

①

Blink led :-

Aim :- Blink the led and a delay of few seconds.

Hardware required :-

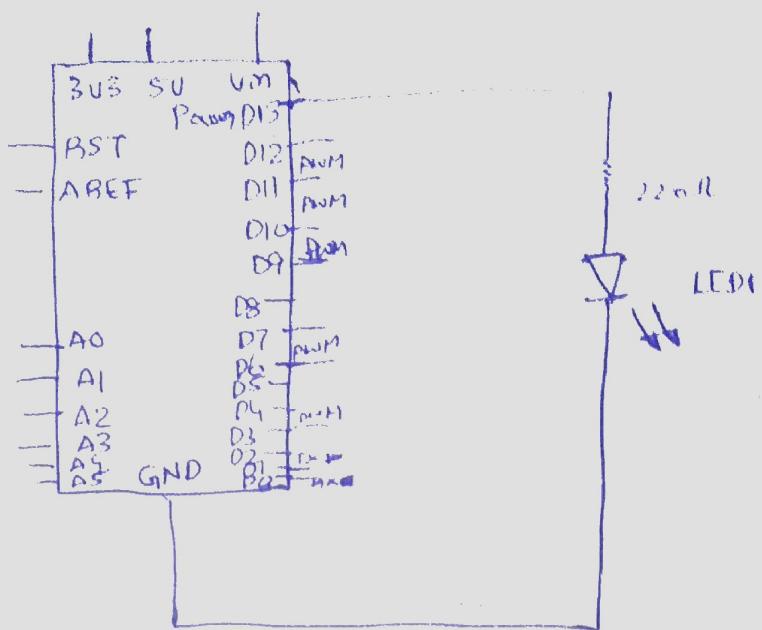
- Arduino Board
- LED
- Jumper wires

Code :-

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

Schematic diagram:-

Arduino



Traffic simulator

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IBML RCSO49

②

dim :- This simple little circuit uses an arduino and some LEDs to replicate a traffic light. It uses code as an internal timer and continues to run until you cut the Arduino's power supply.

Hardware required :-

- ① Arduino UNO
- ② Breadboard
- ③ Jumper wires
- ④ LED :- green, red, orange
- ⑤ Resistor 100 ohm
- ⑥ Arduino USB
2.0 data Cable

Code :-

```
int GREEN=2;  
int Yellow=3;  
int RED=4;  
int DELAY_GREEN=5000;  
int DELAY_YELLOW=2000;  
int DELAY_RED=5000;  
  
void setup()  
{ pinMode(GREEN,OUTPUT);  
  pinMode(YELLOW,OUTPUT);  
  pinMode(RED,OUTPUT);  
}
```

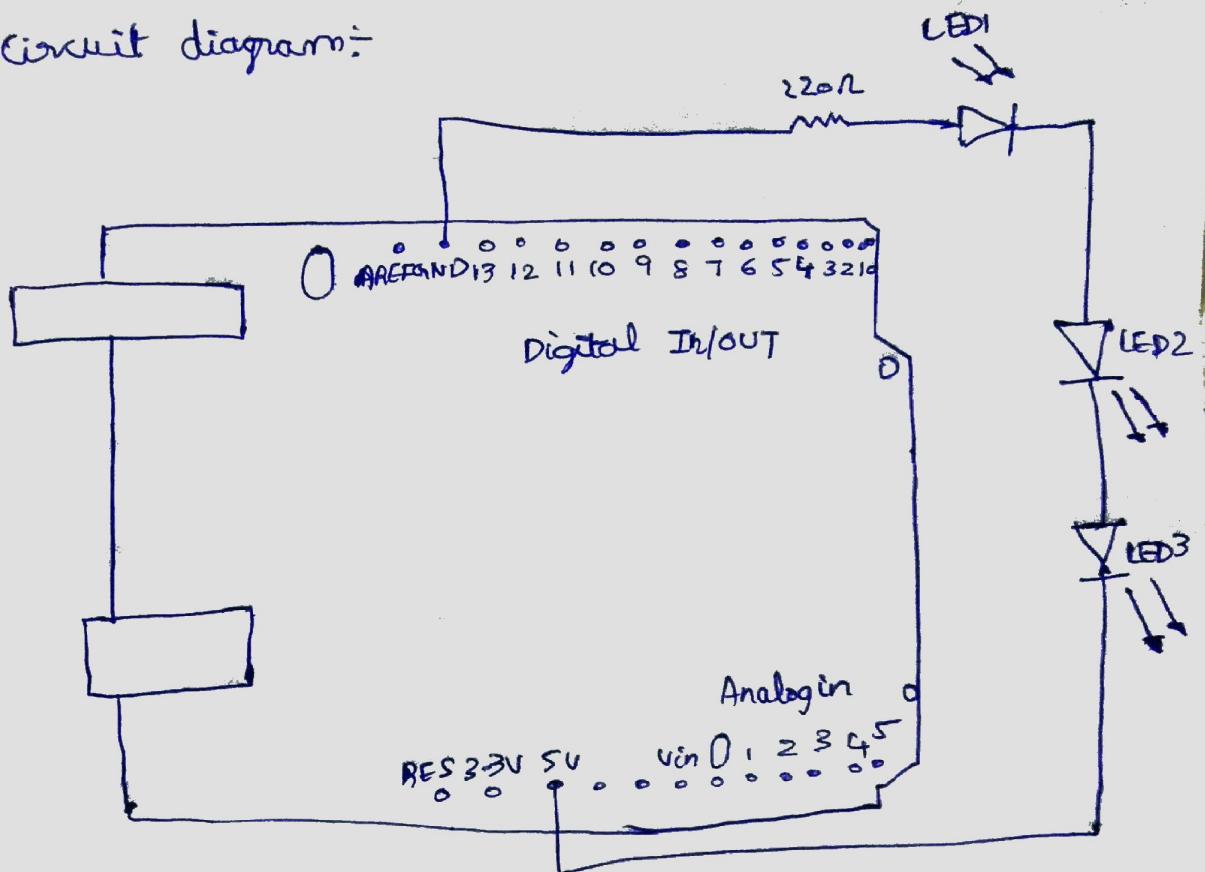
```
void loop()
{
    green_light();
    delay(DELAY_GREEN);
    yellow_light();
    delay(DELAY_YELLOW);
    red_light();
    delay(DELAY_RED);
}
```

```
void green_light()
{
    digitalWrite(GREEN, HIGH);
    digitalWrite(YELLOW, LOW);
    digitalWrite(RED, LOW);
}

void yellow_light()
{
    digitalWrite(GREEN, LOW);
    digitalWrite(YELLOW, HIGH);
    digitalWrite(RED, LOW);
}

void red_light()
{
    digitalWrite(GREEN, LOW);
    digitalWrite(YELLOW, LOW);
    digitalWrite(RED, HIGH);
}
```

