



Lab Sheet 8 Problem Soluton

Course Tittle: Microprocessor and Microcontroller Lab

Course Code: CSE3102

Section: 3

Submitted To

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Problem : 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 Ω Resistor
D1	1	Red LED
D2	1	Yellow LED
D3	1	Green LED
R1 R3 R4	3	1 k Ω 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

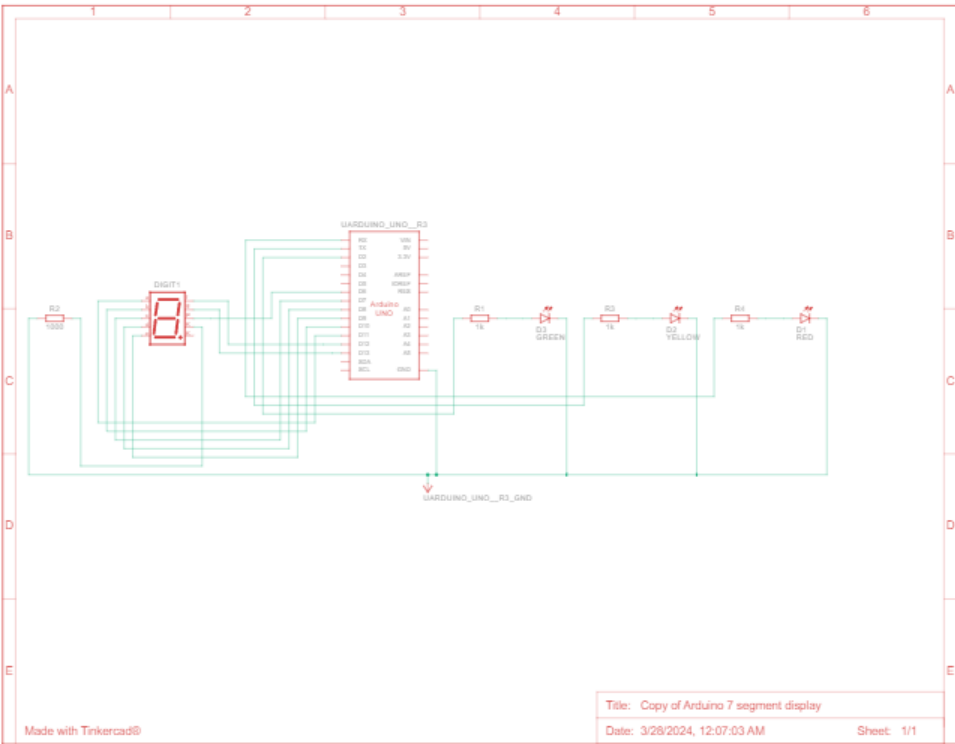
- Functions to display numbers 0-9 on the countdown display.
- A loop function to control the sequence of traffic lights:
- Red light for 15 seconds.
- Yellow light for 4 seconds with countdown.
- Green light for 20 seconds with countdown.
- Yellow light for 4 seconds as a transition phase.

