Experiment No. 2

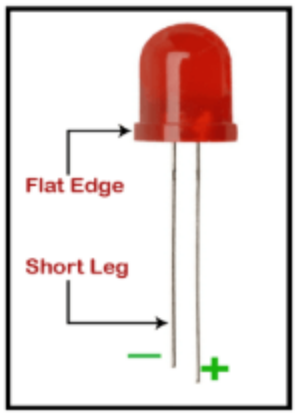
Title: Interfacing LED /RGB LED with Arduino board.

Components Required

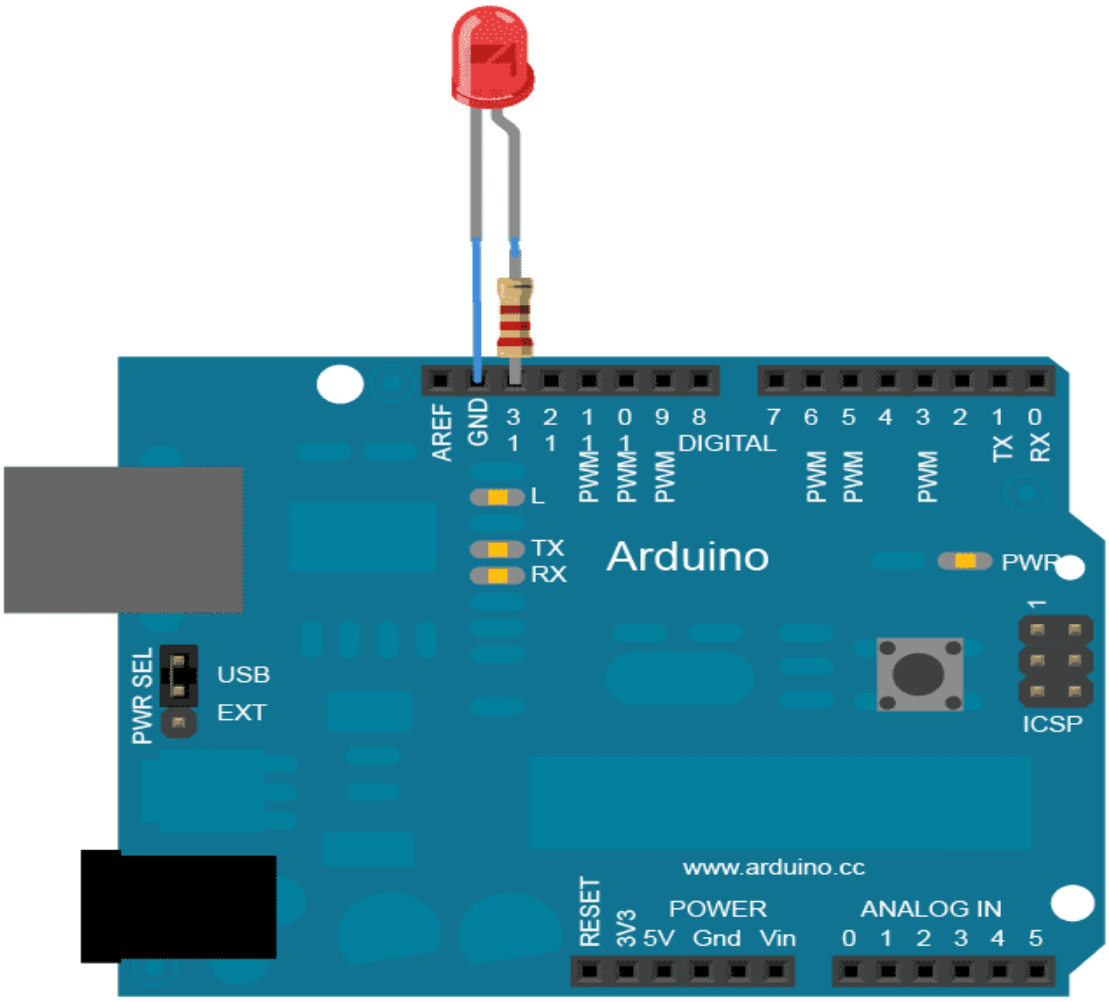
- 1 × Breadboard
- 1 × Arduino Uno R3
- 1 × LED, 1 x RGB LED
- 1 × 330Ω Resistor
- 2 × Jumper