Circuit diagram:



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Program no – 03

Program Title – Fade

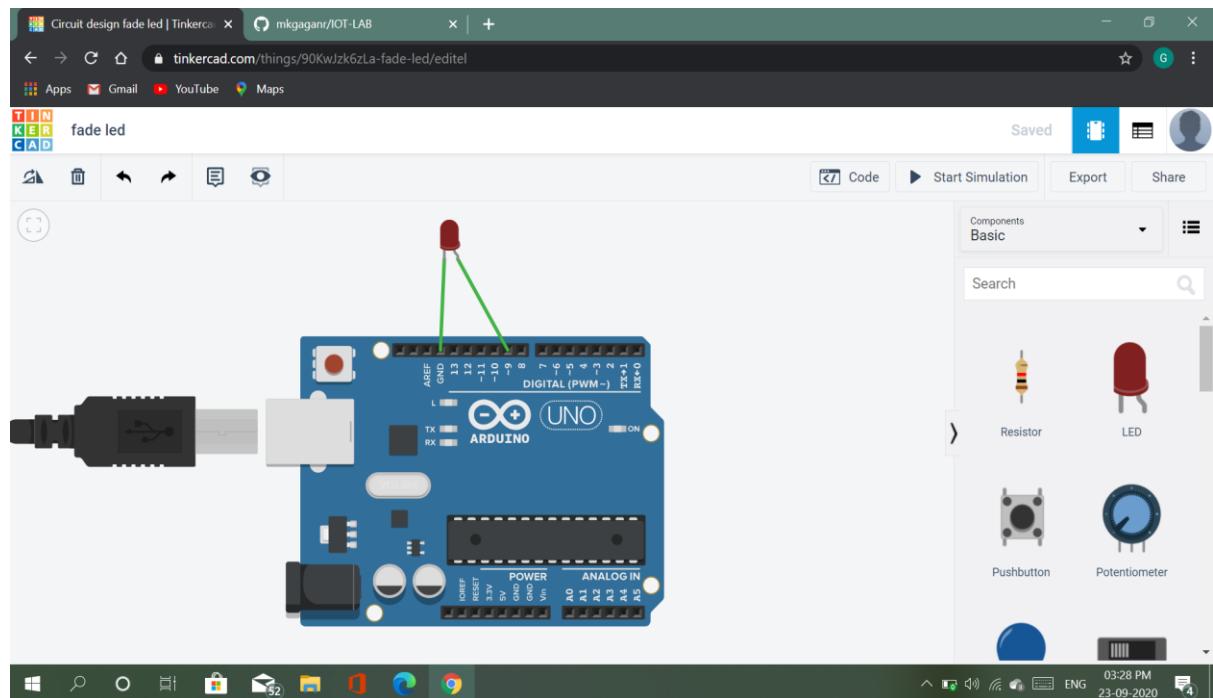
Aim

To fade an led on or off

Hardware Required

- Arduino Board
- 2x 240 Ohm resistor
- led

Circuit Diagram



CODE

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

void loop()
{
    for(int fade=0;fade<=255;fade+=5)
    {
        analogWrite(9,fade);
        delay(30);
    }
    for(int fade=255;fade>=0;fade-=5)
    {
        analogWrite(9,fade);
        delay(30);
    }
}
```

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Observation:

Led is faded on or off

Potentiometer

④

Aim:- led decreases/increases gradually when the potentiometer is turned.

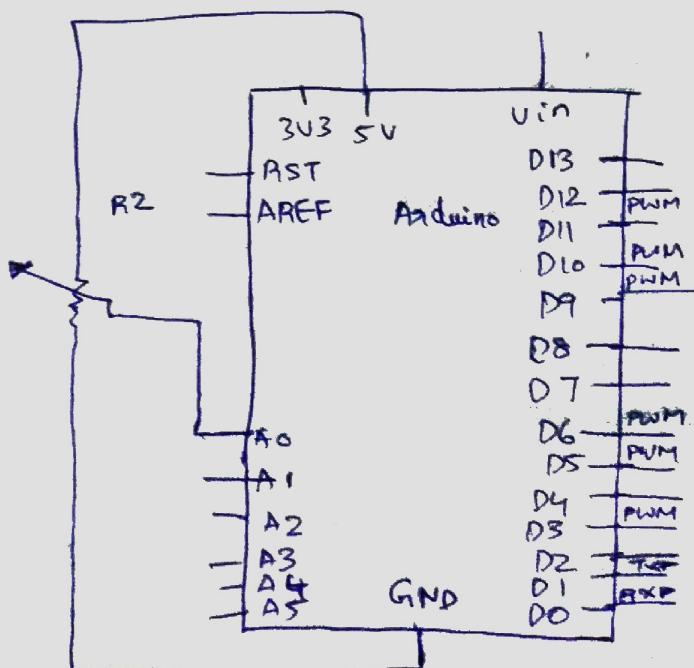
Hardware required:-

- ① arduino board
- ② breadboard
- ③ Jumper wires
- ④ potentiometer
- ⑤ Resistor 100 ohm
- ⑥ arduino USB
2.0 data cable

Q) Code :-

