Experiment 3:

Aim : Programming with Arduino platform

a) Installation of Arduino in computer and verifying any errors in connection.

b) Control LED using Arduino

c) Control LED - RGB using Arduino

d) Traffic Light Control

**a. Installation Steps :**

Step 1: Visit: http://arduino.cc/en/Main/Software

Step 2 : Download & install the Arduino environment (IDE) for Windows, Mac, or Linux. (Latest version: 1.6)

Step 3; Extract the ZIP file. (The extracted folder will contain both the Arduino program itself and also the drivers that allow the Arduino to be connected to your computer by a USB cable.

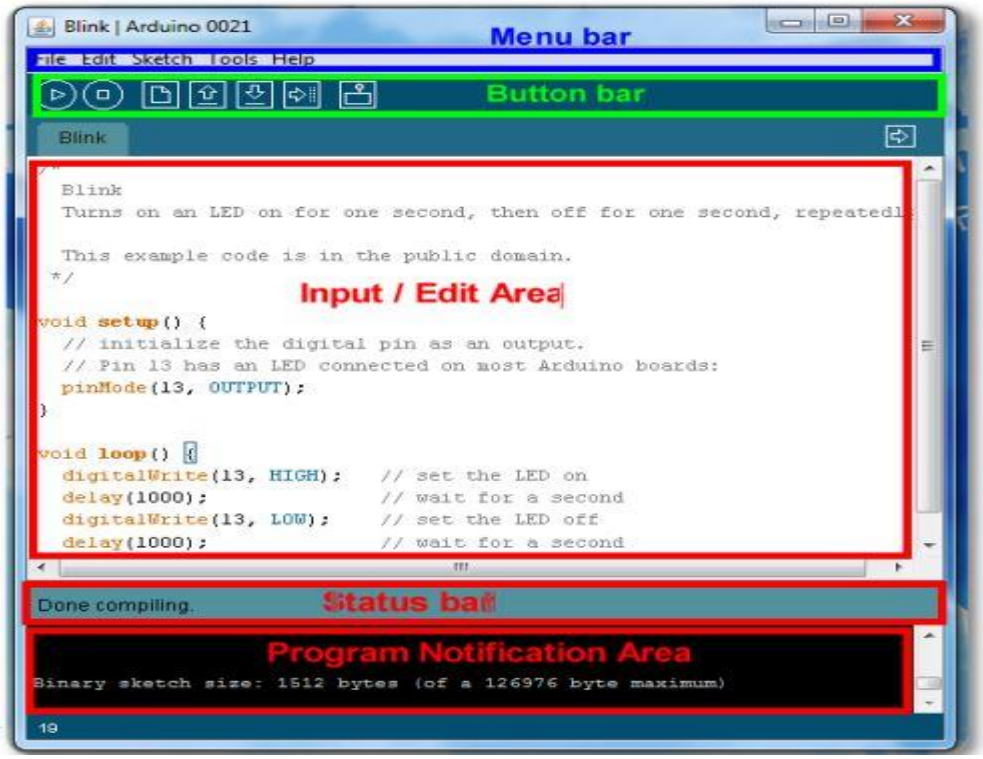
Step 4: Connect the board to your computer via the UBS cable

Step 5: The power light on the LED will light up and you may get a 'Found New Hardware' message from Windows.

Step 6: Ignore this message and cancel any attempts that Windows makes to try and install drivers automatically for you

**Getting Started**

1. Launch the Arduino IDE from desktop .
2. Select your board (Tools>>board>>UNO) (** Depending upon the Board the it will automatically select by Arduino IDE



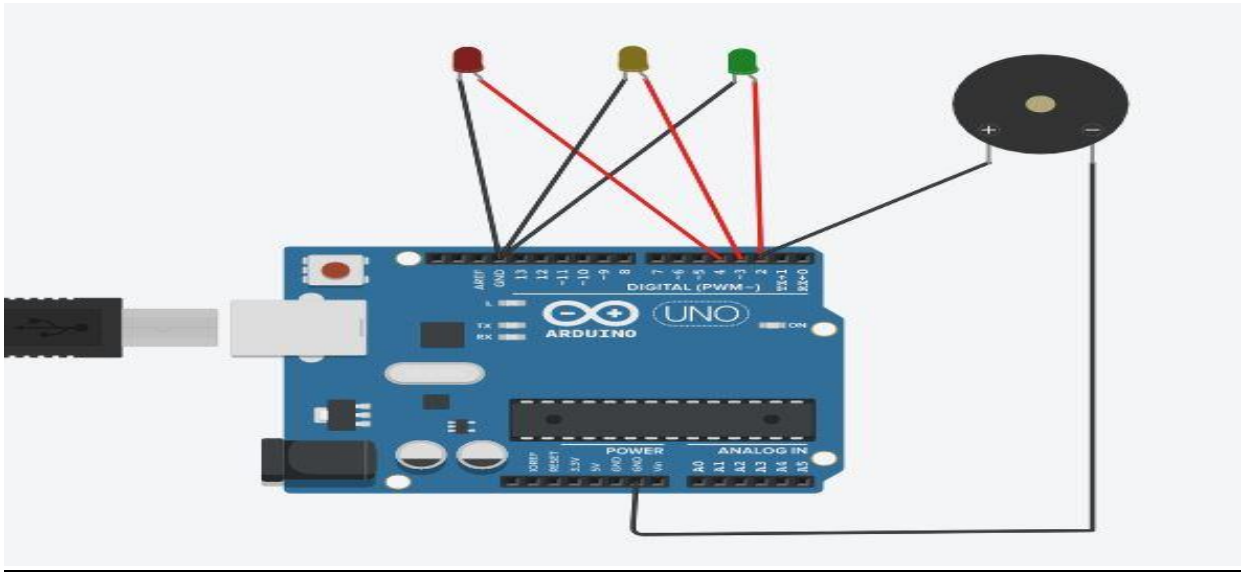
## b. Control LED using Arduino

1. You might notice that your Arduino board's built-in LED already blinks when you connect it to a USB.

2. This is because Arduino boards are generally shipped with the 'Blink' sketch preinstalled.

3. We will do a simple variation to the program by changing the rate of the blink.

**Circuit Connection**

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**Code :**

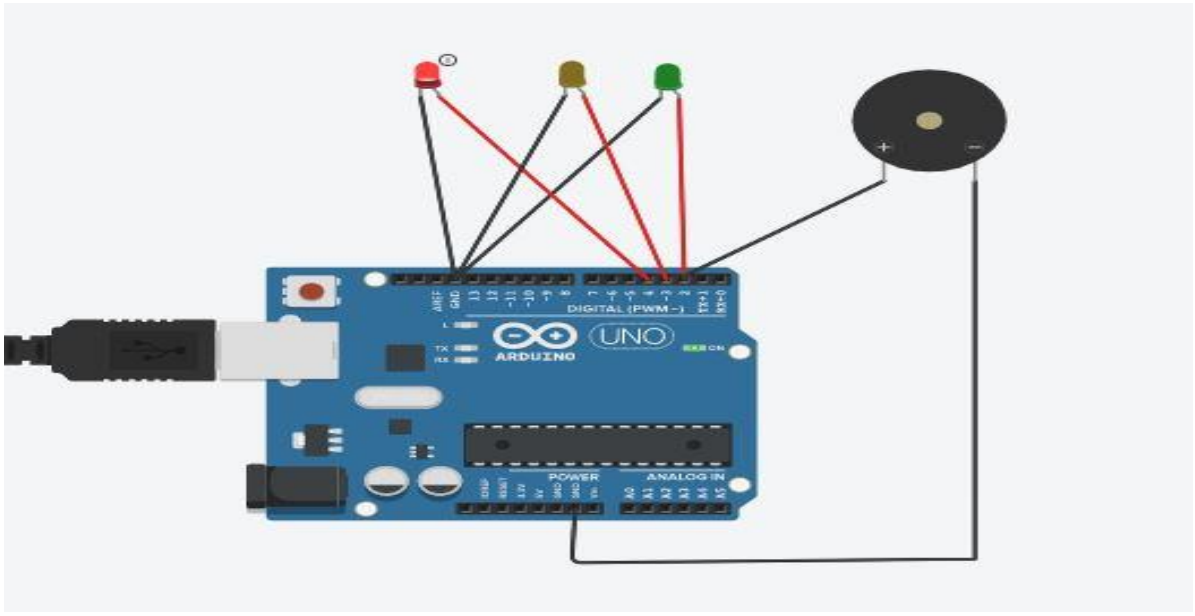
```
void setup()
{
  pinMode(2, OUTPUT);
   pinMode(3, OUTPUT);
   pinMode(4, OUTPUT);
}
void loop()
{
  digitalWrite(2, HIGH);
  tone(10,1055,1000);
  digitalWrite(3, LOW);
  digitalWrite(4, LOW);
  delay(1000);
  digitalWrite(3, HIGH);
  digitalWrite(2, LOW);
  digitalWrite(4, LOW);
  delay(1000);
  digitalWrite(4, HIGH);
  digitalWrite(3, LOW);
  digitalWrite(2, LOW);
  delay(1000);
}
```

