



## **Lab Sheet 8 Problem Soluton**

Course Tittle: Microprocessor and Microcontroller Lab

Course Code: CSE3102

Section: 3

**Submitted To**

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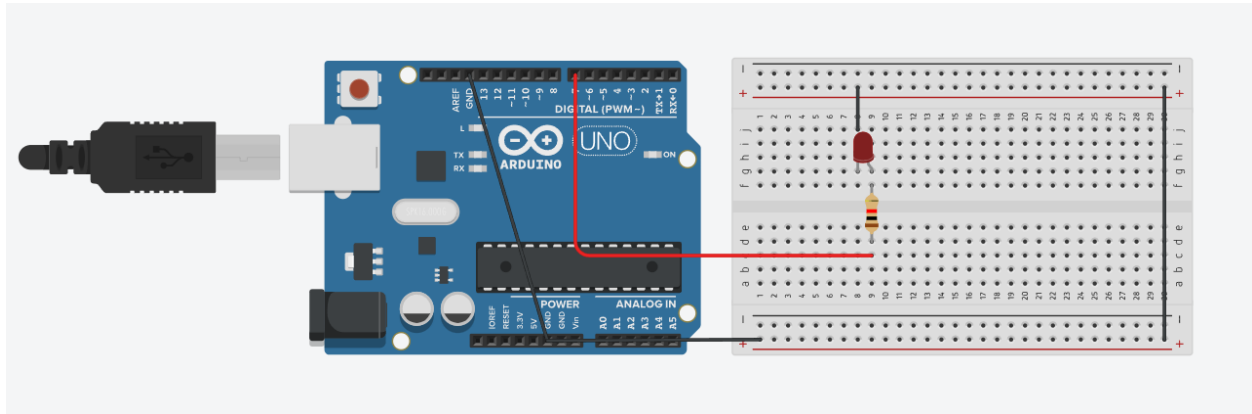
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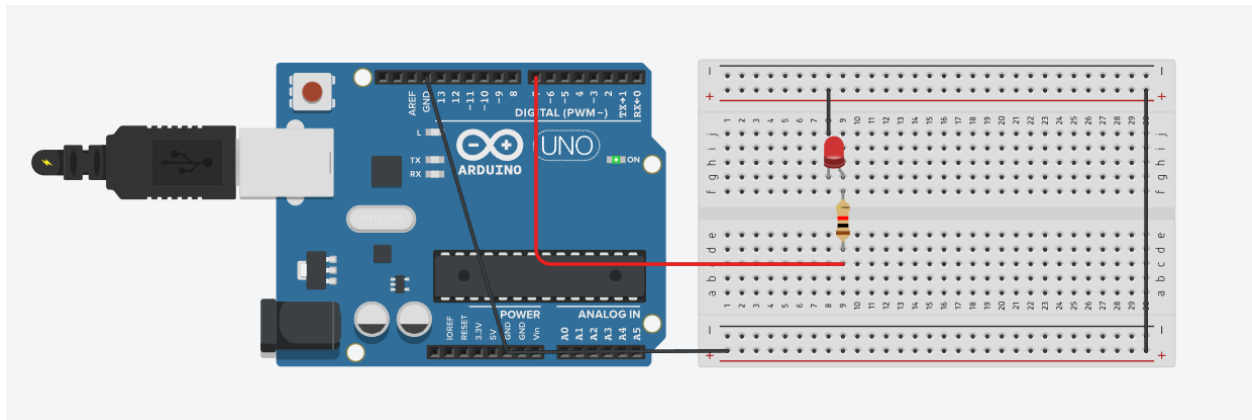
Spring, 24

