complet of the string
    if(ReadChar == ')'){
```

color_change_new

```
    // Right parentheses ) indicates complet of the string
    if(ReadChar == ')'){
      RGB_Completed = true;
    }else{
       RGB += ReadChar;
    }
  }

  //When a command code is received completely with ')' ending ch
  if(RGB_Completed){
   //Print out debug info at Serial output window
      Serial.print("RGB:");
      Serial.print(RGB);
      Serial.print("     PreRGB:");
      Serial.println(RGB_Previous);

      if(RGB==ON){
          digitalWrite(13,HIGH);
          RGB = RGB_Previous; //We only receive 'ON', so get prev
          Light_RGB_LED();

      }else if(RGB==OFF){
          digitalWrite(13,LOW);
          RGB = "0.0.0)"; //Send OFF string to turn light off
          Light_RGB_LED();
      }else{
          //Turn the color according the color code from Bluetoot
          Light_RGB_LED();
          RGB_Previous = RGB;
      }
      //Reset RGB String

      RGB = "";
      RGB_Completed = false;
```

color_change_new

```
      //Reset RGB String

      RGB = "";
      RGB_Completed = false;


  } //end if of check if RGB completed

} // end of loop

void Light_RGB_LED(){

  int SP1 = RGB.indexOf('.');
  int SP2 = RGB.indexOf('.', SP1+1);
  int SP3 = RGB.indexOf('.', SP2+1);
  String R = RGB.substring(0, SP1);
  String G = RGB.substring(SP1+1, SP2);
  String B = RGB.substring(SP2+1, SP3);

  //Print out debug info at Serial output window
  Serial.print("R=");
  Serial.println( constrain(R.toInt(),0,255));
  Serial.print("G=");
  Serial.println(constrain(G.toInt(),0,255));
  Serial.print("B=");
  Serial.println( constrain(B.toInt(),0,255));
  //Light up the LED with color code

  analogWrite(R_LED,  (R.toInt()));
  analogWrite(G_LED, (G.toInt()));
  analogWrite(B_LED,  (B.toInt()));

}
```

Second_Attempt - Combination

color_change_new_2

```
#include <SoftwareSerial.h>
#include <Wire.h>//Include libraries: SoftwareSerial & Wire
SoftwareSerial BT(11,12); //Define PIN11 & PIN12 as RX and TX pi

int sound_sensor = 2;
//RGB LED Pins
int R_LED = 8;
int G_LED = 10;
int B_LED = 9;
//RED LED at Pin 13
int RED_LED = 13;
String RGB = ""; //store RGB code from BT
String RGB_Previous = "255.255.255)"; //preserve previous RGB co
String ON = "ON"; //Check if ON command is received
String OFF = "OFF"; //Check if OFF command is received
boolean RGB_Completed = false;

void setup() {
  Serial.begin(9600); //Arduino serial port baud rate：9600
  BT.begin(9600);//My HC-05 module default baud rate is 9600
  RGB.reserve(30);

  pinMode(sound_sensor, INPUT);
  pinMode(RED_LED, OUTPUT);
  //Set pin13 as output for LED,
}

void loop() {
  // put your main code here, to run repeatedly:

  int status_sensor = digitalRead(sound_sensor);
      if (status_sensor == 1){
               digitalWrite(13, LOW);
```

color_change_new_2

```

  //Read each character from Serial Port(Bluetooth)
  while(BT.available()){
    char ReadChar = (char)BT.read();

    // Right parentheses ) indicates complet of the string
    if(ReadChar == ')'){
      RGB_Completed = true;
    }else{
       RGB += ReadChar;
    }
  }

  //When a command code is received completely with ')' ending
  if(RGB_Completed){
   //Print out debug info at Serial output window
      Serial.print("RGB:");
      Serial.print(RGB);
      Serial.print("     PreRGB:");
      Serial.println(RGB_Previous);

      if(RGB==ON){
          digitalWrite(13,HIGH);
          RGB = RGB_Previous; //We only receive 'ON', so get pr
          Light_RGB_LED();

      }else if(RGB==OFF){
          digitalWrite(13,LOW);
          RGB = "0.0.0)"; //Send OFF string to turn light off
          Light_RGB_LED();
      }else{
          //Turn the color according the color code from Blueto
          Light_RGB_LED();
          RGB_Previous = RGB;
```

color_change_new_2

```
  }//end if of check if RGB completed


}

      else {
                digitalWrite(13, HIGH);
       }

} // end of loop

void Light_RGB_LED(){

  int SP1 = RGB.indexOf('.');
  int SP2 = RGB.indexOf('.', SP1+1);
  int SP3 = RGB.indexOf('.', SP2+1);
  String R = RGB.substring(0, SP1);
  String G = RGB.substring(SP1+1, SP2);
  String B = RGB.substring(SP2+1, SP3);

  //Print out debug info at Serial output window
  Serial.print("R=");
  Serial.println( constrain(R.toInt(),0,255));
  Serial.print("G=");
  Serial.println(constrain(G.toInt(),0,255));
  Serial.print("B=");
  Serial.println( constrain(B.toInt(),0,255));
  //Light up the LED with color code

  analogWrite(R_LED,  (R.toInt()));
  analogWrite(G_LED, (G.toInt()));
  analogWrite(B_LED,  (B.toInt()));

}
```

Thank You