

```
void setup() {  
    pinmode(13, OUTPUT);  
}
```

```
void loop() {  
    digitalWrite(13, HIGH);  
    delay(1000);  
    digitalWrite(13, LOW);  
    delay(1000);  
}
```

```
int GRN = 2;  
int YEL = 3;  
int RED = 4;  
int DEL_GRN = 5000;  
int DEL_YEL = 2000;  
int DEL_RED = 5000;
```

```
void setup(){  
    pinMode(GRN, OUTPUT);  
    pinMode(YEL, OUTPUT);  
    pinMode(RED, OUTPUT);  
}
```

```
void loop(){  
    grn_light();  
    delay(DEL_GRN);  
    yel_light();  
    delay(DEL_YEL);  
    red_light();  
    delay_red();  
}
```

```
void grn_light(){  
    digitalWrite(GRN, HIGH);  
    digitalWrite(YEL, LOW);  
    digitalWrite(RED, LOW);  
}
```

```
void yel_light() {  
    digitalWrite ( GRN , LOW ) ;  
    digitalWrite ( YEL , HIGH ) ;  
    digitalWrite ( RED , LOW ) ;  
}
```

```
void red_light () {  
    digitalWrite ( GRN , LOW ) ;  
    digitalWrite ( YEL , LOW ) ;  
    digitalWrite ( RED , HIGH ) ;  
}
```

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Program no – 02

Program Title – Push Button

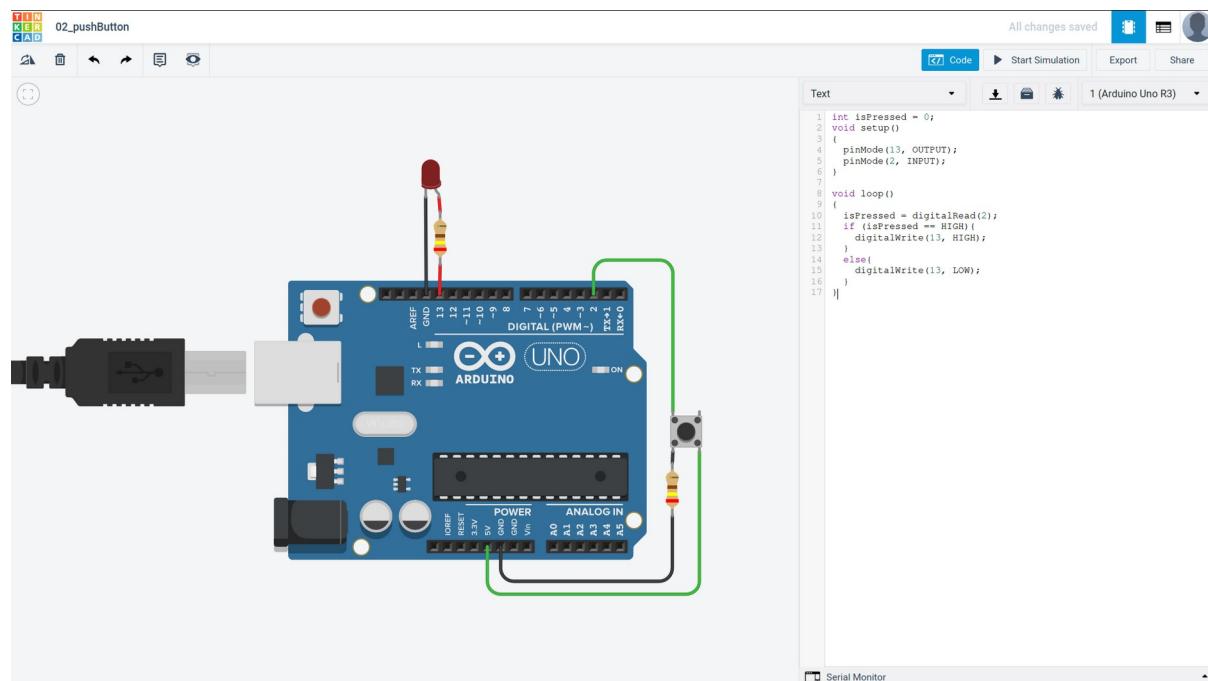
Aim

To use a push button to turn on an LED

Hardware Required

- Arduino Board
- LED
- 2x 240 Ohm Resistor
- Push Button

Circuit Diagram



Code:

```
int isPressed = 0;
void setup()
{
  pinMode(13, OUTPUT);
  pinMode(2, INPUT);
```

```
}
```

```
void loop()
{
isPressed = digitalRead(2);
if (isPressed == HIGH){
digitalWrite(13, HIGH);
}
else{
digitalWrite(13, LOW);
}
}
```

Observation /Output

LED is turned on when the button is pressed.

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Program no – 03

Program Title – Fade

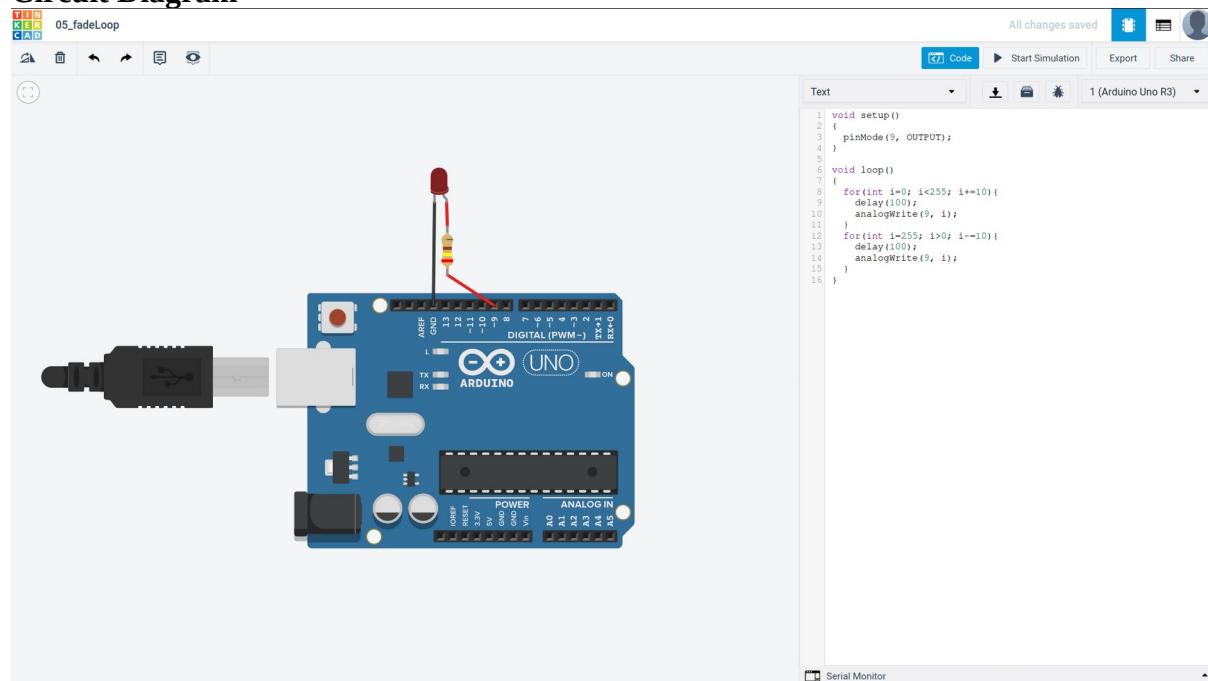
Aim

To fade an LED on and off

Hardware Required

- Arduino Board
- LED
- 240 Ohm Resistor

Circuit Diagram



Code:

```
void setup()
{
  pinMode(9, OUTPUT);
}
```

```
void loop()
```

```
for(int i=0; i<255; i+=10){  
delay(100);  
analogWrite(9, i);  
}  
for(int i=255; i>0; i-=10){  
delay(100);  
analogWrite(9, i);  
}  
}
```

Observation /Output

LED is faded on and off.