**Problem 1 : Develop a project using Arduino to make an LED blink at a regular interval.**

**Before Connection**



**After Connection**



**Source Code**

```
// Pin definitions
const int redPin = 7;

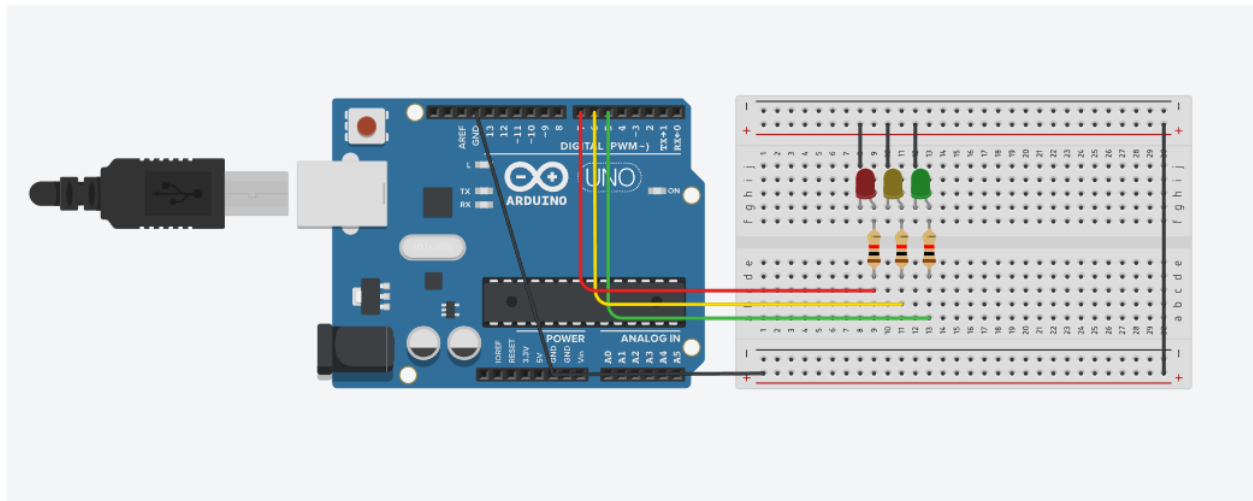
// Time intervals in milliseconds
```

```
const int redDuration = 5000; // 5 seconds
```

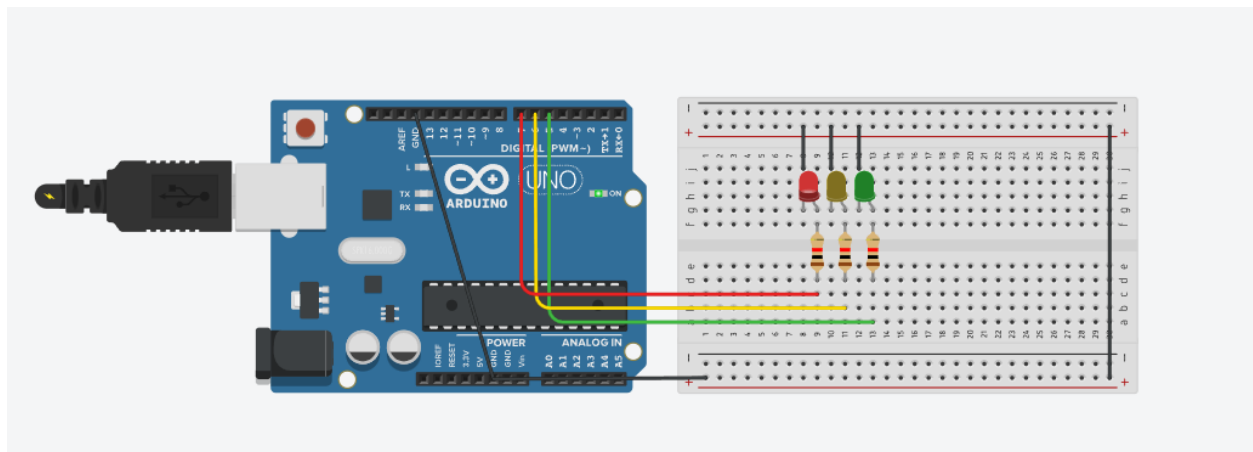
```
void setup() {  
  // Initialize pins as output  
  pinMode(redPin, OUTPUT);  
}  
void loop() {  
  // Red light  
  digitalWrite(redPin, HIGH);  
  delay(redDuration);  
  digitalWrite(redPin, LOW);  
  delay(redDuration);  
}
```