Theory:

An LED is a two-terminal device. The two terminals are called as Cathode and Anode. The long terminal is called Anode, and the shorter terminal is called Cathode. Here, cathode is the negative terminal and anode is the positive terminal.



Circuit Diagram:



Code (LED Interfacing):

```
/*
  Blink
  Turns on an LED on for one second, then off for one second, repeatedly.
*/

// the setup function runs once when you press reset or power the board
```

```
void setup() {

    // initialize digital pin 13 as an output.
  pinMode(13, OUTPUT);
}

// the loop function runs over and over again forever

void loop() {
  digitalWrite(13, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000); // wait for a second
  digitalWrite(13, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}
```

pinMode(13, OUTPUT) − Before you can use one of Arduino's pins, you need to tell Arduino Uno R3 whether it is an INPUT or OUTPUT. We use a built-in "function" called pinMode() to do this.

digitalWrite(13, HIGH) − When you are using a pin as an OUTPUT, you can command it to be HIGH (output 5 volts), or LOW (output 0 volts).

RGB LED using Arduino

Description:

The RGB LED can emit different colors by mixing the 3 basic colors red, green and blue. So it actually consists of 3 separate LEDs red, green and blue packed in a single case.

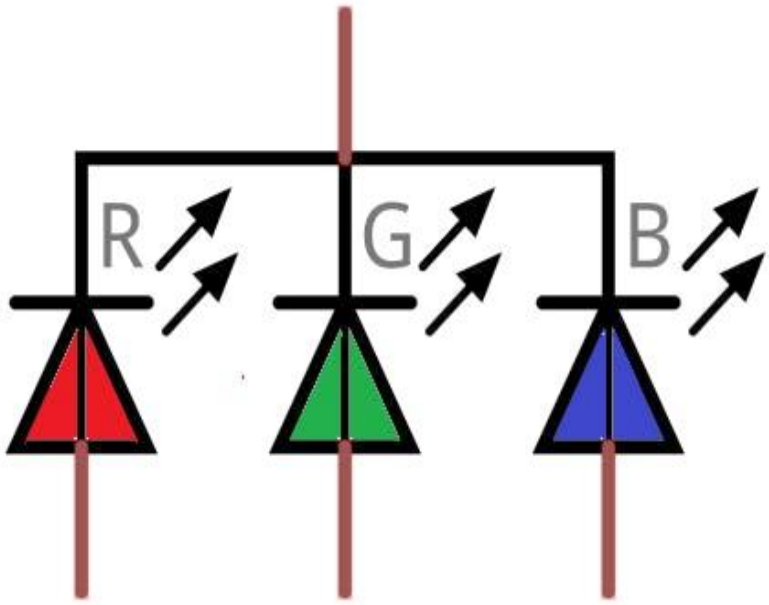
The Arduino has a analog write function which will help us in obtaining different colors by mixing up these colors,for Arduino RGB led.

RGB LED Schematic:

There are actually two types of RGB LEDs- the common cathode and the common anode

In the **common cathode RGB LED**, the cathode of all the LEDs is common and we give PWM signals to the anode of LEDs.

In the **common anode RGB LED**, the anode of all the LEDs is common and we give PWM signals to the cathode of LEDs.



We are using common cathode RGB LED So, we will connect the common pin to the GND of Arduino and the other three leads of the LEDs to the **PWM pins of Arduino**.

The RGB LED has one big lead than the other leads. In the common cathode case, it will be connected to GND and in the common anode case; it will be connected to 5V.