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Program no – 04

Program Title – Potentiometer

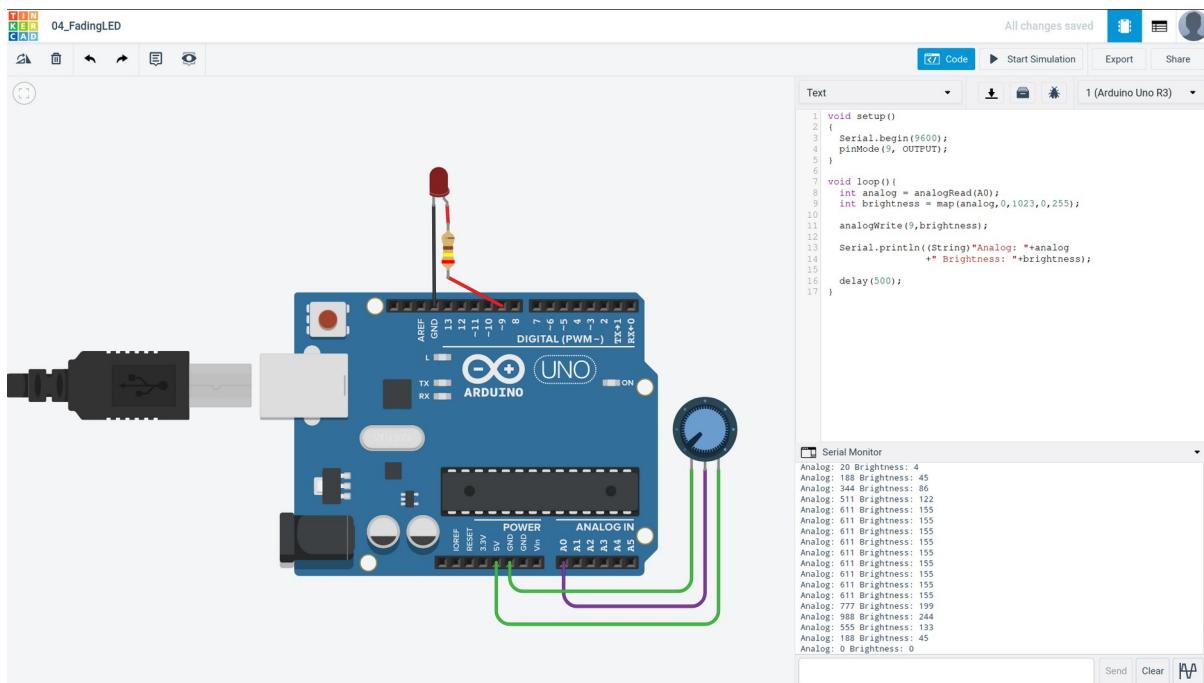
Aim

To fade an LED on and off using a potentiometer

Hardware Required

- Arduino Board
- LED
- 240 Ohm Resistor

Circuit Diagram



Code:

```
void setup()
{
  Serial.begin(9600);
  pinMode(9, OUTPUT);
}

void loop()
```

```
int analog = analogRead(A0);
int brightness = map(analog,0,1023,0,255);
analogWrite(9,brightness);
Serial.println((String)"Analog: "+analog
+" Brightness: "+brightness);
delay(500);
}
```

Observation /Output

LED is faded on and off using the potentiometer.

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Program no – 05

Program Title – Temperature sensor

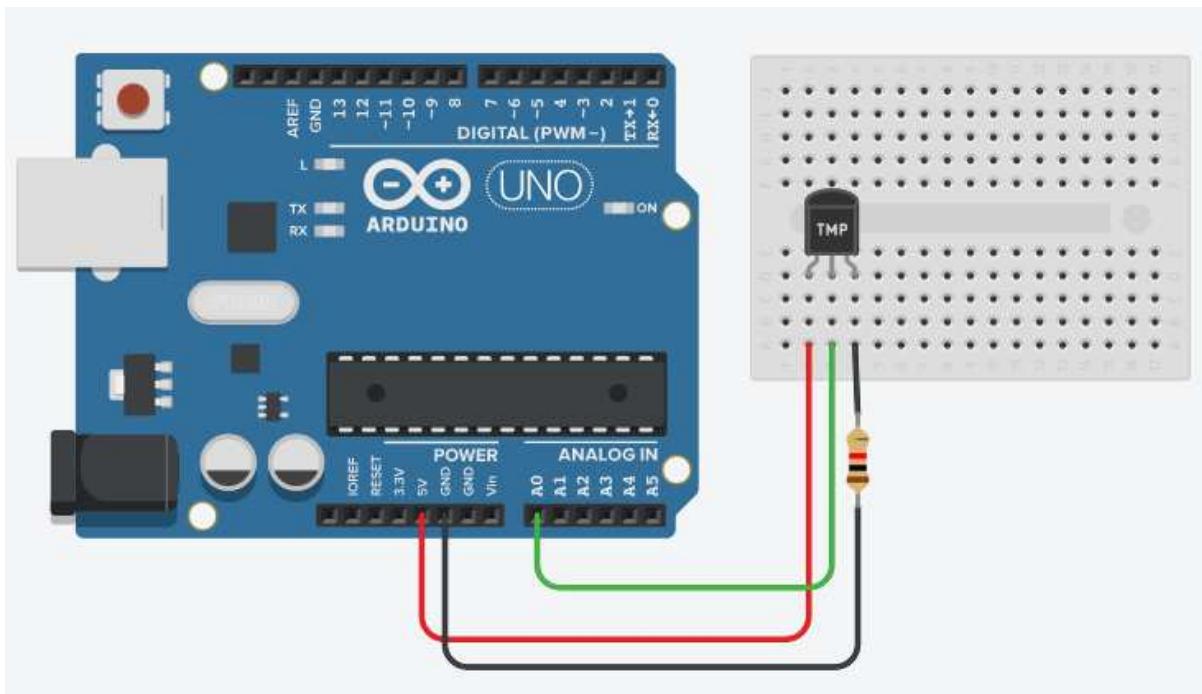
Aim

To log the temperature in Celcius and farenheit

Hardware Required

- Arduino Board
- Temperature Sensor
- 240 Ohm Resistor

Circuit Diagram



Code:

```
// Shaan Subbaiah B C - 1BM18CS096  
// TEMP SENSOR
```

```
void setup(){
```

```

Serial.begin(9600);
}

void loop()
{
    int analog = analogRead(A0);
    // 31->-40 368->125

    float c = map(analog,31,368,-40,125);
    float f = (float)((9/5)*c)+32;
    Serial.println((String)"Analog: "+analog
                  +", Temp: "+c+"C = "+f+"F");

    delay(1000);
}

```

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~~//Shaan Subbiah BC~~

```

void setup(){
    Serial.begin(9600);
}

void loop(){
    int analog = analogRead(A0);

    float c = map(analog, 31, 368, -40, 125);
    float f = (float)(9/5 * c) + 32;
    Serial.println((String)"Temp: "+c+"°C "+f+"F");
    delay(1000);
}

```

Observation /Output

Temperature is logged in the Serial output.