**Problem 2 : Develop a sequential blinking 3 led lights using Microcontroller.**

**Before Connection**



## After Connection



## Source Code

```
// Pin definitions
const int redPin = 7;
const int yellowPin = 6;
const int greenPin = 5;

// Time intervals in milliseconds
const int redDuration = 5000; // 5 seconds
const int greenDuration = 5000; // 5 seconds
```

```
const int yellowDuration = 2000; // 2 seconds
```

```
void setup() {
```

```
    // Initialize pins as output
```

```
    pinMode(redPin, OUTPUT);
```

```
    pinMode(yellowPin, OUTPUT);
```

```
    pinMode(greenPin, OUTPUT);
```

```
}
```

```
void loop() {
```

```
    // Red light
```

```
    digitalWrite(redPin, HIGH);
```

```
    digitalWrite(yellowPin, LOW);
```

```
    digitalWrite(greenPin, LOW);
```

```
    delay(redDuration);
```

```
    // Green light
```

```
    digitalWrite(redPin, LOW);
```

```
    digitalWrite(yellowPin, LOW);
```

```
    digitalWrite(greenPin, HIGH);
```

```
    delay(greenDuration);
```

```
    // Yellow light
```

```
    digitalWrite(redPin, LOW);
```

```
    digitalWrite(yellowPin, HIGH);
```

```
    digitalWrite(greenPin, LOW);
```

```
    delay(yellowDuration);
```

```
}
```

**Problem 3 : Create a simulation of a traffic light with red, yellow, and green LEDs. Use timers to control the light sequence.**

**Theory**

The aim of this simulation is to simulate a traffic light system using an Arduino board. The traffic lights consist of three colors: red, yellow, and green. Additionally, there is a countdown display that shows the countdown from 9 to 0, indicating the remaining time for each light phase.

**Components List**

Name	Quantity	Component
UArduino UNO R3	1	Arduino Uno R3
Digit1	1	Cathode 7 Segment Display
R2	1	1000 $\Omega$ Resistor
D1	1	Red LED
D2	1	Yellow LED
D3	1	Green LED
R1 R3 R4	3	1 k $\Omega$ Resistor

**Overview**

The code utilizes an Arduino board to simulate a traffic light system. It defines pins for red, yellow, and green LEDs representing traffic lights, as well as pins for individual segments of a countdown display.

## Functionality

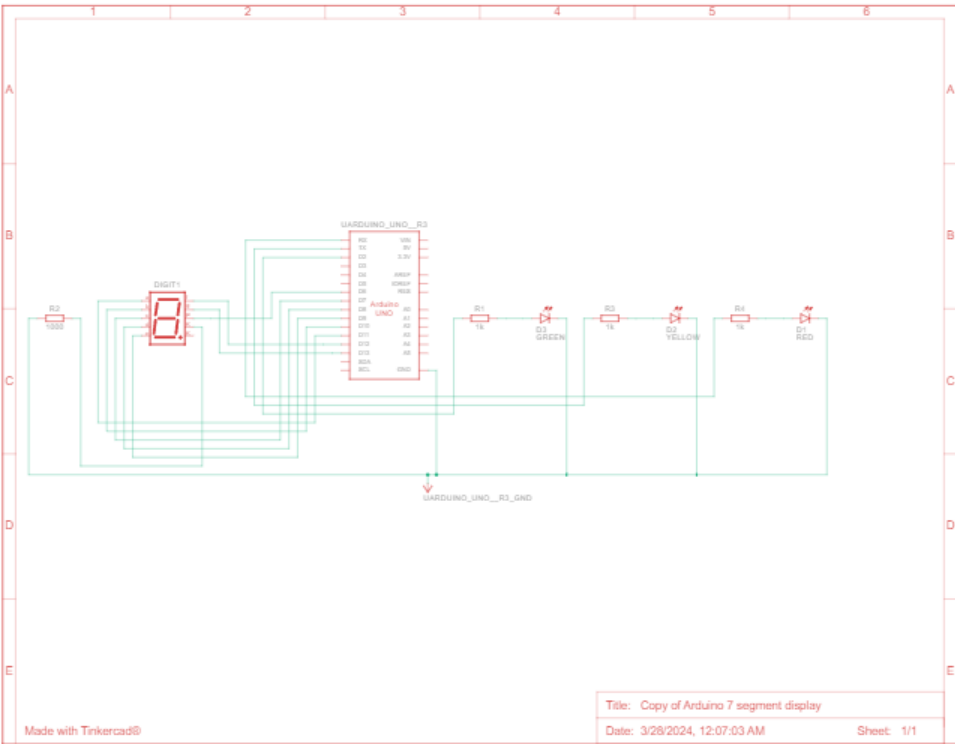
- Functions to display numbers 0-9 on the countdown display.
- A loop function to control the sequence of traffic lights:
- Red light for 15 seconds.
- Yellow light for 4 seconds with countdown.
- Green light for 20 seconds with countdown.
- Yellow light for 4 seconds as a transition phase.

