EXPERIMENT NO. 5 (Group B)

Aim: Create a program so that when the user enters "B" the green light blinks, "g" the green light is illuminated "y" the yellow light is illuminated and "r" the red light is illuminated

Outcome: Connectivity, configuration and control of LED using Arduino circuit under different conditions.

- **Hardware Requirement:** Arduino, LED, 220 ohm resistor etc.
- **Software Requirement**: Arduino IDE
- **Theory:**

The problem statement is like an Arduino traffic light, a fun little project that you can build in under an hour. Here's how to build your own using an Arduino, and how to change the circuit for an advanced variation.

What You Need to Build an Arduino Traffic Light

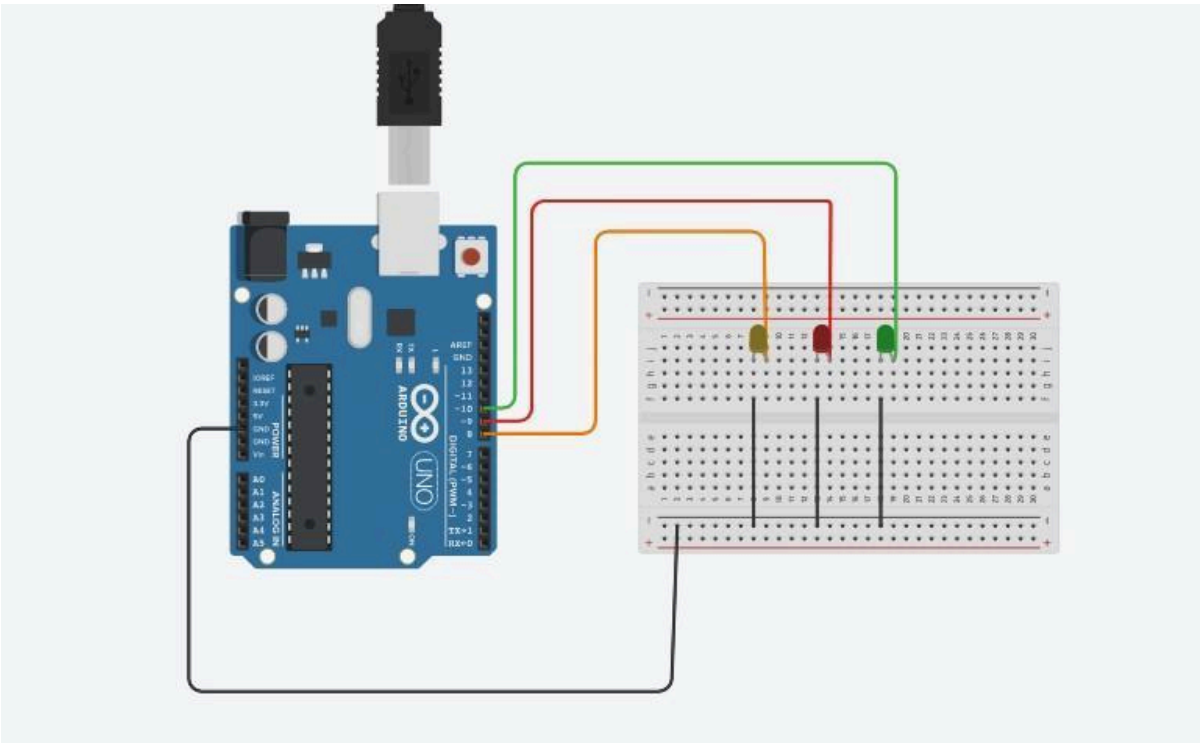
Controller Apart from the basic Arduino, you'll

need:

- 1 x 10k-ohm resistor
- 1 x pushbutton switch
- 6 x 220-ohm resistors
- A breadboard
- Connecting wires
- Red, yellow and green
- LEDs Arduino Traffic Light: The Basics

Let's start small. A basic, single traffic light is a good place to start. Here's the circuit:

Connect the anode (long leg) of each LED to digital pins eight, nine, and ten (via a 220- ohm resistor). Connect the cathodes (short leg) to the Arduino's ground.



Code for the Arduino Traffic Light

Start by defining variables so that you can address the lights by name rather than a number. Start a new Arduino project, and begin with these lines:

```
int red = 10;
int yellow = 9;
int green = 8;
```

Next, let's add the setup function, where you'll configure the red, yellow and green LEDs to be outputs. Since you have created variables to represent the pin numbers, you can now refer to the pins by name instead:

```
  void setup(){
  pinMode(red, OUTPUT);
  pinMode(yellow, OUTPUT);
  pinMode(green, OUTPUT);
}
```

The **pinMode** function configures the Arduino to use a given pin as an output. You have to do this for your LEDs to work at all. Now for the actual logic of the traffic light. Here's the code you need. Add this below your variable definitions and setup function:

```
  void loop(){
  changeLights();
  delay(15000);
}
void changeLights(){
      // green off, yellow on for 3
  seconds digitalWrite(green, LOW);
  digitalWrite(yellow, HIGH);
  delay(3000);
```

```
    // turn off yellow, then turn red on for 5 seconds
  digitalWrite(yellow, LOW);
    digitalWrite(red,
  HIGH); delay(5000);
    // red and yellow on for 2 seconds (red is already on though)
  digitalWrite(yellow, HIGH);
    delay(2000);
    // turn off red and yellow, then turn on
  green digitalWrite(yellow, LOW);
    digitalWrite(red, LOW);
  digitalWrite(green, HIGH);
  delay(3000);
}
```

Upload this code to your Arduino, and run (make sure to select the correct board and port from the **Tools** > Board and **Tools** > **Port** menus). You should have a working traffic light that changes every 15 seconds, like this (sped up):

Let's break down this code. The **changeLights** function performs all the hard work. This rotates the traffic light through yellow and red, then back to green. As this gets called inside the **loop** function, the Arduino will run this code forever, with a 15-second pause every time.

The **changeLights** function consists of four distinct steps:

- Green on, yellow off
- Yellow off, red on
- Yellow on, red on
- Green on, red off, yellow off

These four steps replicate the process used in real traffic lights. For each step, the code is very similar. The appropriate LED gets turned on or off using **digitalWrite**. This is an Arduino function used to set output pins to HIGH (for on), or LOW (for off).

After enabling or disabling the required LEDs, the **delay** makes the Arduino wait for a given amount of time. Three seconds in this case.

Conclusion:

_____
_____
_____
_____

Experiment No. 5

```
const int greenLED = 13;
const int yellowLED = 8;
const int redLED = 5;
void setup() {
pinMode(greenLED, OUTPUT);
pinMode(yellowLED, OUTPUT);
pinMode(redLED, OUTPUT);
Serial.begin(9600);
}
void loop() {
if (Serial.available())
{
char command = Serial.read();
if (command == 'b')
{
for (int i = 0; i < 5; i++)
{
digitalWrite(greenLED, HIGH);
delay(500);
digitalWrite(greenLED, LOW);
delay(500);
}
}
else if (command == 'g')
{
digitalWrite(greenLED, HIGH);
digitalWrite(yellowLED, LOW);
digitalWrite(redLED, LOW);
}
else if (command == 'y')
{
digitalWrite(greenLED, LOW);
digitalWrite(yellowLED, HIGH);
digitalWrite(redLED, LOW);
}
else if (command == 'r')
{
digitalWrite(greenLED, LOW);
digitalWrite(yellowLED, LOW);
digitalWrite(redLED, HIGH);
}
}
}
```