Operation

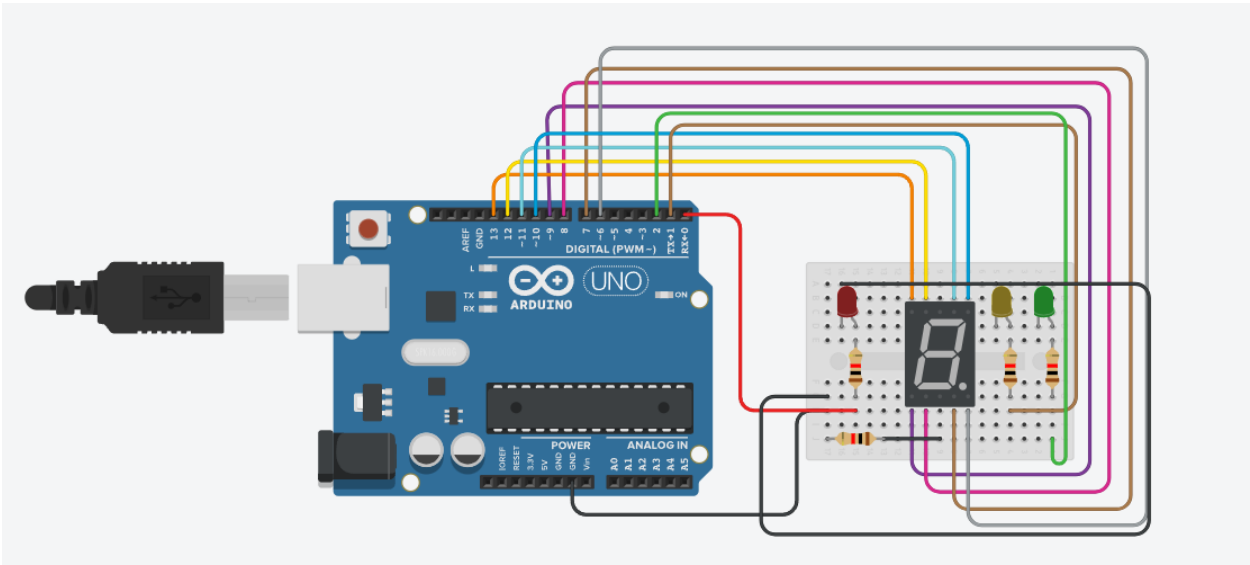
- Red light turns on for 15 seconds.
- Yellow light turns on with a countdown from 9 to 0 for 4 seconds.
- Green light turns on with a countdown from 9 to 0 for 20 seconds.
- Yellow light turns on for 4 seconds.

This sequence repeats indefinitely.

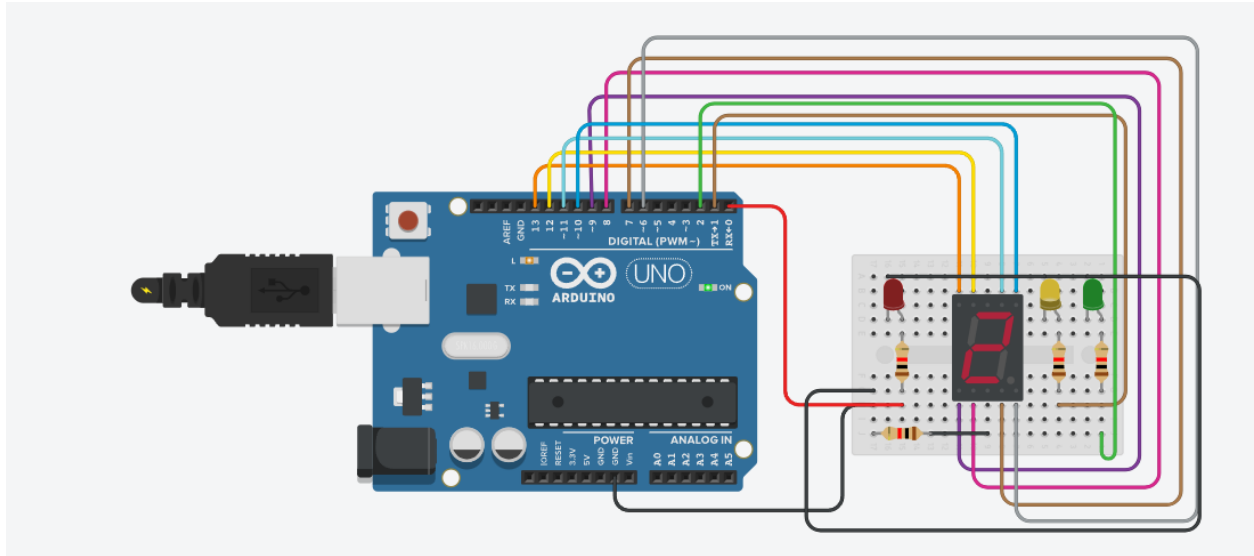
Schematic View



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);

}
```