## Operation

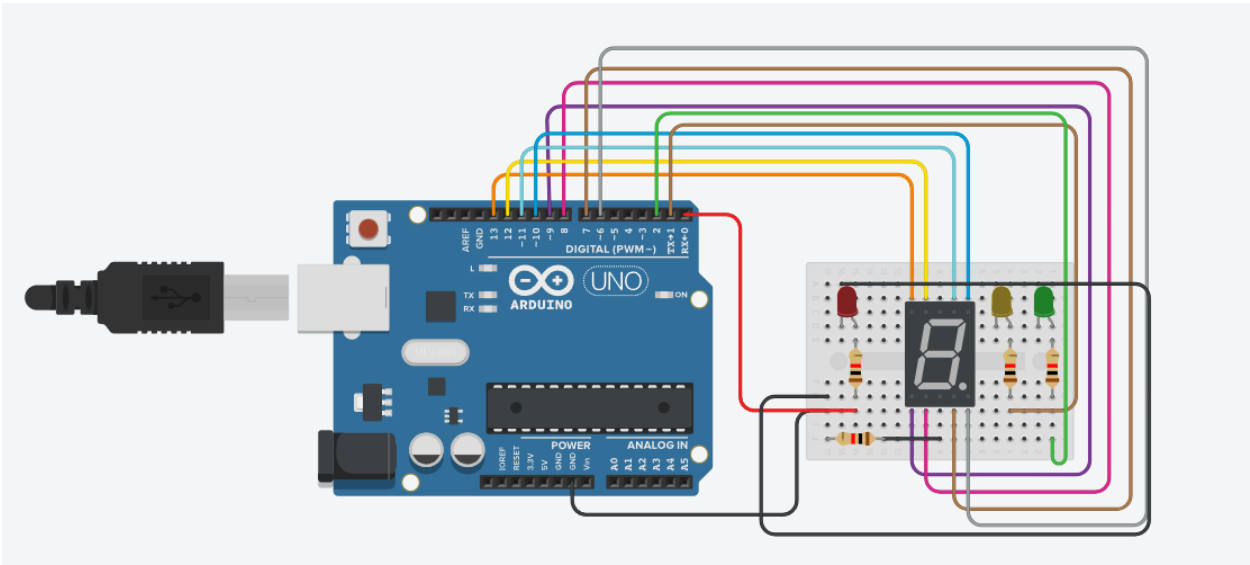
- Red light turns on for 15 seconds.
- Yellow light turns on with a countdown from 9 to 0 for 4 seconds.
- Green light turns on with a countdown from 9 to 0 for 20 seconds.
- Yellow light turns on for 4 seconds.

This sequence repeats indefinitely.

