Arduino Final Project

Program Overview:

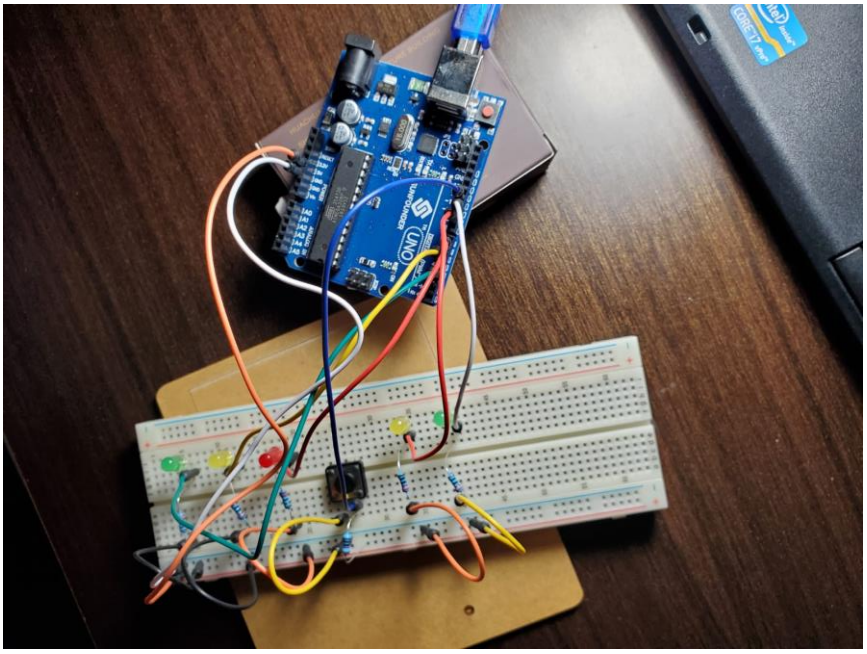

Figure 1: View of the bread board and the Arduino

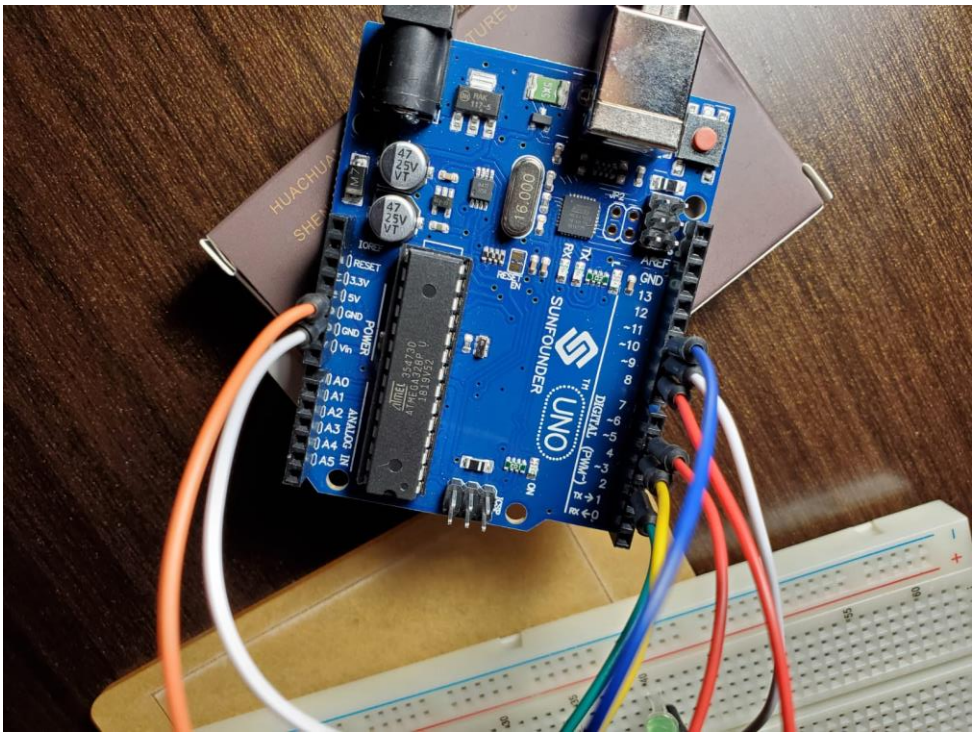

Figure 2: Close up view of the bread board

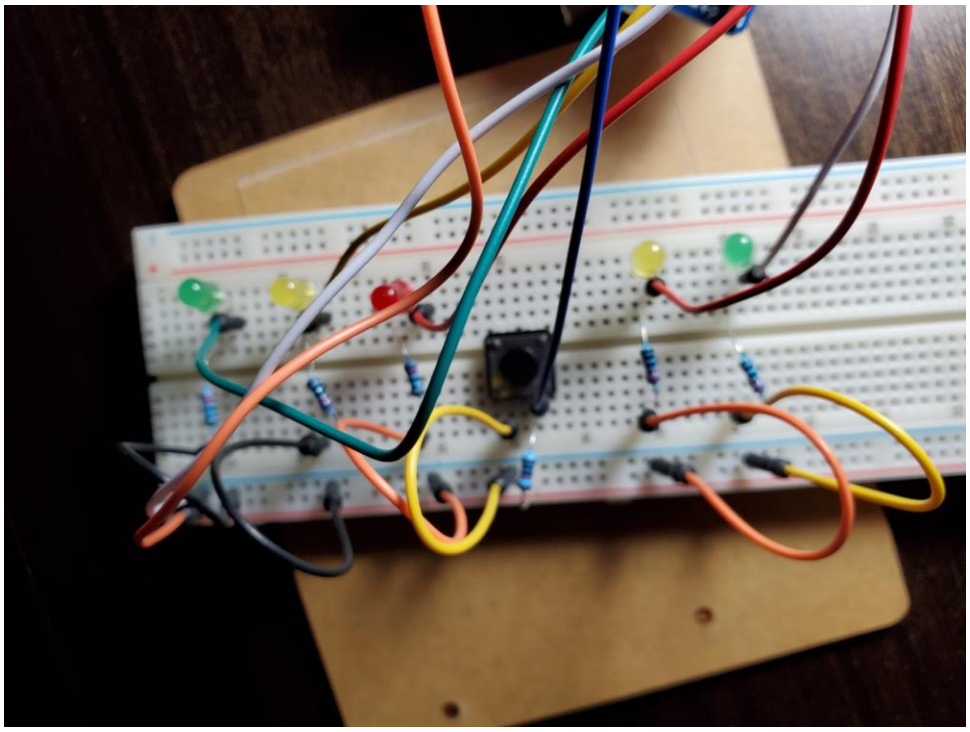

Figure 3: Close up of the bread board

This program consists of a traffic lights system. The three lights (green, yellow, and red) are traffic lights, and the other two lights (yellow light, green light) are pedestrian lights. The green traffic and pedestrian lights switch on for 15 seconds per cycle. The yellow lights switch on after the green lights. The yellow traffic light stays on for 3 seconds, whereas the yellow pedestrian light flashes on and off for the 3 second duration. The red traffic light and the yellow pedestrian light follow the yellow lights. The red traffic light and yellow pedestrian light remain on for 15 seconds. The yellow pedestrian light remains on continuously without flashing. This remains on unless the button is pressed. Once the button is pressed the lights change back to green within three seconds. If the red traffic light and the yellow pedestrian light is in its final three seconds of its 15 seconds cycle, the time from button would not add on and the lights would change at the maximum of 15 seconds. The whole cycle is 33 seconds in length if it is uninterrupted.

Program Code:

```
/*
Name: Harmanpreet Singh Sagar
Assignment: Arduino Final Project
Date: February 26th, 2021
Class: TDR 3M1
Purpose: To create a traffic signal stop lights simulation
*/

// Green Light connected to pin 3
int greenLight = 3;

// Yellow Light connected to pin 5
int yellowLight = 5;

// Red Light connected to pin 6
int redLight = 6;

// Orange Light connected to pin 9
int orangeLight = 9;

// Green Pedestrian Light connected to pin 10
int greenPLight = 10;

// Pushbutton connected to pin 11
int button = 11;

// Sets the amount of general light time
int lightTime = 15000;

// Sets the amount of time if button is pressed
int buttonTime = 3000;

// Sets the amount of time for the yellow light
int yellowTime = 3000;

// Time since button pressed
unsigned long changeTime;



void setup()
```

```
{
  // Configures greenLight to be an output pin
  pinMode(greenLight, OUTPUT);
  // Configures yellowLight to be an output pin
