**Traffic Light System**

Select a few LEDs (red, yellow, and green), resistors, and some jumper wires. This project simulates a basic traffic light system.

**Components:**

* Arduino Mega
* Red LED
* Yellow LED
* Green LED
* 3x 220-ohm resistors
* Jumper wires
* Breadboard

**Circuit Setup:**

1. Connect the anode (longer leg) of the Red LED to digital pin 8 on the Arduino Mega through a 220-ohm resistor.
2. Connect the anode of the Yellow LED to digital pin 9 on the Arduino Mega through a 220-ohm resistor.
3. Connect the anode of the Green LED to digital pin 10 on the Arduino Mega through a 220-ohm resistor.
4. Connect all the cathodes (shorter legs) of the LEDs to the ground (GND) on the Arduino Mega.

**TRAFFIC LIGHT SYSTEM ARDUINO CODE**

const int redLED = 8;

const int yellowLED = 9;

const int greenLED = 10;

void setup() {

pinMode(redLED, OUTPUT);

pinMode(yellowLED, OUTPUT);

pinMode(greenLED, OUTPUT);

}

void loop() {

// Green light

digitalWrite(greenLED, HIGH);

delay(5000); // 5 seconds

digitalWrite(greenLED, LOW);

// Yellow light

digitalWrite(yellowLED, HIGH);

delay(2000); // 2 seconds

digitalWrite(yellowLED, LOW);

// Red light

digitalWrite(redLED, HIGH);

delay(5000); // 5 seconds

digitalWrite(redLED, LOW);

}

**TASK 2: BUTTON TO CONTROL THE LIGHTS**

**Components:**

* **Arduino Mega**
* **Red LED**
* **Yellow LED**
* **Green LED**
* **3x 220-ohm resistors**
* **Jumper wires**
* **Breadboard**
* **Push button**
* **10k-ohm resistor**

**Circuit Setup:**

1. **Connect the anode (longer leg) of the Red LED to digital pin 8 on the Arduino Mega through a 220-ohm resistor.**
2. **Connect the anode of the Yellow LED to digital pin 9 on the Arduino Mega through a 220-ohm resistor.**
3. **Connect the anode of the Green LED to digital pin 10 on the Arduino Mega through a 220-ohm resistor.**
4. **Connect all the cathodes (shorter legs) of the LEDs to the ground (GND) on the Arduino Mega.**
5. **Connect one leg of the push button to digital pin 2 on the Arduino Mega.**
6. **Connect the other leg of the push button to GND.**
7. **Connect a 10k-ohm resistor between digital pin 2 and 5V (pull-up resistor).**

**Arduino Code:**

**const int redLED = 8;**

**const int yellowLED = 9;**

**const int greenLED = 10;**

**const int buttonPin = 2;**

**int lightState = 0;**

**int buttonState = 0;**

**int lastButtonState = 0;**

**void setup() {**

**pinMode(redLED, OUTPUT);**

**pinMode(yellowLED, OUTPUT);**

**pinMode(greenLED, OUTPUT);**

**pinMode(buttonPin, INPUT\_PULLUP);**

**}**

**void loop() {**

**buttonState = digitalRead(buttonPin);**

**if (buttonState == LOW && lastButtonState == HIGH) {**

**lightState++;**

**if (lightState > 2) {**

**lightState = 0;**

**}**

**delay(200); // debounce delay**

**}**

**lastButtonState = buttonState;**

**switch (lightState) {**

**case 0:**

**digitalWrite(greenLED, HIGH);**

**digitalWrite(yellowLED, LOW);**

**digitalWrite(redLED, LOW);**

**break;**

**case 1:**

**digitalWrite(greenLED, LOW);**

**digitalWrite(yellowLED, HIGH);**

**digitalWrite(redLED, LOW);**

**break;**

**case 2:**

**digitalWrite(greenLED, LOW);**

**digitalWrite(yellowLED, LOW);**

**digitalWrite(redLED, HIGH);**

**break;**

**}**

**}**