```
int LED_PIN=9;  
void setup()  
{  
    Serial.begin(9600);  
    pinMode(LED_PIN, OUTPUT);  
}  
void loop()  
{  
    int analogValue = analogRead(A0);  
    int brightness = map(analogValue, 0, 1023, 0, 255);  
    analogWrite(LED_PIN, brightness);  
    Serial.print("analog: ");  
    Serial.print("analog(blue)");  
    Serial.print("Brightness: ");  
    Serial.println(brightness);  
    delay(100);  
}
```

Circuit diagram:-



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Program no – 05

Program Title – Temperature sensor

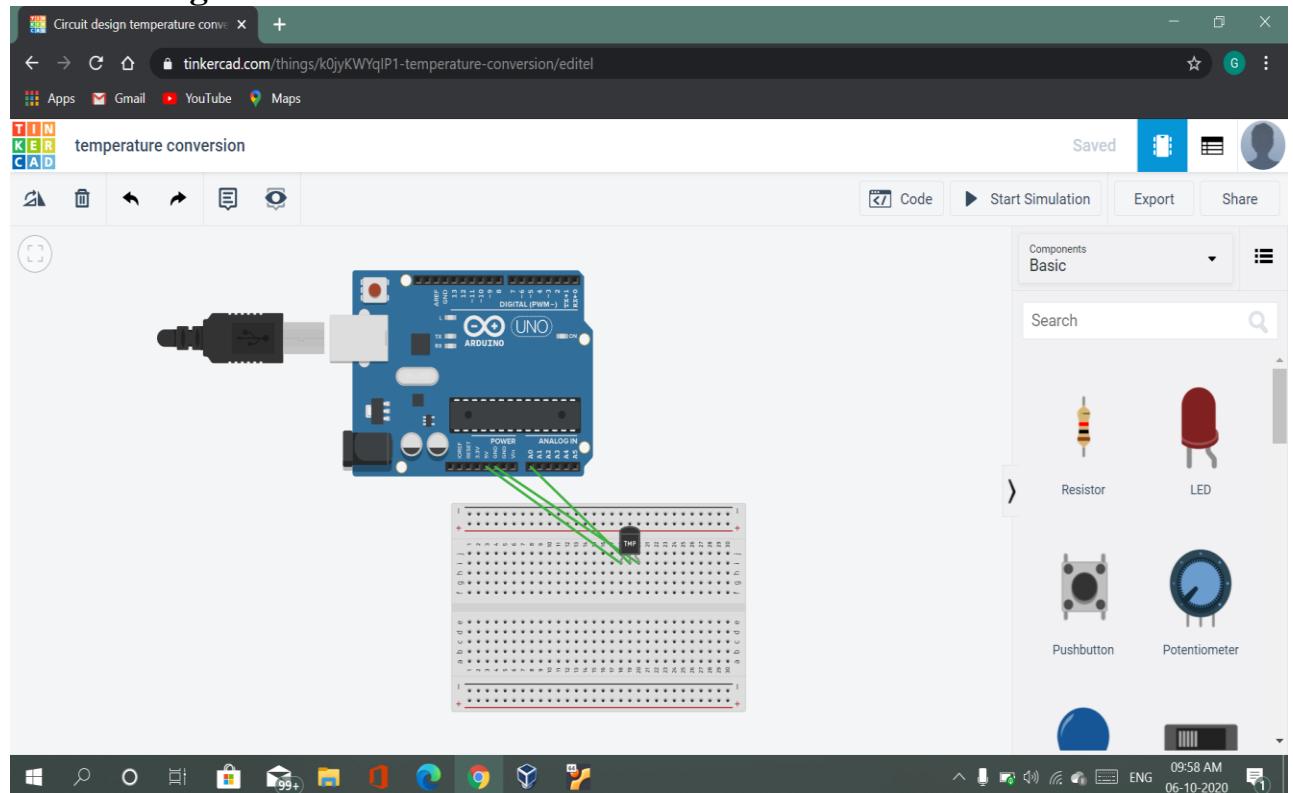
Aim

To log the temperature in Celsius and faherneit .

Hardware Required

- Arduino Board
- Temperature sensor
- 2x 240 Ohm resistor

Circuit Diagram



CODE

```
Int
outputpin=0;
void setup()
{
    Serial.begin(9600);
}
void loop(){
    int voltage=analogRead(outputpin);
    float millivolts=(voltage/1240.0)*5000;
    float celcius=millivolts/10;
    Serial.print(celcius);
    Serial.print("celcius ");
    Serial.print((celcius*9)/5 + 32);
    Serial.print(" in fahrenheit");
    delay(1000);
}
```

OBSERVATION:

THE TEMPERATURE CONVERSION CAN BE SEEN IN THE SERIAL MONITOR

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Program no – 06 Program Title – Light sensor

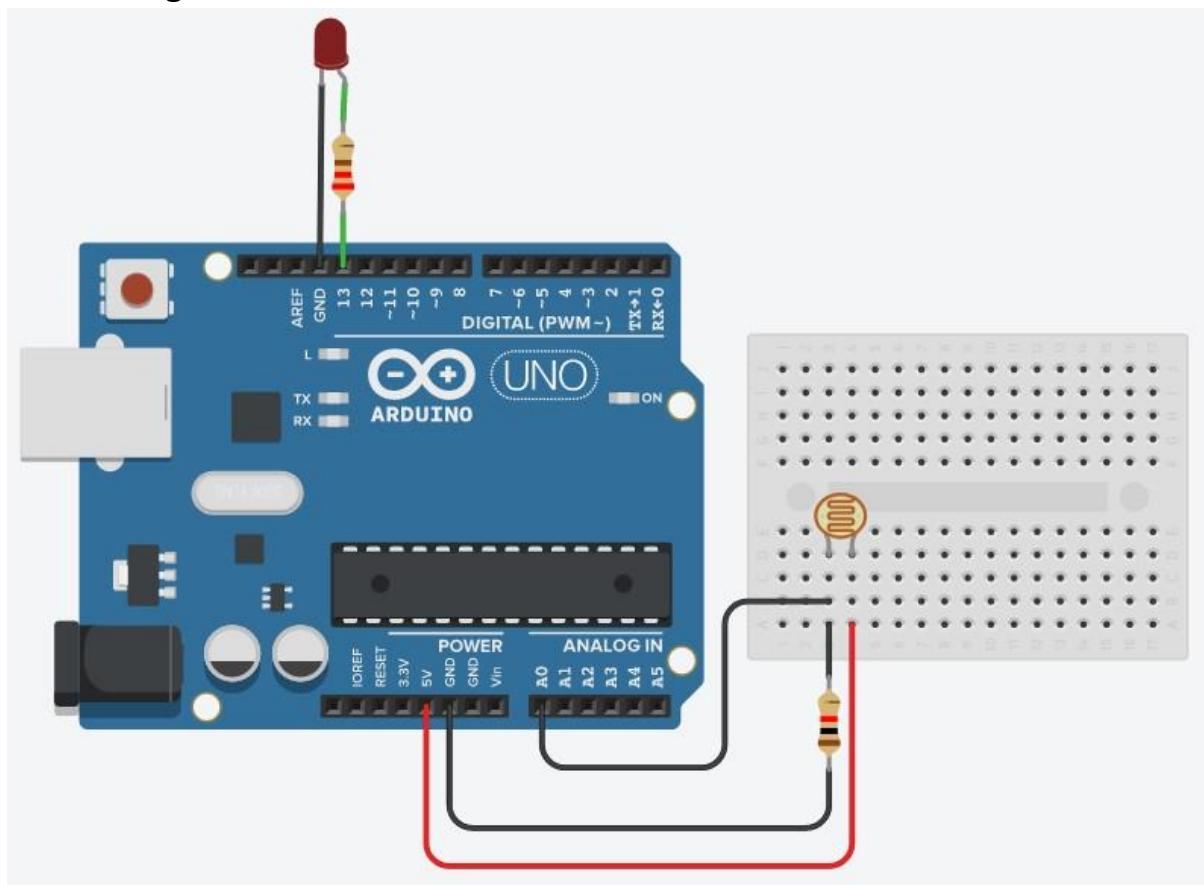
Aim

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:

```
// 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);
}
```

OBSERVATION:

LED IS TURNED ON WHEN LIGHT IS LOW

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Program no – 07 Program Title – Passive Infrared Sensor

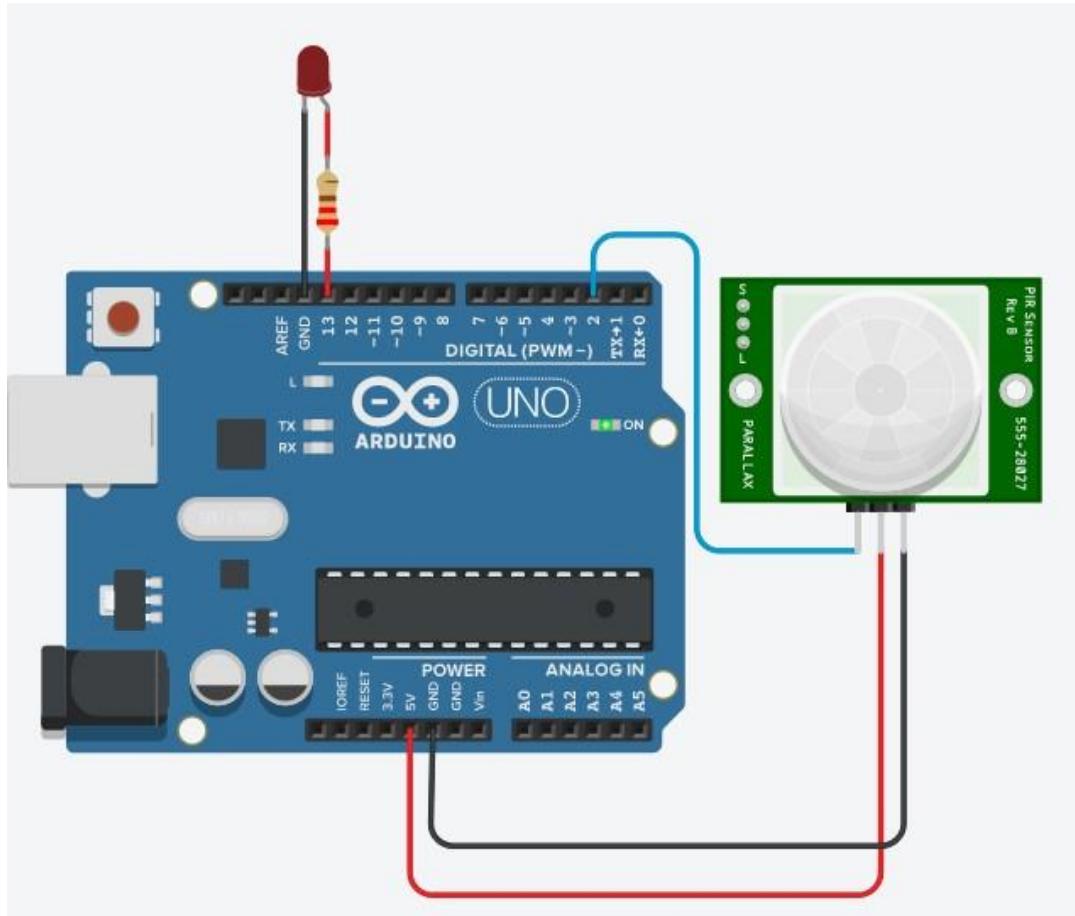
Aim

To turn on the LED upon detecting motion.

Hardware Required

- Arduino Board
- PIR
- LED
- 240 Ohm Resistor

Circuit Diagram



Code:

```
// 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);
}
```

Observation /Output

LED is turned on when motion is detected.

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Program no – 08

Program Title – MOTION DETECTION AT NIGHT

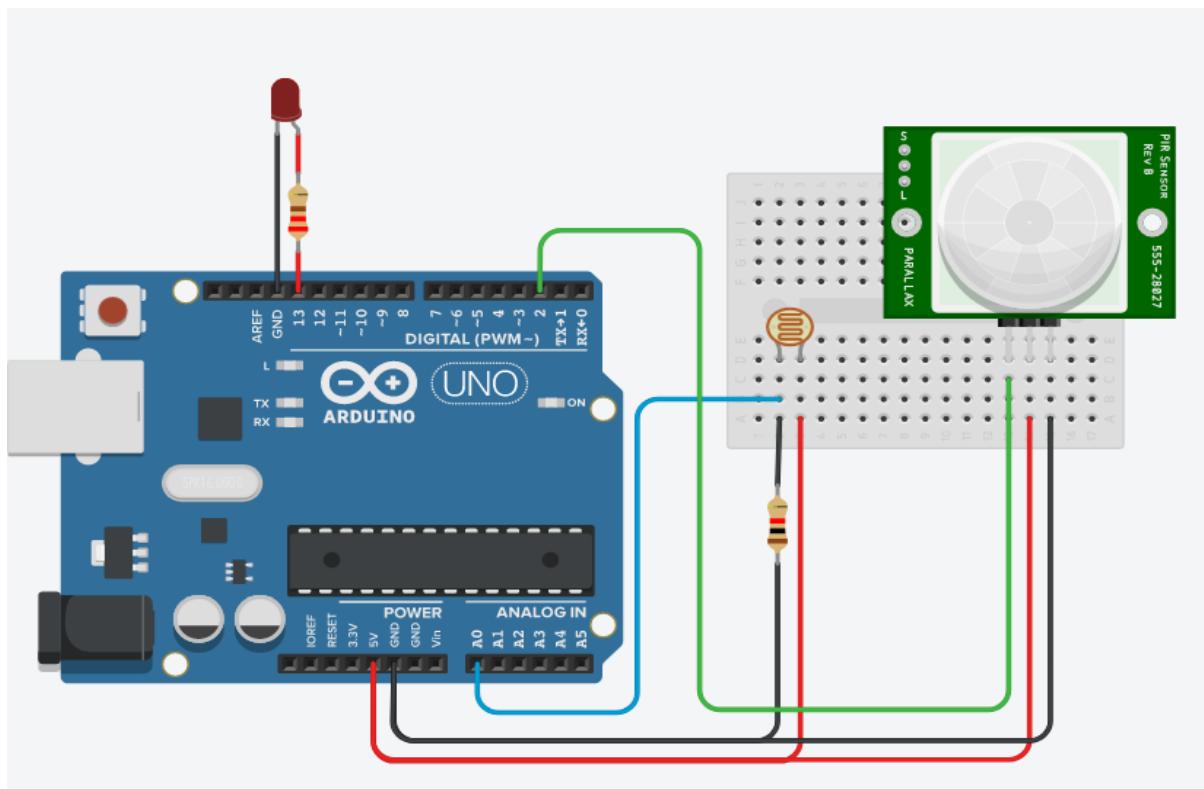
Aim

To LED glows when motion is detected at night.

Hardware Required

- Arduino Board
- led
- 2x 240 Ohm resistor
- Pir sensor
- LDR sensor

Circuit Diagram



CODE:

```
//  
LDR+PIR  
  
  
void setup()  
{  
    Serial.begin(9600);  
    pinMode(13, OUTPUT);  
    pinMode(2, INPUT);  
}  
  
  
void loop()  
{  
    int isDark, isMoving;  
  
    int analog = analogRead(A0);  
    if(analog < 520)  
        isDark = 1;  
    else  
        isDark = 0;  
  
    isMoving = digitalRead(2);  
  
    if(isMoving && isDark){  
        Serial.println((String)"Someone is in the dark.");  
        digitalWrite(13, HIGH);  
    }  
    else{  
        Serial.println("...");  
        digitalWrite(13, LOW);  
    }  
  
    delay(1000);  
}
```

OBSERVATION:

Led glows when motion is detected

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Program no – 09

Program Title – Fire Detection

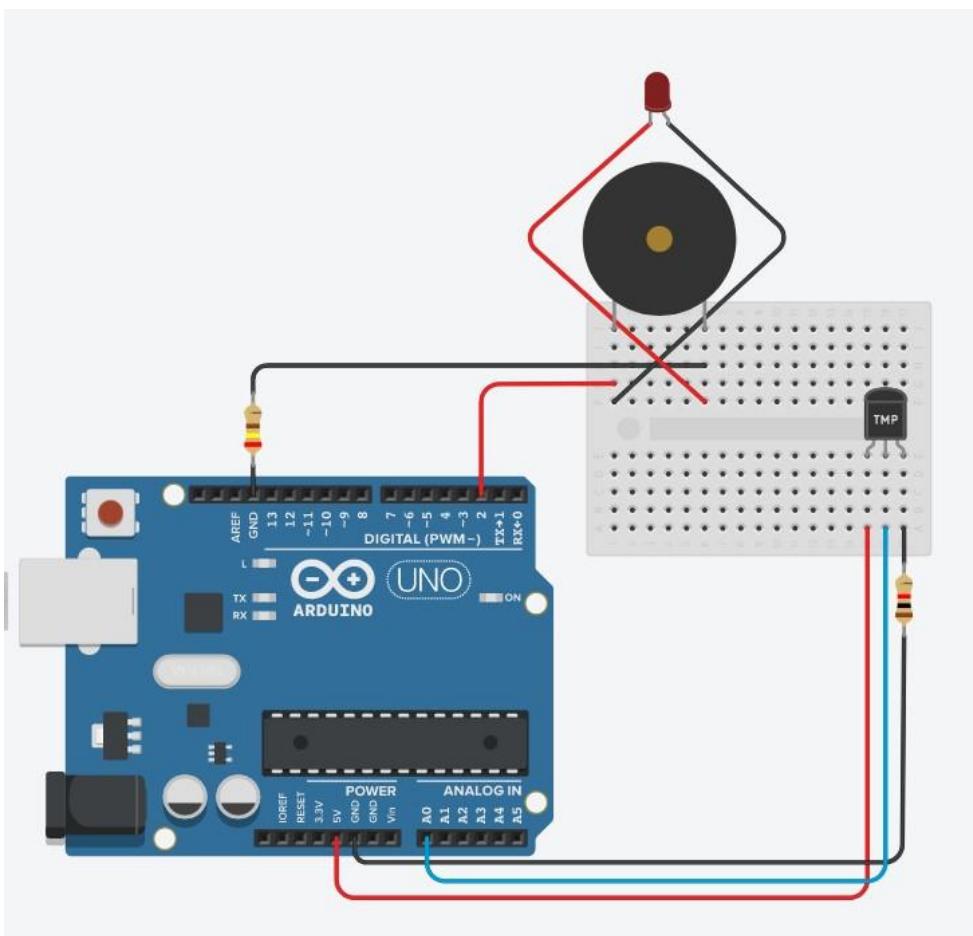
Aim

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



Code:

```
// 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.

Program no – 11

Program Title – Measure distance using an Ultrasonic Sensor, LCD

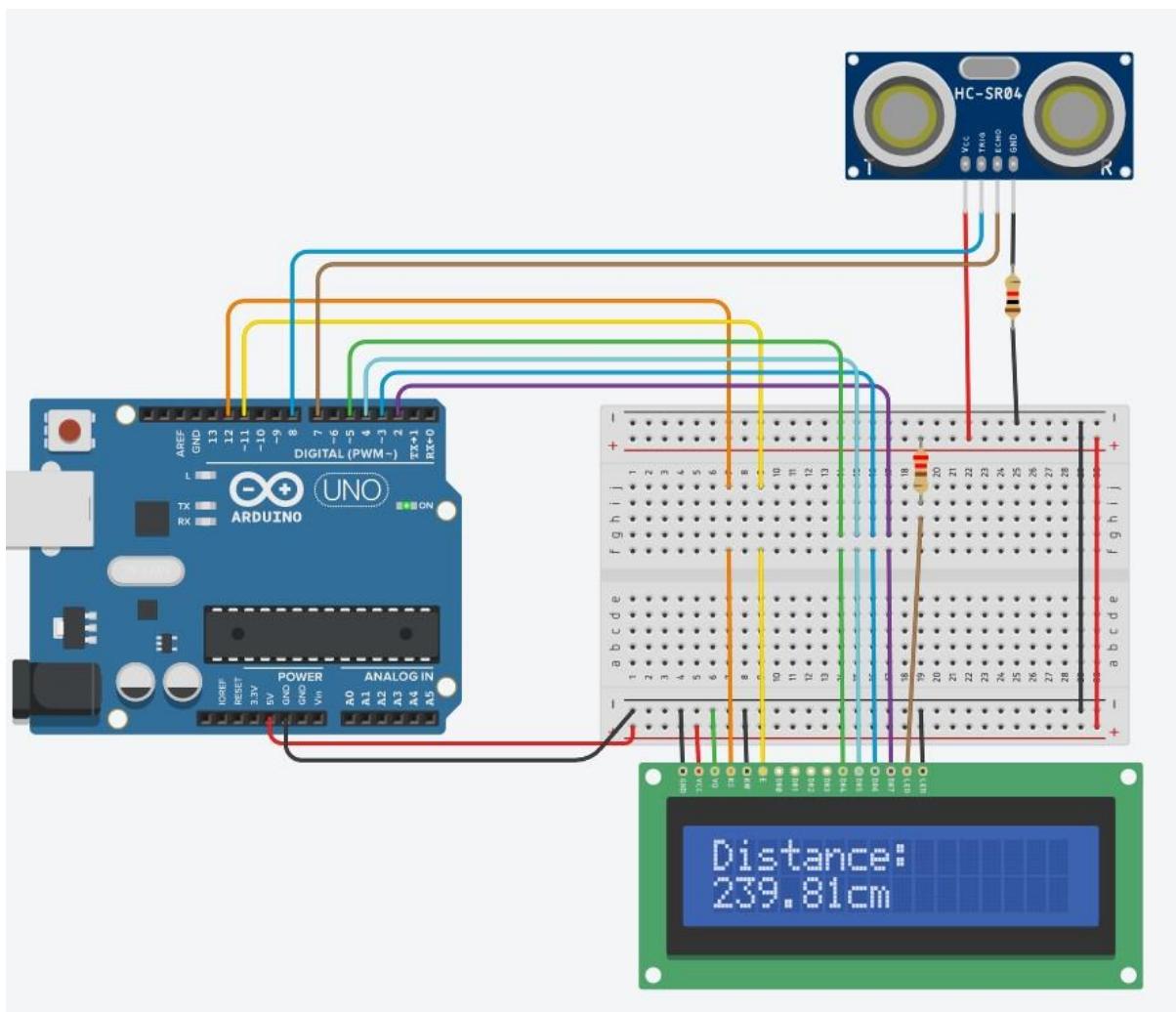
Aim

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



Code:

```
// 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

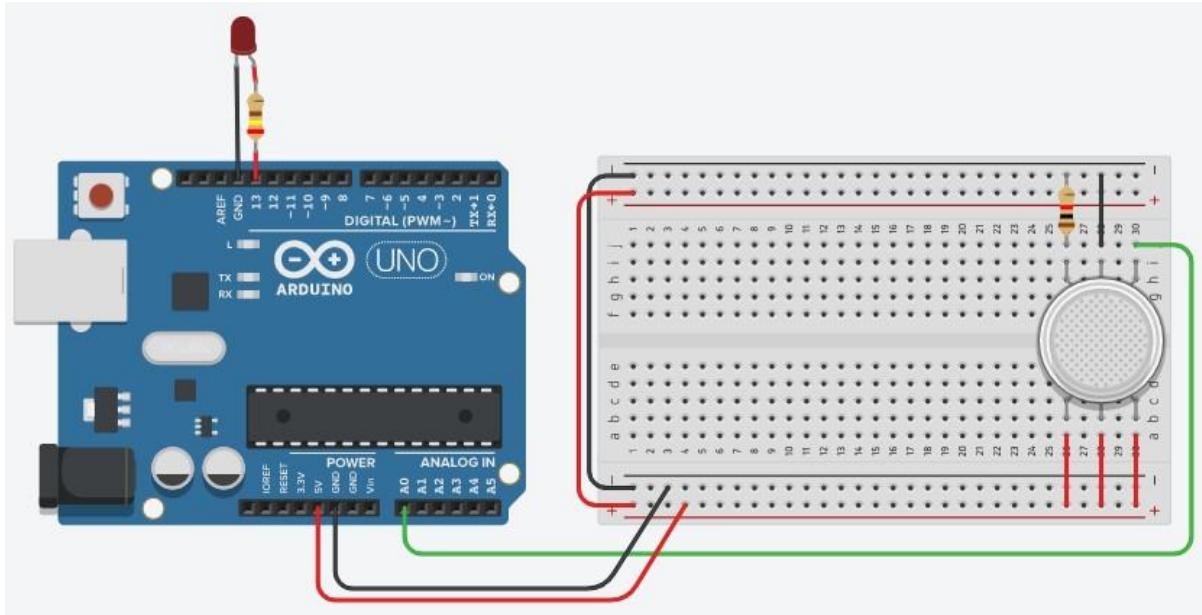
Aim

To turn on the LED upon detecting gas.

Hardware Required

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

Circuit Diagram



Code:

```
// 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);
}
```

OBSERVATION:

**THE LED GLOWS WHEN GAS IS
DETECTED**

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Program no – 13

Program Title – Tilt Sensor

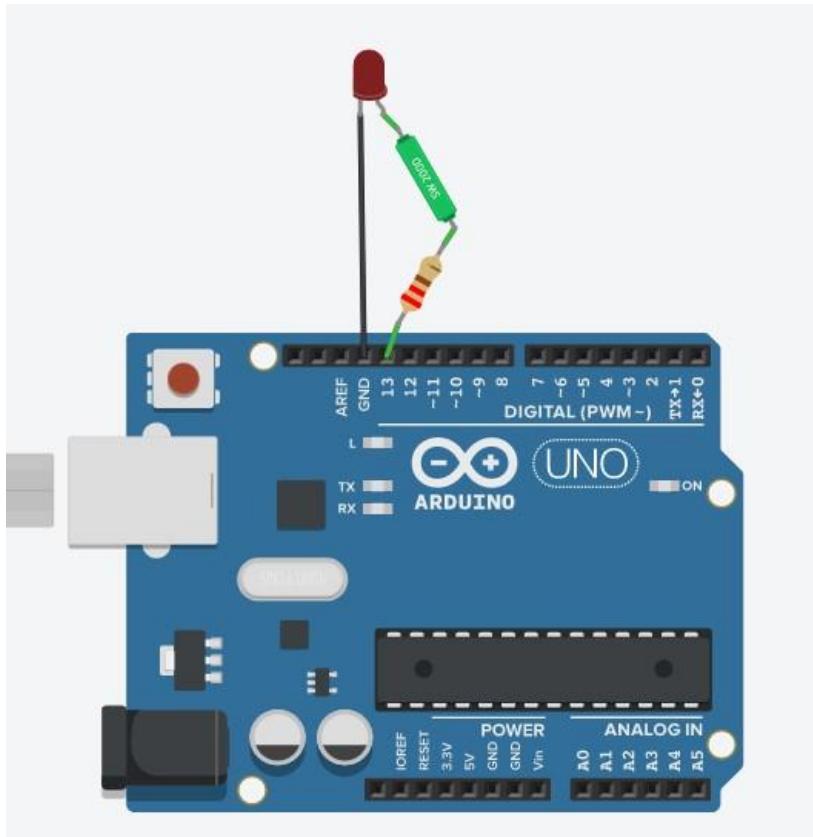
Aim

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);
}
```

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

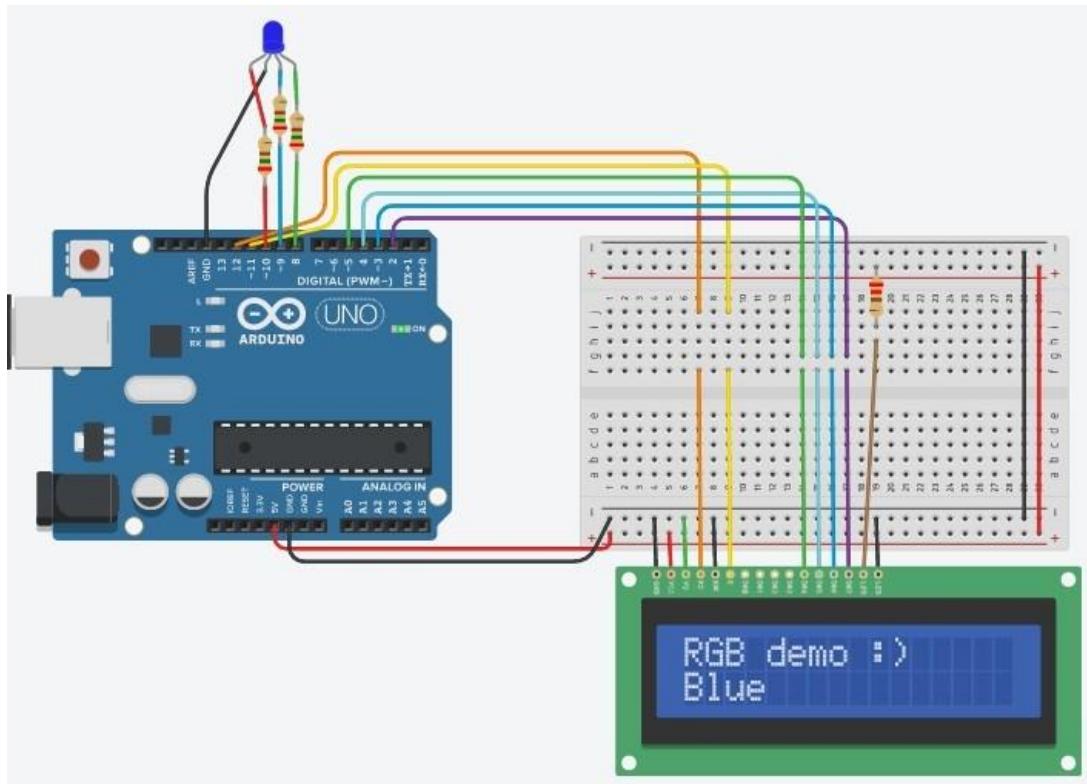
Switch colors using the rgb led, display the current color in the lcd display.

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);
}
```

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

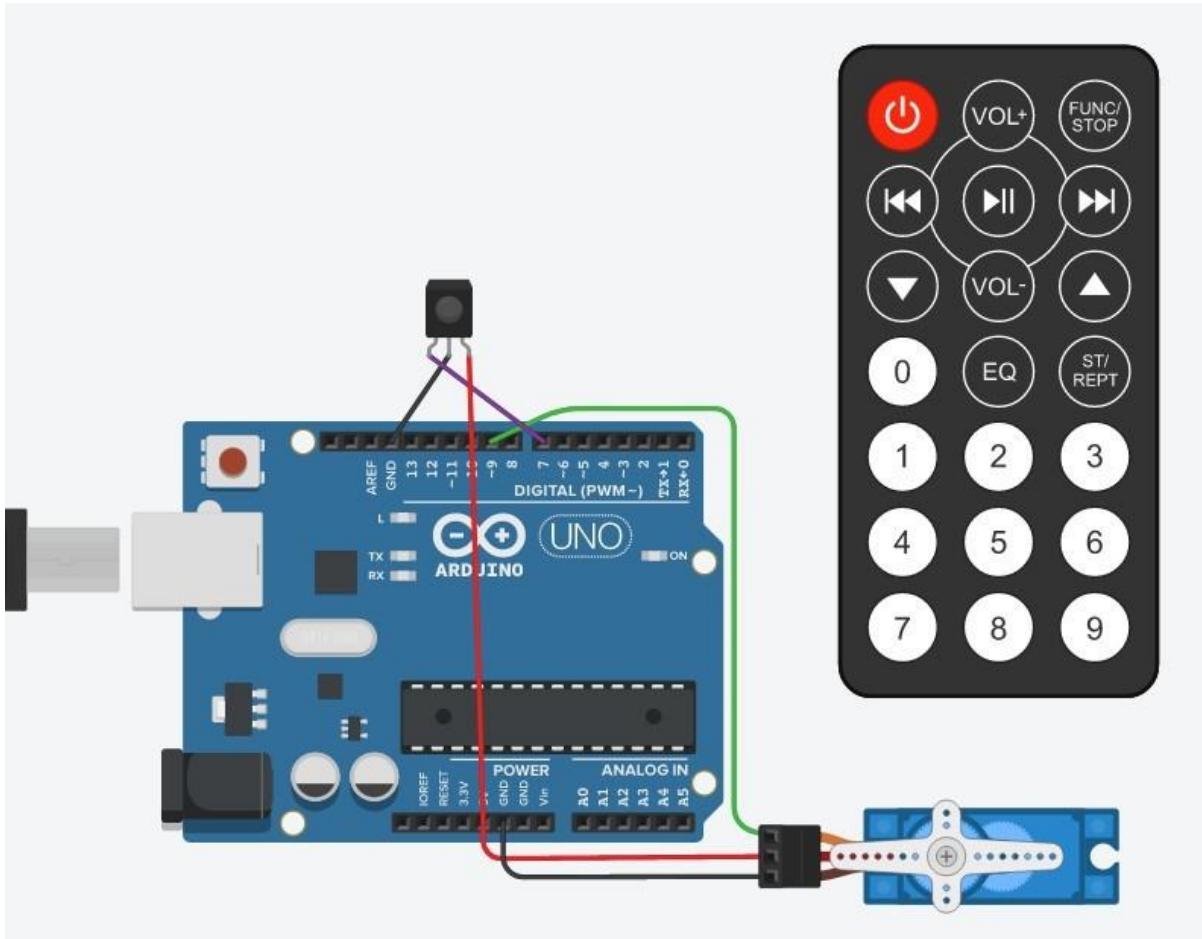
Aim

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();
}
```

OBSERVATION:

SERVER MOTOR MOVES LEFT AND RIGHT WHEN RESPECTIVE BUTTONS ARE PRESSED ON IR REMOTE.

M K GAGAN ROSHAN - 1BM18CS096

Program no – 16 Program Title – Irrigation system using a servo and moisture sensor

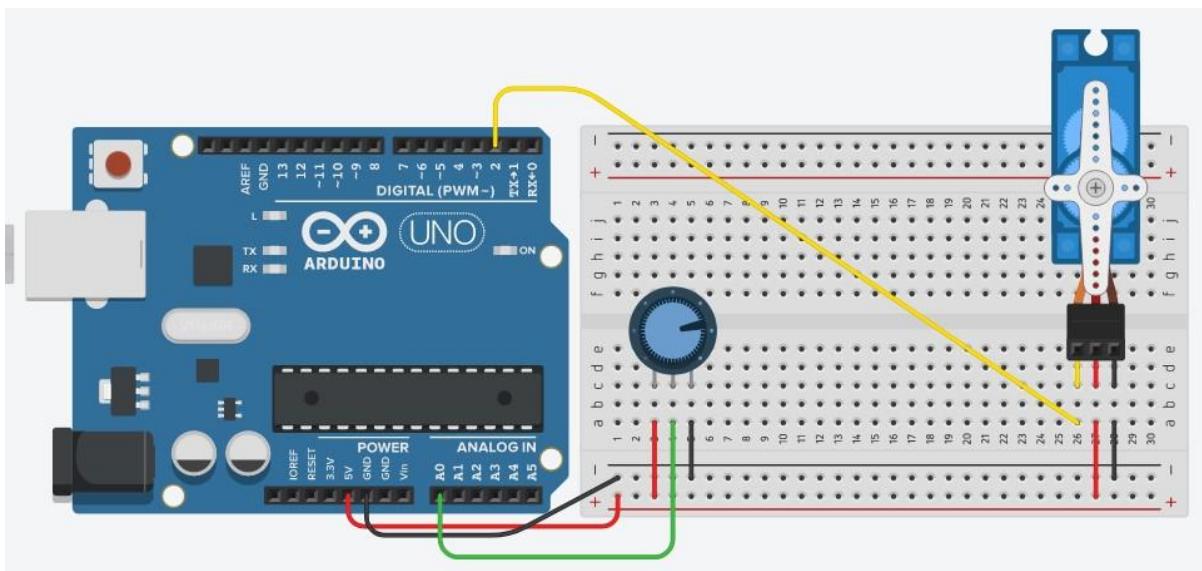
Aim

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);
}
```

Observation /Output

Automatically opens and closes the valve for water.