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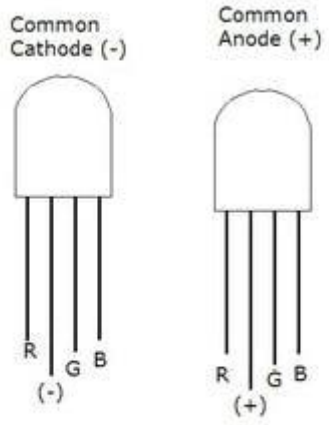

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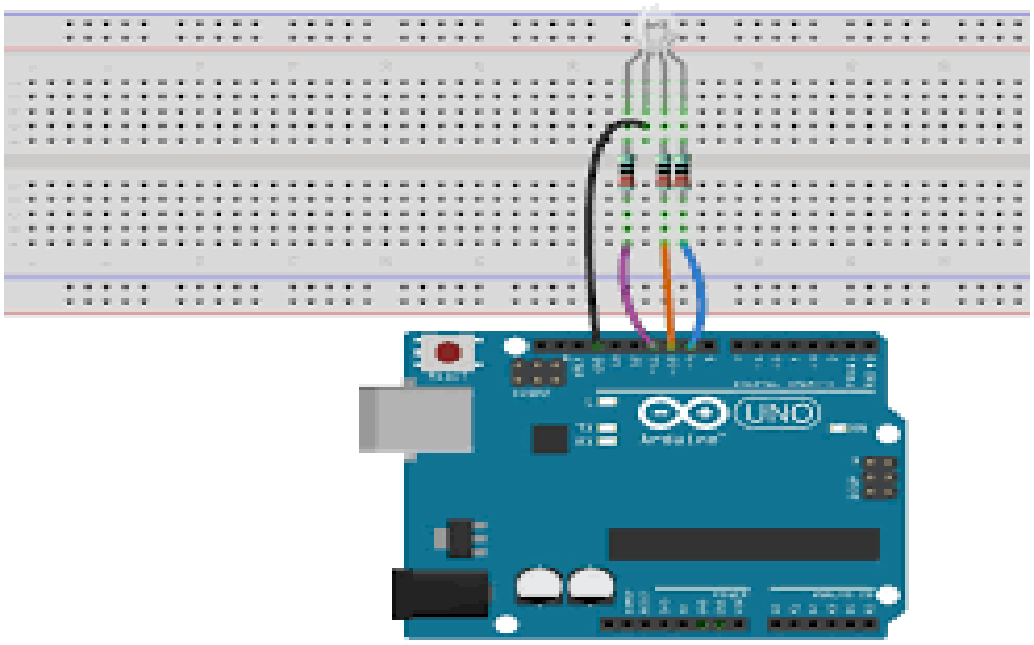

CODE (Interfacing RGB LED)

```
 int red_light_pin= 11;
int green_light_pin = 10;
int blue_light_pin = 9;
```

```
void setup() {
  pinMode(red_light_pin, OUTPUT);
  pinMode(green_light_pin, OUTPUT);
  pinMode(blue_light_pin, OUTPUT);
}
void loop() {
  RGB_color(255, 0, 0); // Red
  delay(1000);
  RGB_color(0, 255, 0); // Green
  delay(1000);
  RGB_color(0, 0, 255); // Blue
  delay(1000);
  RGB_color(255, 255, 125); // Raspberry
  delay(1000);
  RGB_color(0, 255, 255); // Cyan
  delay(1000);
  RGB_color(255, 0, 255); // Magenta
  delay(1000);
  RGB_color(255, 255, 0); // Yellow
  delay(1000);
  RGB_color(255, 255, 255); // White
  delay(1000);
}
void RGB_color(int red_light_value, int green_light_value, int blue_light_value)
 {
  analogWrite(red_light_pin, red_light_value);
  analogWrite(green_light_pin, green_light_value);
  analogWrite(blue_light_pin, blue_light_value);
}
```

Result:

Conclusion: