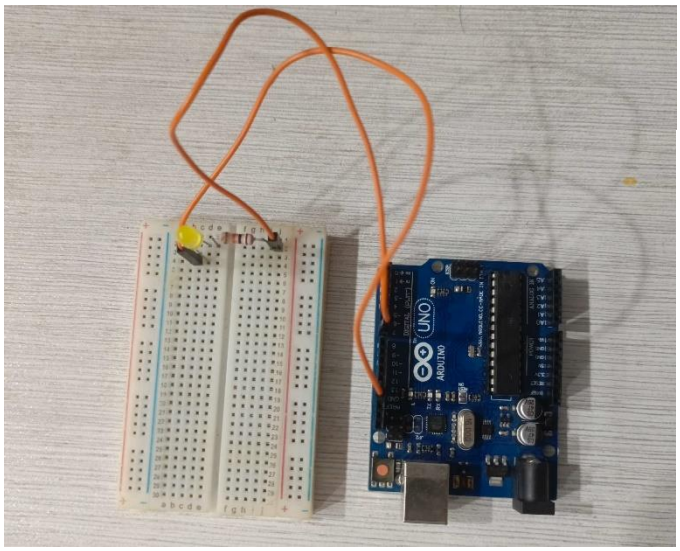
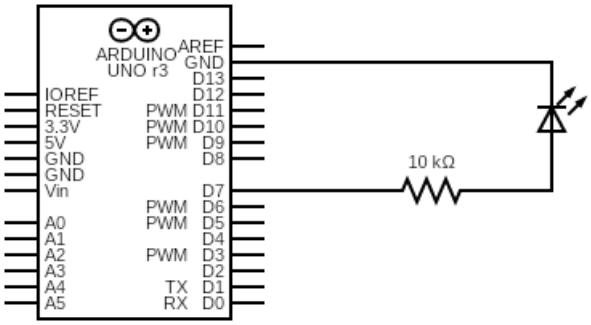
LAB TASKS

Q1: Design a circuit to blink an LED for 1 second via pin 7 of the Arduino UNO board. Now modify the code to turn it ON for 3 seconds and OFF for 1 second.

```
void setup() {
  // Defining output ports for LED inputs
  pinMode(7, OUTPUT); // Port location for Yellow LED
}

void loop() {
  // Assignning LED with 1 (High) or 0 (Low) with their respective duration
  digitalWrite(7, HIGH);
  delay(3000); // Adding a time delay
  digitalWrite(7, LOW);
  delay(1000);
}
```



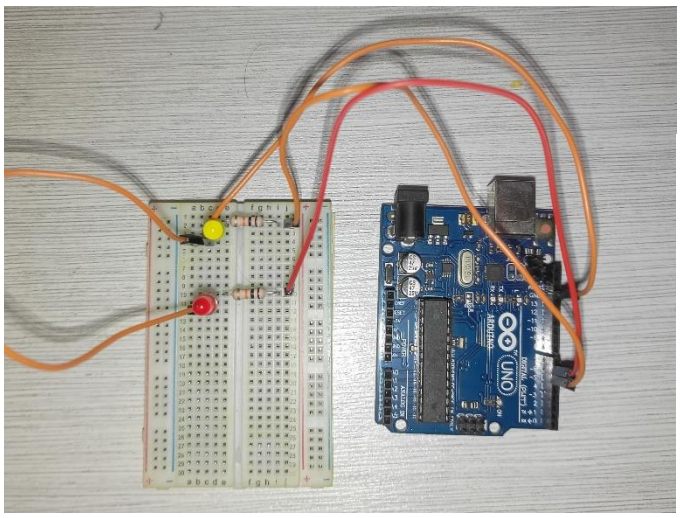


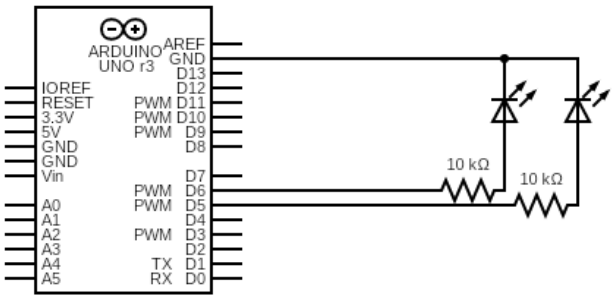
Q2: Design an Intelligent Light blinking circuit which can be used on Police cars. The LEDs have to be automatically turned ON & OFF so fast one after another as you have seen the lights mounted on the roof of highway police car. It is also capable of showing different light pattern by doing slight changes. Show the demonstration in front of the instructor.

```
void setup() {
  // Defining output ports for LED inputs
  pinMode(5, OUTPUT); // Port location for Yellow LED
  pinMode(6, OUTPUT); // Port location for Red LED
}

void loop() {
  // Assignning LED with 1 (High) or 0 (Low) with their respective duration
  digitalWrite(5, HIGH);
  delay(1000); // Adding a time delay
  digitalWrite(5, LOW);
  delay(100);
  digitalWrite(6, HIGH);
  delay(100);
```

```
  digitalWrite(6, LOW);
  delay(100);
}
```

