RGB LED

Introduction

In this lesson, you will use PWM to control an RGB LED and make it to display different colors.

Component List

- Arduino Nano Mainboard
- Breadboard
- USB cable
- RGB LED*1
- Resistor (220Ω) *3
- Some wires

Experimental Principle

RGB

RGB stands for the red, green, and blue color channels, it is an industry color standard. RGB displays various new colors by changing the three channels and superimposing them, which, according to statistics, can create 16,777,216 different colors. If you say the color displayed doesn’t completely match a natural color, then it almost certainly cannot be differentiated with the naked eyes.

Each of the three color channels of red, green, and blue has 255 stages of brightness. When the three primary colors are all 0, "LED light" is the darkest, that is, it turns off. When the three primary colors are all 255, "LED light" is the brightest. When superimposing the light emitted by the three primary colors, the colors will be mixed. However, the brightness is equal to the sum of all brightness, and the more you mix, the brighter the LED is. This process is known as additive mixing.

In this experiment, we will also use PWM, if you’ve followed the lessons thus far, you already have a basic understanding of. Here we input a value between 0 and 255 to the three pins of the RGB LED to make it display different colors.

Experimental Procedures

Step 1: Build the circuit

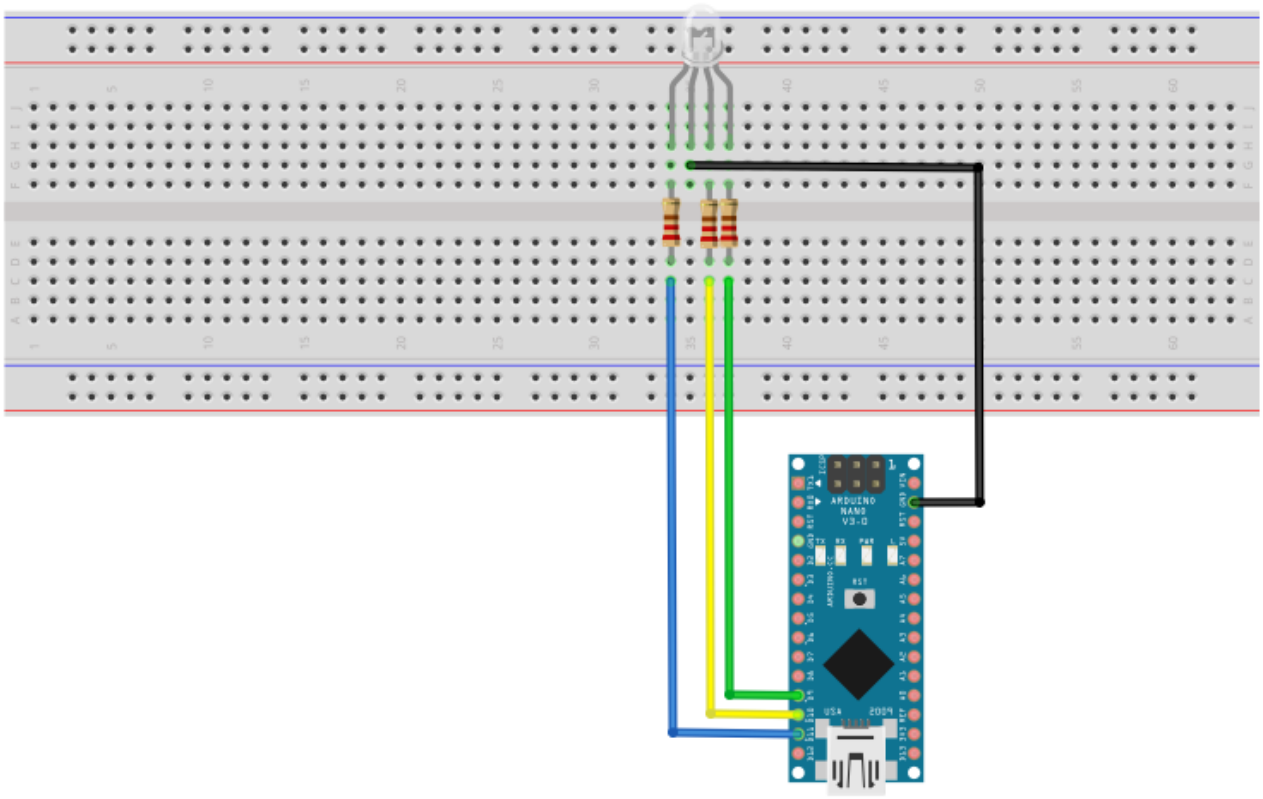
Step 2: Program (Please refer to the example code in LEARN -> Get Tutorials on our website)

Step 3: Compile the code

Step 4: Upload the sketch to the Arduino Uno board

Wiring of Circuit

Arduino Nano	RGB
11	1
10	3
9	4
GND	2



Code

```
#define RGB_RED    11
#define RGB_GREEN  10
#define RGB_BLUE   9

void setup()
{
    pinMode(RGB_RED,OUTPUT);
    pinMode(RGB_GREEN,OUTPUT);
    pinMode(RGB_BLUE,OUTPUT);
}

void setColor(int red,int green,int blue)
{
    analogWrite(RGB_RED,red);
    analogWrite(RGB_GREEN,green);
    analogWrite(RGB_BLUE,blue);
}

void loop()
{
    int i;
    for(i=0,i<256;i++)
    {
        setColor(i,0,0);
        delay(4);
    }
    delay(500);          //turn the RGB LED red smoth

    for(i=0;i<256;i++)
    {
  setColor(0,i,0);
        delay(4);
```

```
    }
    delay(500);          //turn the RGB LED green smoth

    for(i=0,i<256;i++)
    {
        setColor(0,0,i);
        delay(4);
    }
    delay(100);          //turn the RGB LED blue smoth
}
```

Experiment Result

Here you should see the RGB LED flashes colorfully, and blue first, then red, orange, yellow, green, blue, indigo and purple.