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Program no – 06

Program Title – Light sensor

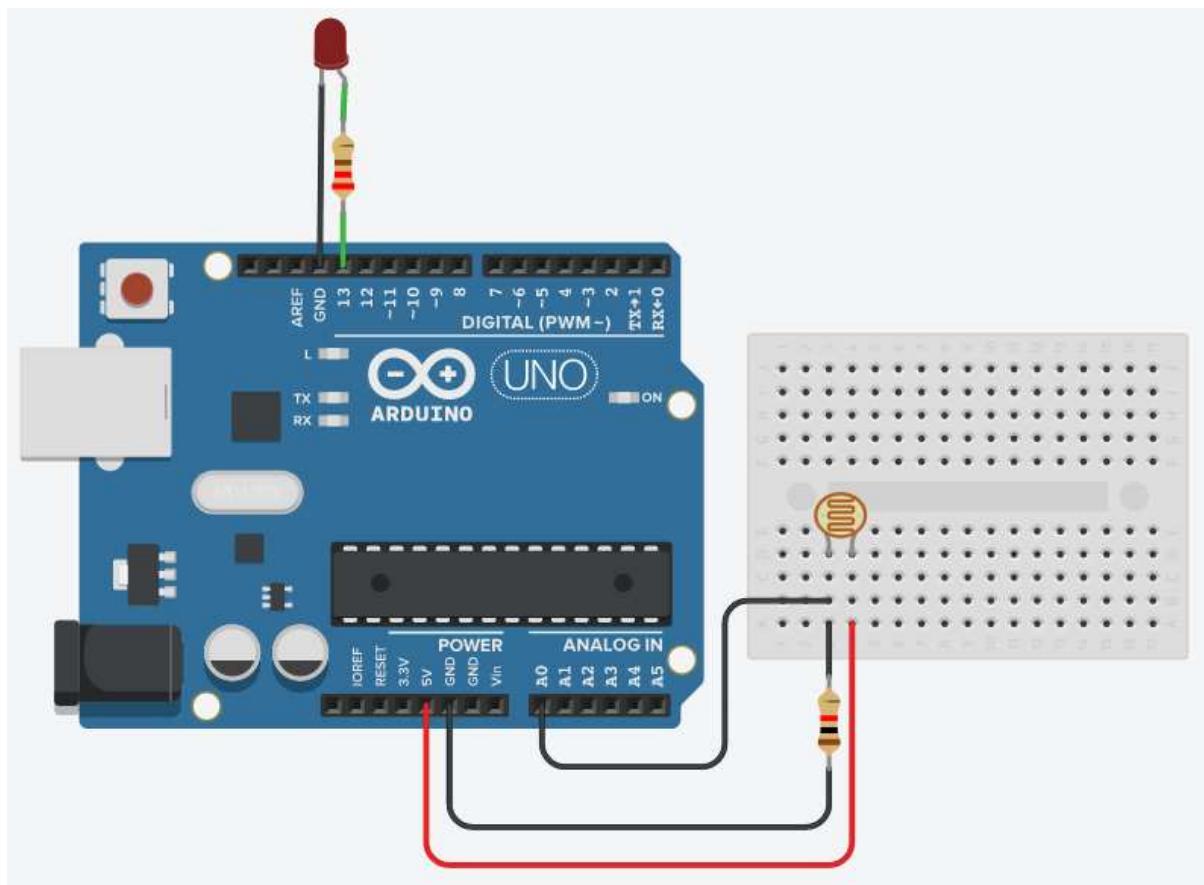
Aim

To turn on the LED when light is below a certain threshold

Hardware Required

- Arduino Board
- LDR
- LED
- 240 Ohm Resistor, 1000 Ohm Resistor

Circuit Diagram



Code:

```
// Shaan Subbaiah B C - 1BM18CS096
// LDR

void setup()
{
    Serial.begin(9600);
    pinMode(13, OUTPUT);
}

void loop()
{
    int analog = analogRead(A0);

    if(analog < 520)
        digitalWrite(13, HIGH);
    else
        digitalWrite(13, LOW);

    Serial.println((String)"Sensed light = "+analog);

    delay(1000);
}
```

// Shaan Subbaiah B C

```
void setup()
{
    Serial.begin(9600);
    pinMode(13, OUTPUT);
}

void loop()
{
    int ag = analogRead(A0);
    if (ag < 520)
        digitalWrite(13, HIGH);
    else
        digitalWrite(13, LOW);

    Serial.println((String)"Sensed light = "+analog);

    delay(1000);
}
```

Observation /Output

LED is turned on when light is low.

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Program no – 07

Program Title – Passive Infrared Sensor

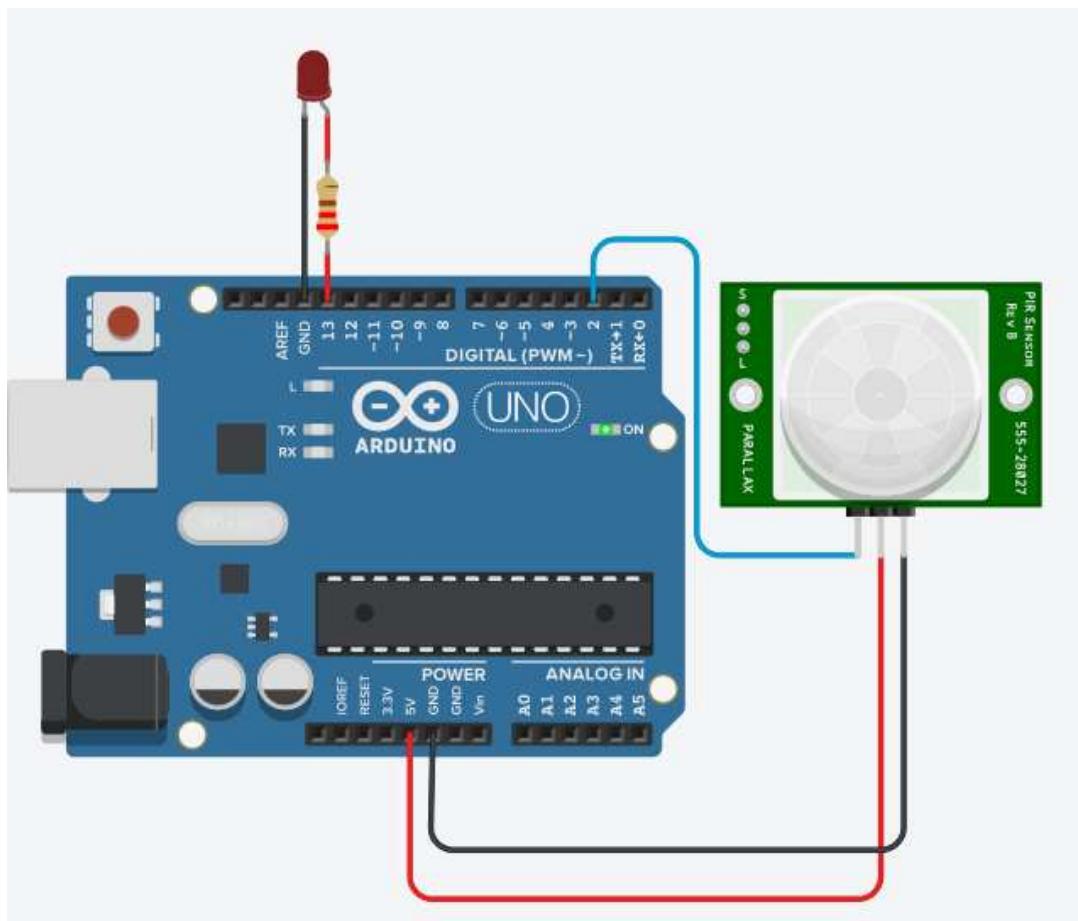
Aim

To turn on the LED upon detecting motion.

Hardware Required

- Arduino Board
- PIR
- LED
- 240 Ohm Resistor

Circuit Diagram



Code:

```
// Shaan Subbaiah B C - 1BM18CS096
// PIR SENSOR

void setup()
{
    Serial.begin(9600);
    pinMode(13, OUTPUT);
    pinMode(2, INPUT);
}

void loop()
{
    int pirVal = digitalRead(2);
    if(pirVal == HIGH)
        digitalWrite(13, HIGH);
    else
        digitalWrite(13, LOW);

    Serial.println((String)"Is something moving: "+pirVal);

    delay(1000);
}
```

```
// Shaan Subbaiah b c
void setup() {
    Serial.begin(9600);
    pinMode(13, OUTPUT);
    pinMode(2, INPUT);
}

void loop() {
    int pir = digitalRead(2);
    if (pir == HIGH)
        digitalWrite(13, HIGH);
    else
        digitalWrite(13, LOW);

    Serial.println((String)"Is something moving? "+pir);
    delay(1000);
}
```

Observation /Output

LED is turned on when motion is detected.

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Program no – 09

Program Title – Fire Detection

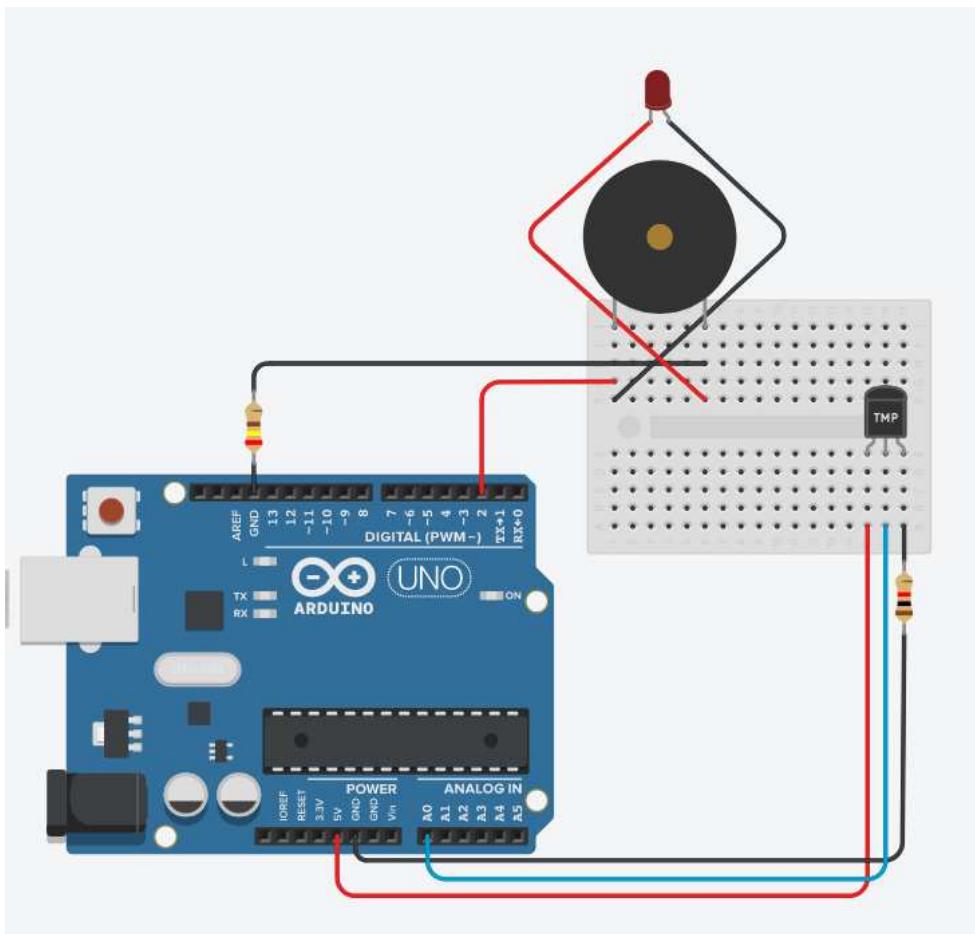
Aim

To turn on the LED and Buzzer upon detecting a fire.

Hardware Required

- Arduino Board
- Buzzer
- LED
- Temperature Sensor
- 2x 240 Ohm Resistor

Circuit Diagram



```
void setup() {  
    Serial.begin(9600);  
    pinMode(2, OUTPUT);  
}
```

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```
void loop() {  
    int tempAlg = analogRead(A0);  
    float c = map(tempAlg, 31, 368, -40, 125);  
  
    if (c > 70) {  
        Serial.println("buzzing!");  
        digitalWrite(2, HIGH);  
        delay(2000);  
        digitalWrite(2, LOW);  
    } else {  
        Serial.println("Idle");  
    }  
}
```

Code:

```
// Shaan Subbaiah B C - 1BM18CS096
// FIRE Sensor
void setup()
{
    Serial.begin(9600);
    pinMode(2, OUTPUT);
}

void loop()
{
    int temp_alg = analogRead(A0);
    float c = map(temp_alg,31,368,-40,125);

    if(c > 70){
        Serial.println("Buzzing!");
        digitalWrite(2, HIGH);
        delay(2000);
        digitalWrite(2, LOW);
    }else{
        Serial.println("Idle");
    }
}
```

Observation /Output

LED and buzzer is turned on when a fire is detected.

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Program no – 11

Program Title – Measure distance using an Ultrasonic Sensor, LCD

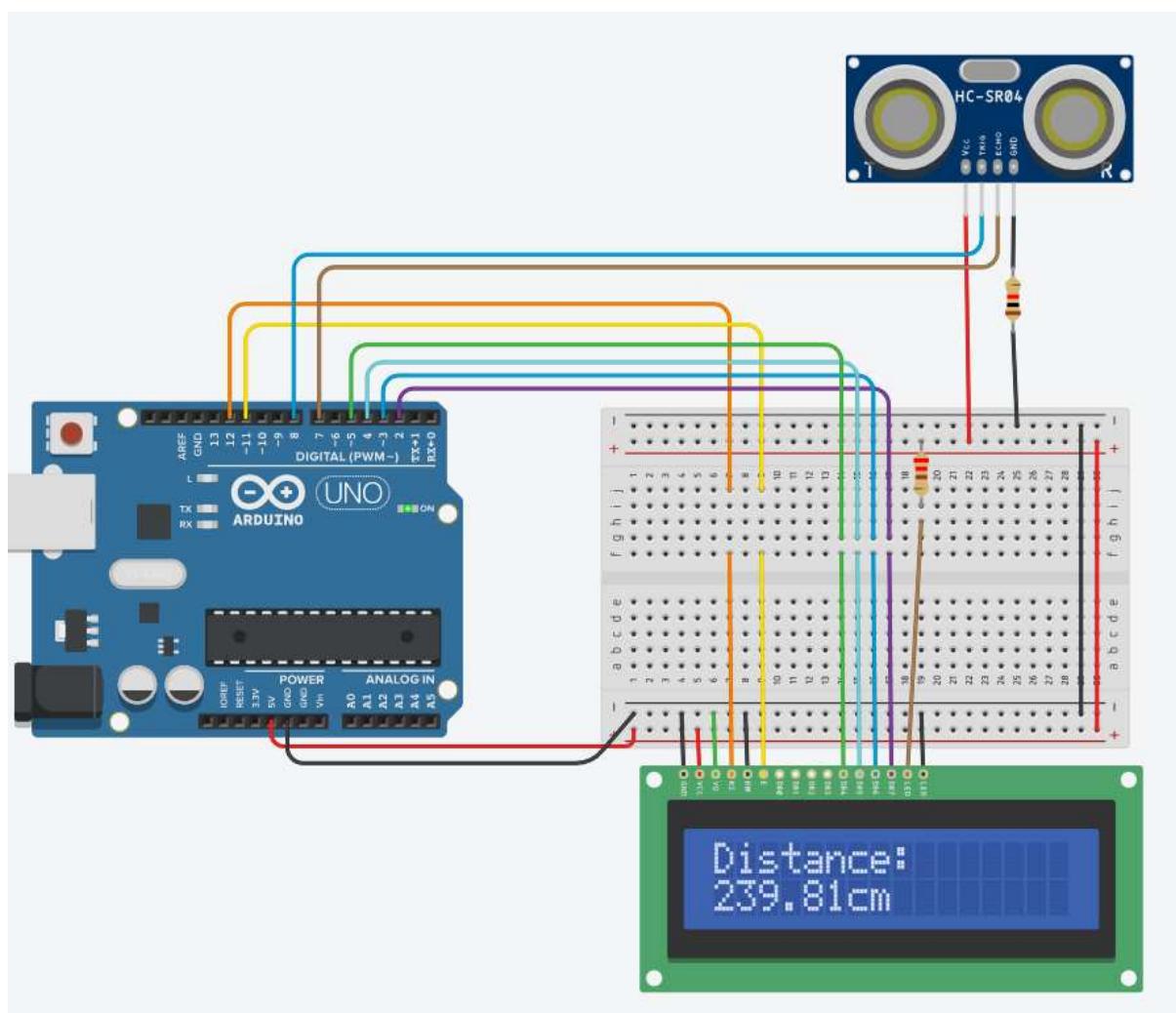
Aim

To display distance measured of an object on the LCD panel using an Ultrasonic Sensor.

Hardware Required

- Arduino Board
- Ultrasonic Sensor – HC-SR04
- 16x2 LCD
- 2x 240 Ohm Resistor

Circuit Diagram



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```
#include <LiquidCrystal.h>
```

```
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
```

```
void setup() {
```

```
    lcd.begin(16, 2);
```

```
    lcd.print("Distance : ");
```

```
    pinMode(7, INPUT);
```

```
    pinMode(8, OUTPUT);
```

```
    Serial.begin(9600);
```

```
}
```

```
void loop() {
```

```
    lcd.setCursor(0, 1);
```

```
    digitalWrite(8, HIGH);
```

```
    delayMicroseconds(10);
```

```
    digitalWrite(8, LOW);
```

```
    float duration = pulseIn(7, HIGH);
```

```
    float dist = duration * 0.034 / 2;
```

```
    lcd.print((String)dist + "cm");
```

```
    Serial.println((String)dist + "cm");
```

```
}
```

Code:

```
// Shaan Subbaiah B C - 1BM18CS096
// Distance using HC-SR04

/*
The circuit:
* LCD RS pin to digital pin 12
* LCD Enable pin to digital pin 11
* LCD D4 pin to digital pin 5
* LCD D5 pin to digital pin 4
* LCD D6 pin to digital pin 3
* LCD D7 pin to digital pin 2
* LCD R/W pin to ground
* LCD VSS pin to ground
* LCD VCC pin to 5V
* 10K resistor:
* ends to +5V and ground
* wiper to LCD VO pin (pin 3)
*/
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup() {
    // set up the LCD's number of columns and rows:
    lcd.begin(16, 2);
    // Print a message to the LCD.
    lcd.print("Distance:");

    pinMode(7, INPUT);
    pinMode(8, OUTPUT);

    Serial.begin(9600);
}

void loop() {
    // set the cursor to column 0, line 1
    // (note: line 1 is the second row, since counting begins with 0):
    lcd.setCursor(0, 1);

    digitalWrite(8, HIGH);
```

```
delayMicroseconds(10);
digitalWrite(8, LOW);

float duration = pulseIn(7, HIGH);
float dist = duration*0.034/2;

lcd.print((String)dist+"cm");
Serial.println((String)dist+"cm");
}
```

Observation /Output

Distance is displayed on the LCD panel.

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Program no – 11

Program Title – Gas Sensor

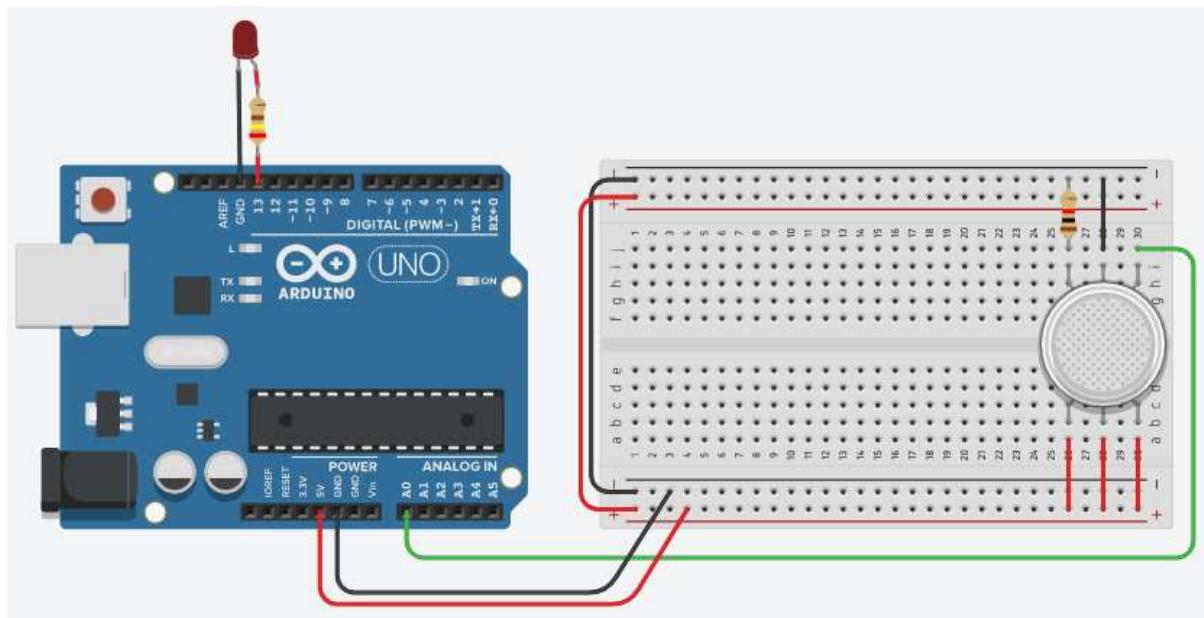
Aim

To turn on the LED upon detecting gas.

Hardware Required

- Arduino Board
- Gas Sensor
- LED
- 240 Ohm Resistor

Circuit Diagram



Code:

```
// Shaan Subbaiah - 1BM18CS096
// Gas Detection
```

```
void setup()
{
    pinMode(13, OUTPUT);
    pinMode(A0, INPUT);

    Serial.begin(9600);
}

void loop()
{
    float gasVal = analogRead(A0);

    if(gasVal > 200)
        digitalWrite(13, HIGH);
    else
        digitalWrite(13, LOW);

    Serial.println((String)"Gas value: "+gasVal);
    delay(1000);
}
```

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```
void setup(){
    pinMode (13, OUTPUT);
    pinMode (A0, INPUT);
    Serial.begin (9600);
}

void loop(){
    float gasVal = analogRead(A0);
    if (gasVal > 200)
        digitalWrite (13, HIGH);
    else
        digitalWrite (13, LOW);
    Serial.println ((String)"Gas val: "+gasVal);
    delay(1000);
}
```

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Program no – 12

Program Title – Daylight detection

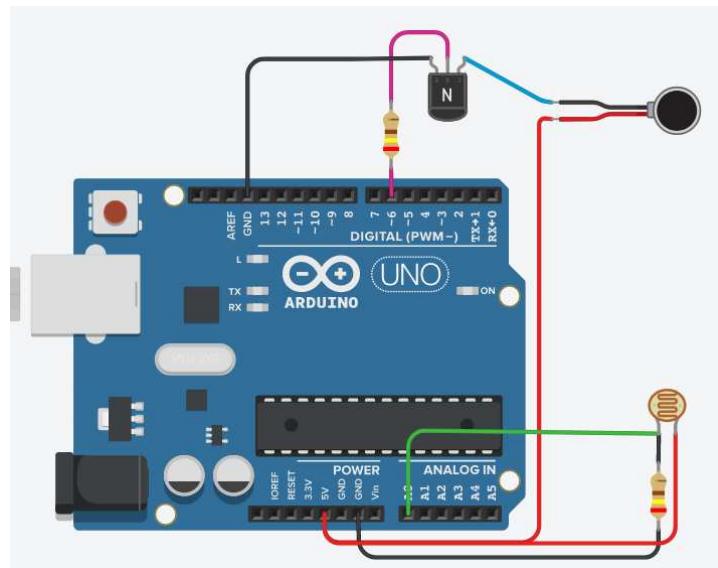
Aim

To turn on the vibration motor during the day / when a certain light threshold is met.

Hardware Required

- Arduino Board
- NPM transistor
- 2x 240 Ohm resistor
- Vibration motor
- LDR

Circuit Diagram



Code:

```
// Shaan Subbaiah - 1BM18CS096  
// Vibration on daylight
```

```

void setup()
{
    pinMode(6, OUTPUT);
    Serial.begin(9600);
}

void loop()
{
    int lightVal = analogRead(A0);

    Serial.println(lightVal);
    if(lightVal >= 200)
        digitalWrite(6, 255);
    else
        digitalWrite(6, 0);

    delay(300);
}

```

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```

void setup() {
    pinMode (6, OUTPUT);
}

void loop() {
    int lightVal = analogRead (A0);

    if (lightVal >= 200)
        digitalWrite (6, 255);
    else
        digitalWrite (6, 0);

    delay (1000);
}

```

Observation /Output

Vibration motor turns on during the day.

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Program no – 13

Program Title – Tilt Sensor

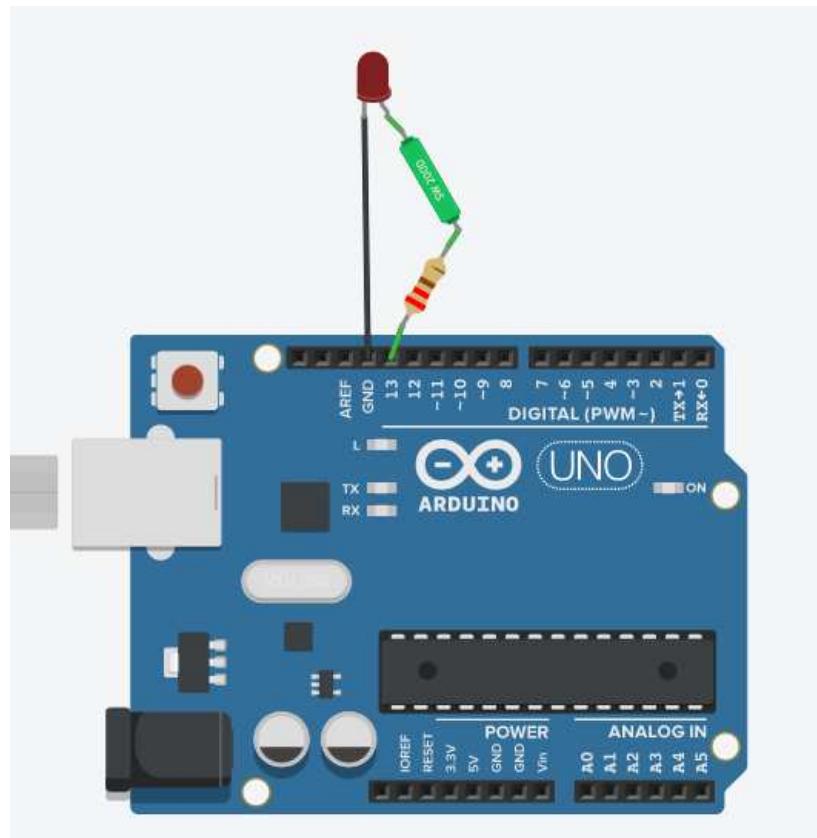
Aim

To turn on the LED when not tilted.