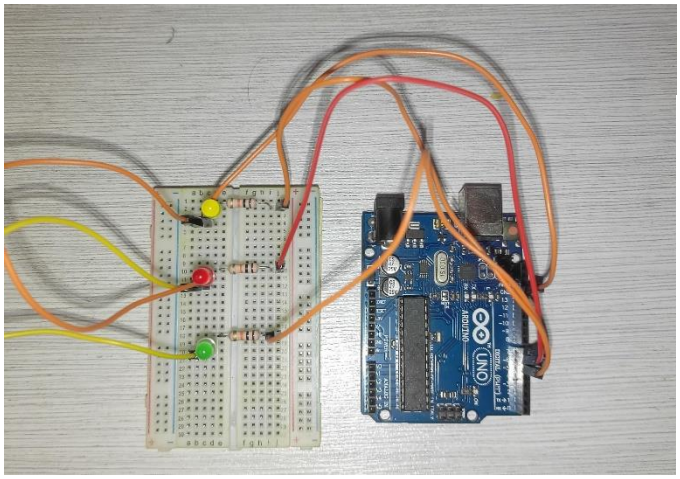


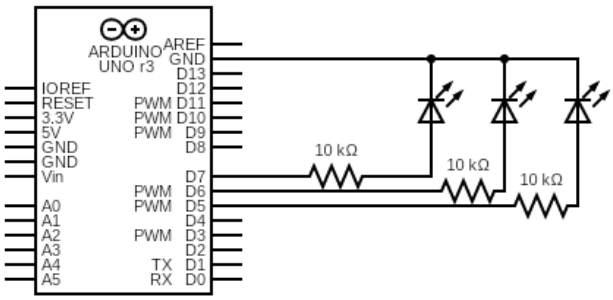


Q3: Design a decorative dancing lighting system which consist of three LEDs. The LEDS should be visually connected in a line and should light up in a sequence one after another.

```
void setup() {
  // Defining output ports for LED inputs
  pinMode(5, OUTPUT); // Port location for Yellow LED
  pinMode(6, OUTPUT); // Port location for Red LED
  pinMode(7, OUTPUT); // Port location for Green LED
}

void loop() {
  // Assignning LED with 1 (High) or 0 (Low) with their respective duration
  digitalWrite(5, HIGH);
  delay(1000); // Adding a time delay
  digitalWrite(5, LOW);
  delay(100);
  digitalWrite(6, HIGH);
  delay(100);
  digitalWrite(6, LOW);
  delay(100);
  digitalWrite(7, HIGH);
  delay(100);
  digitalWrite(7, LOW);
  delay(100);
}
```





POST LAB TASKS

Q1: Why is the resistor used with LED?

A resistor is used with an LED to limit the current flowing through it, preventing it from burning out due to excessive current. LED's behavior is such that it requires a specific current to function optimally, and without a resistor, the LED might draw more current than it can handle, leading to its failure. The resistor helps regulate the current, ensuring the LED operates within its optimal limits.

Q2: Is it necessary to define the port in IDE? What happens if the wrong port is selected?

In the Arduino IDE, selecting the correct port is necessary for the software to communicate with the Arduino board. If the wrong port is chosen, the IDE won't be able to establish a connection with the board, resulting in an upload error or failure.

Q3: Give any two examples of deployment of Arduino at your home and how will it benefit you.

I can think of two Arduino projects that would be beneficial for me:

1. LED Ambient Mood Light with Arduino: I aim to design an interactive LED Ambient Mood Light using Arduino. This project will enable me to create a customized lighting system capable of producing different colors, brightness levels, and dynamic lighting patterns. This setup will significantly enhance the ambiance of my living space, providing a versatile and mood-setting lighting experience for relaxation and entertainment.
2. Voice-Controlled Home Automation: I plan to integrate Arduino with voice recognition capabilities, establishing a voice-controlled home automation system. With this technology, I will be able to hands-free manage various operation of lights, thermostats, and other smart home devices through simple voice commands, ensuring a convenient and accessible home environment.

Q4: What is the pattern of your dancing LED system? Explain in detail (also mention the color sequence of your circuit).

In our Arduino UNO project, the LEDs smoothly transitioned from yellow to red to green and back again in a loop, with each LED having a 0.1-second delay between turning on and off, resulting in a seamless color shift. Additionally, we incorporated 10k ohm resistors before each LED to ensure consistent, equal, and suitable current supply throughout the system.