**Run the code**

1. Make sure that Arduino is connected to your PC.
2. Click Upload and wait until the status is done.

**OutPut :**

Led Might Blink Depending upon the Pin connection and code Written

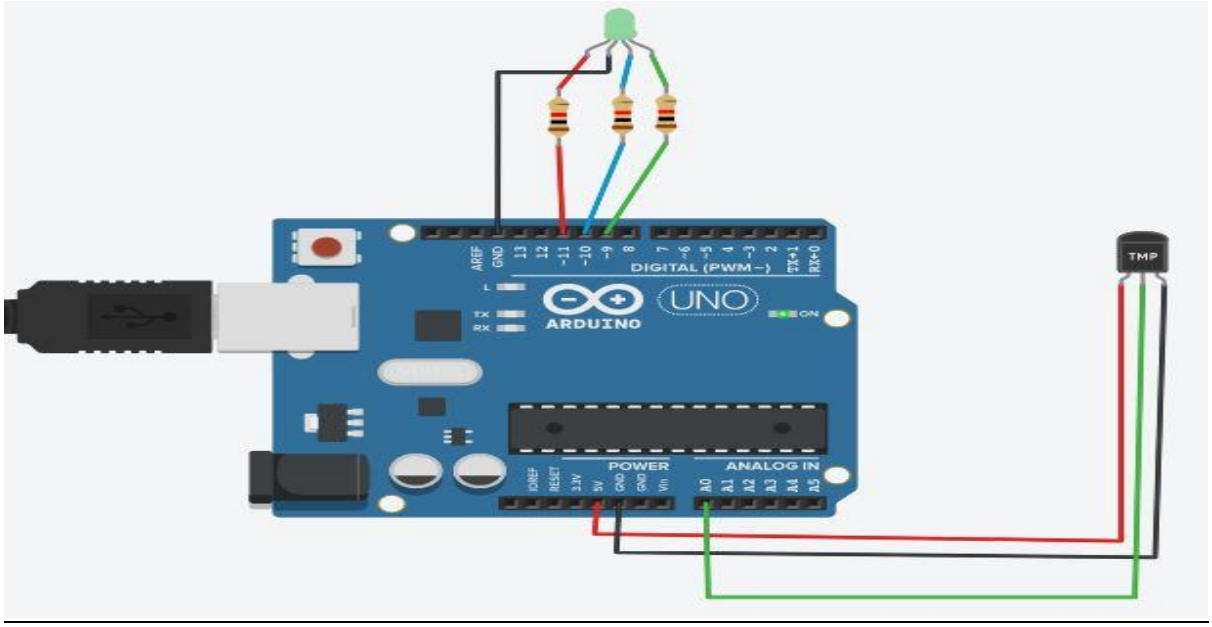



**C.controlling 1 LED in three Different Colours**

**Devices : LED –RGB**

RGB LED means red, blue and green LEDs. RGB LED products combine these three colors to produce over 16 million hues of light. Note that not all colors are possible. Some colors are “outside” the triangle formed by the RGB LEDs. Also, pigment colors such as brown or pink are difficult, or impossible, to achieve

**Circuit Connection**




**Code :**

```
int V_tempsensor = 0;
void setup()
{
  pinMode(11, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(A0, INPUT);
}
void loop()
{
  analogWrite(11, 51);
  analogWrite(10, 204);
  analogWrite(9, 0);
  V_tempsensor = (-40 + 0.488155 * (analogRead(A0) - 20));
  if (V_tempsensor >= 50) {
    analogWrite(11, 255);
    analogWrite(10, 0);
    analogWrite(9, 0);
  }
  if (V_tempsensor >= 30) {
    analogWrite(11, 51);
    analogWrite(10, 51);
    analogWrite(9, 255);
  }
  if (V_tempsensor <= 10) {
    analogWrite(11, 0);
    analogWrite(10, 102);
    analogWrite(9, 0);
  }
  delay(10); // Delay a little bit to improve simulation performance
}
```

Ouput:

Depending upon the temperature the LED will blink in three Colours.

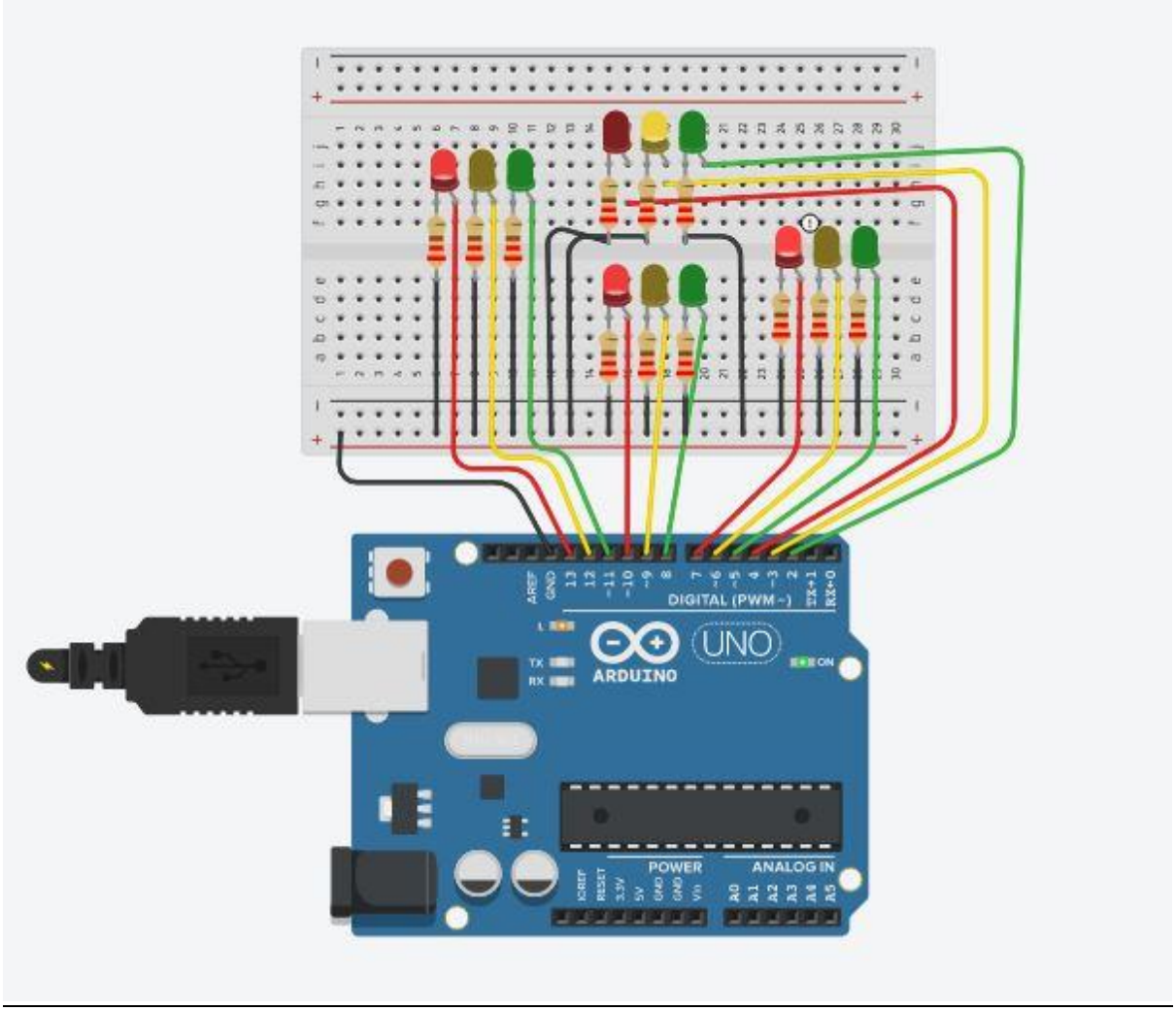
## D. Traffic Light control

The use of personal vehicles is very common now a days and a result, the number of vehicles on the roads are exponentially increasing. Roads without any supervision or guidance can lead in to traffic congestions and accidents.

Traffic Lights or Traffic Signals are signalling devices that are used to control the flow of traffic. Generally, they are positioned at junctions, intersections, 'X' roads, pedestrian crossings
etc. and alternate the priority of who has to wait and who has to go.

The traffic lights will provide instructions to the users (drivers and pedestrians) by displaying lights of standard color. The three colors used in traffic lights are Red, Yellow and Green. The system must be used to control the traffic lights for smooth and safe movement of traffic. These control systems consist of electro mechanical controllers with clockwork mechanisms or modern solid state computerised systems with easy setup and maintenance

### Circuit connection



**Code :**

```
int red1 = 13;
int yellow1 = 12;
int green1 = 11;
int red2 = 10;
int yellow2 = 9;
int green2 = 8;
int red3 = 7;
int yellow3 = 6;
int green3 = 5;
int red4 = 4;
int yellow4 = 3;
int green4 = 2;
void setup()
{
  for(int i = 2; i<=13; i++) {
    pinMode(i, OUTPUT);
  }
}
void loop()
{
  direction(red1, yellow1, green1, red2, yellow2, green2, red3, yellow3, green3, red4, yellow4, green4);
  direction(red2, yellow2, green2, red1, yellow1, green1, red3, yellow3, green3, red4, yellow4, green4);
  direction(red3, yellow3, green3, red1, yellow1, green1, red2, yellow2, green2, red4, yellow4, green4);
  direction(red4, yellow4, green4, red1, yellow1, green1, red2, yellow2, green2, red3, yellow3, green3);
}
void direction(int a, int b, int c, int d, int e, int f, int g, int h, int i, int j, int k, int l)
{
  digitalWrite(a, LOW);
  digitalWrite(b, LOW);
  digitalWrite(c, HIGH);
  digitalWrite(d, HIGH);
  digitalWrite(e, LOW);
  digitalWrite(f, LOW);
  digitalWrite(g, HIGH);
  digitalWrite(h, LOW);
  digitalWrite(i, LOW);
  digitalWrite(j, HIGH);
  digitalWrite(k, LOW);
  digitalWrite(l, LOW);
  delay(5000);
  digitalWrite(c, LOW);
  digitalWrite(b, HIGH);
  delay(3000);
}
```

**OutPut: Using Arduino Uno Traffic light Management has been simulated and it has been working properly.**

**Result :** Programming Arduino installation has been installed successfully and Controlling of LED in different method are executed