Hardware Required

- Arduino Board
- Tilt Sensor
- LED
- 240 Ohm Resistor

Circuit Diagram



Code:

```
void setup()
{
  pinMode(13, OUTPUT);
}

void loop()
{
  digitalWrite(13, HIGH);
}
```

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```
void setup() {
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH);
}
```

Observation /Output

LED is turned on when not tilted.

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Program no – 14

Program Title – RGB led interfacing with LCD panel

Aim

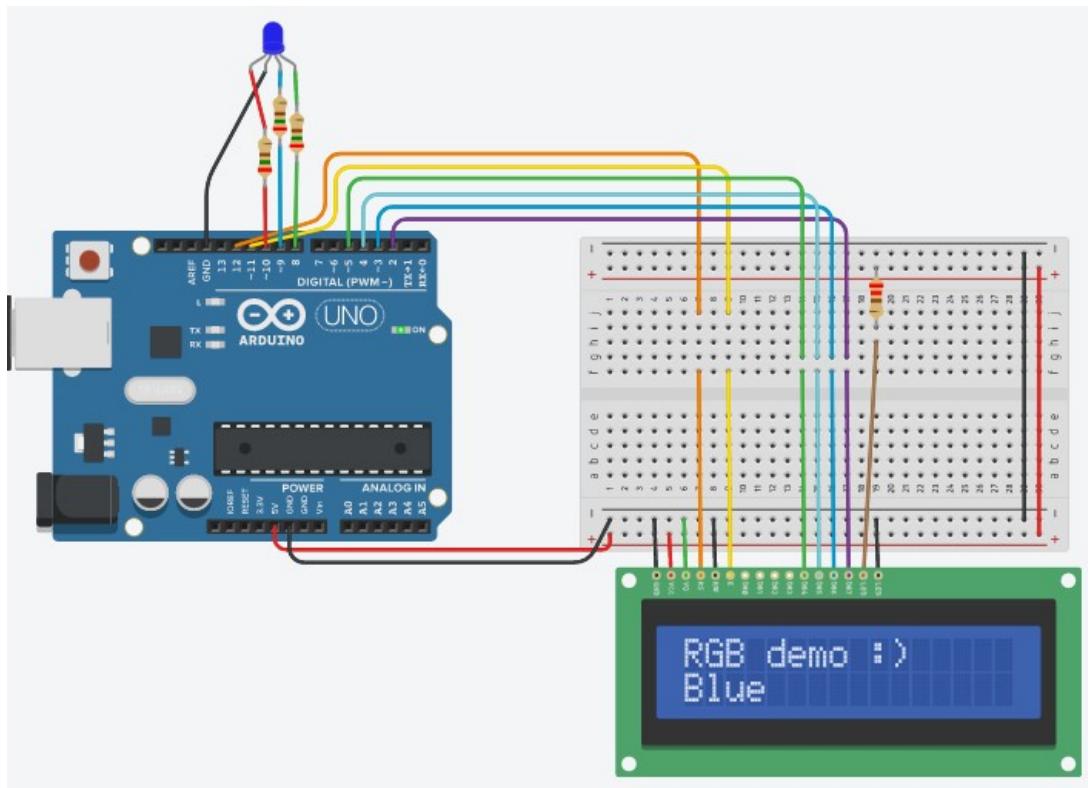
Switch colors using the rgb led, display the current color in the lcd display.

Hardware Required

- Arduino Board
- Tilt Sensor
- RGB LED
- LCD Panel
- Mini Breadboard
- 4 x 240 Ohm Resistor

LED color switches from Red -> Green -> Blue and name of the current color is displayed on the LCD panel

Circuit Diagram



Code:

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup() {
    pinMode(8, OUTPUT);
    pinMode(9, OUTPUT);LED color switches from Red -> Green -> Blue and name of the current color is displayed on the LCD panel
    pinMode(10, OUTPUT);LED color switches from Red -> Green -> Blue and name of the current color is displayed on the LCD panel

    lcd.begin(16, 2);
    lcd.print("RGB demo :)");
}

void loop() {
    lcd.setCursor(0, 1);

    lcd.print("Red ");
    digitalWrite(10, HIGH);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);

    delay(500);
    lcd.setCursor(0, 1);

    lcd.print("Blue ");
    digitalWrite(10, LOW);
    digitalWrite(9, HIGH);
    digitalWrite(8, LOW);

    delay(500);
    lcd.setCursor(0, 1);

    lcd.print("Green");
    digitalWrite(10, LOW);
    digitalWrite(9, LOW);
    digitalWrite(8, HIGH);

    delay(500);
}
```

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```
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
```

```
void setup(){
    pinMode(8, OUTPUT);
    pinMode(9, OUTPUT);
    pinMode(10, OUTPUT);
```

```
    lcd.begin(16, 2);
    lcd.print("RGB Demo :)");
}
```

```
void loop(){
    lcd.setCursor(0, 1);
    lcd.print("Red ");
    digitalWrite(10, HIGH);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);
    delay(500);
```

```
    lcd.setCursor(0, 1);
    lcd.print("Green ");
    digitalWrite(10, LOW);
    digitalWrite(9, LOW);
    digitalWrite(8, HIGH);
    delay(500);
```

```
lcd.setCursor(0,1);
lcd.print("Blue");
digitalWrite(10,LOW);
digitalWrite(9,HIGH);
digitalWrite(8,LOW);
delay(500);
```

Observation /Output

LED color switches from Red -> Green -> Blue and name of the current color is displayed on the LCD panel

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Program no – 15

Program Title – Controlling a Servo with an IR remote and receiver

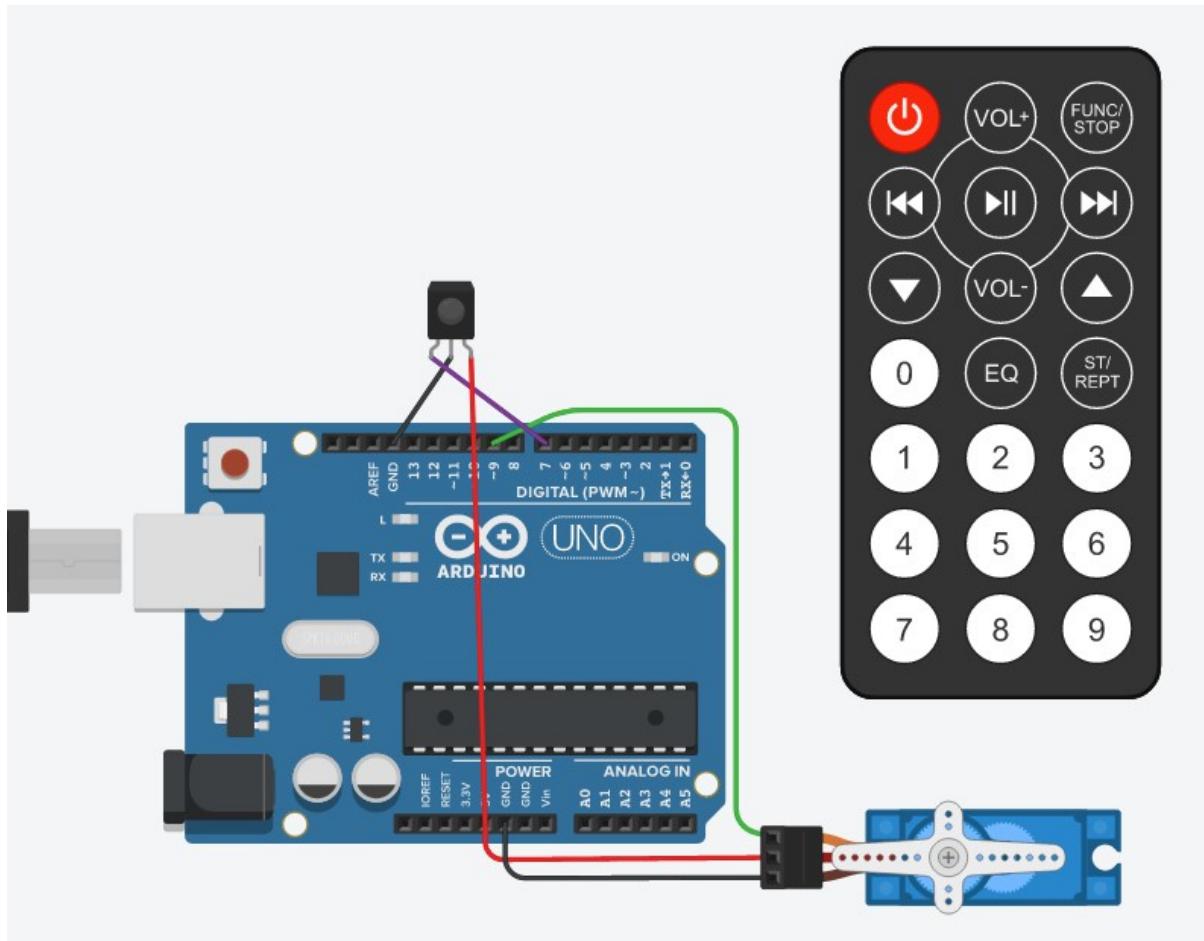
Aim

Switch colors using the rgb led, display the current color in the lcd display.

Hardware Required

- Arduino Board
- IR receiver, IR remote
- Servo

Circuit Diagram



Code:

```
#include <Servo.h>
#include <IRremote.h>

// setup servo pin, initialzae pos
int pos = 0;
Servo servo_9;

// setup ir reciever
int ir_in = 7;
IRrecv irrecv(ir_in);
decode_results results;

void setup()
{
    Serial.begin(9600);

    servo_9.attach(9);
    Serial.println("Enabled Servo");
    irrecv.enableIRIn();
    Serial.println("Enabled IRin");
}

void loop()
{
    if (irrecv.decode(&results)) {
        switch (results.value){
            case 0xFD609F:
                servo_9.write(360);
                Serial.println("Clockwise");
                break;
            case 0xFD20DF:
                servo_9.write(-360);
                Serial.println("Counter Clockwise");
                break;
            default:
                Serial.print("Use only << or >>");
                break;
        }
        irrecv.resume();
    }
}
```

```
#include <Servo.h>
#include <IRremote.h>

int pos = 0;
Servo servo_9;

int ir_in = 7;
IRrecv irrecv(ir_in);
decode_results results;

void setup() {
    Serial.begin(9600);
    servo_9.attach(9);
    irrecv.enableIRIn();
}

void loop() {
    if (irrecv.decode(&results)) {
        switch (results.value) {
            case 0xFD609F:
                servo_9.write(360);
                break;
            case 0xFD20DF:
                servo_9.write(-360);
                break;
        }
        irrecv.resume();
    }
}
```

Observation /Output

Servo moves left and reight when respective buttons are pressed on the IR Remote

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Program no – 16

Program Title – Irrigation system using a servo and moisture sensor

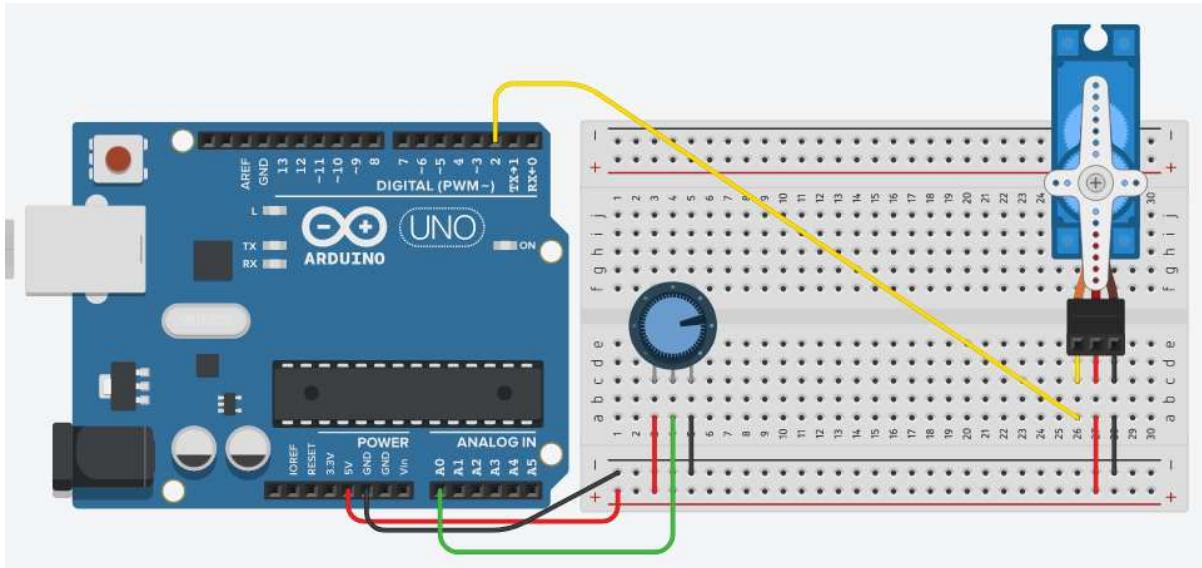
Aim

To open and close the valve for water automatically using a moisture sensor (here a potentiometer is used).

Hardware Required

- Arduino Board
- Potentiometer
- Servo

Circuit Diagram



Code:

```
#include <Servo.h>
```

```
Servo myServo;  
int isOpened = 0;
```

```
void setup()
{
    myServo.attach(2);
    Serial.begin(9600);
}

void loop()
{
    int moistureVal = analogRead(A0);
    Serial.println(moistureVal);

    if(moistureVal >= 512){
        if(isOpened == 0)
            myServo.write(90);
        isOpened = 1;
    }
    else{
        if(isOpened == 1)
            myServo.write(0);
        isOpened = 0;
    }

    delay(1000);
}
```

```

#include <Servo.h>                                # Shaan Subbaiah B C
Servo myServo;                                     # IBM18C8096
int isOpened = 0;

void setup() {
    myServo.attach(2);
}

void loop() {
    int moistVal = analogRead(A0);

    if (moistVal >= 512) {
        if (isOpened == 0)
            myServo.write(90);
        isOpened = 1;
    }
    else {
        if (isOpened == 1)
            myServo.write(0);
        isOpened = 0;
    }

    delay(1000);
}

```

Observation /Output

Automatically opens and closes the valve for water.