  pinMode(yellowLight, OUTPUT);
  // Configures redLight to be an output pin
  pinMode(redLight, OUTPUT);
  // Configures orangeLight to be an output pin
  pinMode(orangeLight, OUTPUT);
  // Configures greenPLight to be an output pin
  pinMode(greenPLight, OUTPUT);
  // Configures button to be an input pin
  pinMode(button, INPUT);
}

void loop()
{
  // Summons the greenYellowFunction subroutine
  greenYellowFunction();

  // Switches the red light on
  digitalWrite(redLight, HIGH);
  //Switches the orange light on
  digitalWrite(orangeLight, HIGH);
  // Opens while loop
  // Loop will continue to run until either the conditions are turned false
  while (digitalRead(button) == HIGH && (millis() - changeTime) < lightTime)
  {
    // If the button is pressed, wait 3 seconds and change the lights to green
    if (digitalRead(button) == HIGH && (millis() - changeTime > 12000 &&
millis() - changeTime < lightTime))
    {
      delay(lightTime - (millis() - changeTime));
    }
    else
    {
      delay(buttonTime);
    }
  }

  // Switches the red light off
  digitalWrite(redLight, LOW);
  // Switches the orange light off
```

```
  digitalWrite(orangeLight, LOW);
}

void greenYellowFunction()
{
  // Switches the green light on
  digitalWrite(greenLight, HIGH);
  // Switches the white light on
  digitalWrite(greenPLight, HIGH);
  // Wait 15 seconds
  delay(lightTime);

  // Switches the green light off
  digitalWrite(greenLight, LOW);
  // Switches the white light off
  digitalWrite(greenPLight, LOW);

  // Switches the yellow light on
  digitalWrite(yellowLight, HIGH);
  // Starts if statement
  // Statement will run if yellow light is on
  if(digitalRead(yellowLight) == HIGH);
  {
    // Opens for loop
    // Declares a variable orangeFlash, assigns default value and sets maximum
value of less than 3 seconds
    for (int orangeFlash = 0; orangeFlash < yellowTime; orangeFlash += 1000)
    {
      // Switches on the orange light
      digitalWrite(orangeLight, HIGH);
      // Wait 500 milliseconds
      delay (500);
      // Switches off the orange light
      digitalWrite(orangeLight, LOW);
      // Wait 500 milliseconds
      delay (500);
    }
  }

  // Switches the yellow light off
  digitalWrite(yellowLight, LOW);

  // Records the time since last change of lights
```

```
  changeTime = millis();
}
```