# Schematic View

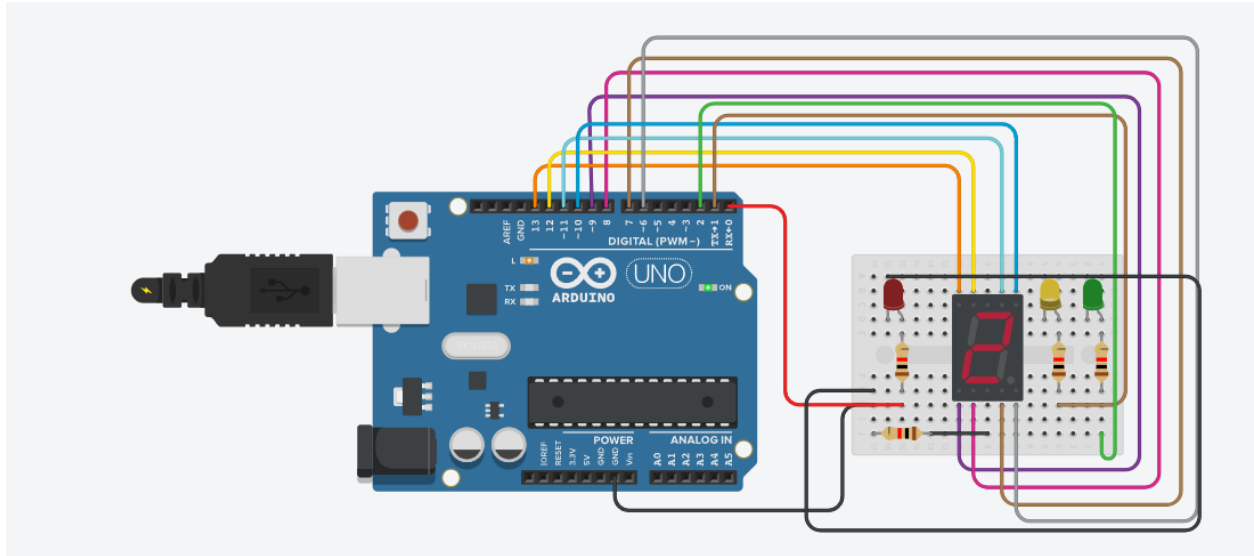


# Before Connection





## After Connection



## Source Code

```
const int red = 0;
const int yellow = 1;
const int green = 2;
const int A = 13;
const int B = 12;
const int C = 11;
const int D = 10;
const int E = 9;
const int F = 8;
const int G = 7;
const int H = 6;

void setup(){

  pinMode(red, OUTPUT);
  pinMode(yellow, OUTPUT);
```

```
pinMode(green, OUTPUT);  
pinMode(A, OUTPUT);  
pinMode(B, OUTPUT);  
pinMode(C, OUTPUT);  
pinMode(D, OUTPUT);  
pinMode(E, OUTPUT);  
pinMode(F, OUTPUT);  
pinMode(G, OUTPUT);  
pinMode(H, OUTPUT);
```

```
}
```

```
void zero(void) {  
    digitalWrite(A, LOW);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, HIGH);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void one(void) {  
    digitalWrite(A, LOW);  
    digitalWrite(B, LOW);  
    digitalWrite(C, LOW);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, LOW);  
    digitalWrite(F, LOW);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void two(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, LOW);
```

```
digitalWrite(C, HIGH);  
digitalWrite(D, HIGH);  
digitalWrite(E, HIGH);  
digitalWrite(F, HIGH);  
digitalWrite(G, LOW);  
digitalWrite(H, LOW);  
}
```

```
void three(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, LOW);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, LOW);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void four(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, LOW);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, LOW);  
    digitalWrite(F, LOW);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void five(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, LOW);  
    digitalWrite(E, LOW);  
    digitalWrite(F, HIGH);  
}
```

```
digitalWrite(G, HIGH);  
digitalWrite(H, LOW);  
}
```

```
void six(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, LOW);  
    digitalWrite(E, HIGH);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void seven(void) {  
    digitalWrite(A, LOW);  
    digitalWrite(B, LOW);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, LOW);  
    digitalWrite(F, LOW);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void eight(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, HIGH);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void nine(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, LOW);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void timer(void)
```

```
{  
  
    nine();  
    delay(1000);  
  
    eight();  
    delay(1000);  
  
    seven();  
    delay(1000);  
  
    six();  
    delay(1000);  
  
    five();  
    delay(1000);  
  
    four();  
    delay(1000);  
  
    three();  
    delay(1000);  
  
    two();  
    delay(1000);  
}
```

```
one();  
delay(1000);  
  
zero();  
delay(1000);  
  
}  
  
void loop(void){  
digitalWrite(red, HIGH);  
delay(15000);  
digitalWrite(red, LOW);  
  
digitalWrite(yellow, HIGH);  
delay(4000);  
timer();  
digitalWrite(yellow, LOW);  
  
digitalWrite(green, HIGH);  
delay(20000);  
timer();  
digitalWrite(green, LOW);  
  
digitalWrite(yellow, HIGH);  
delay(4000);  
digitalWrite(yellow, LOW);  
  
}
```