Homework 3

Course Name: Special Topics/Problems in CS: Cyber Physical Systems

Course Number: CS-5331

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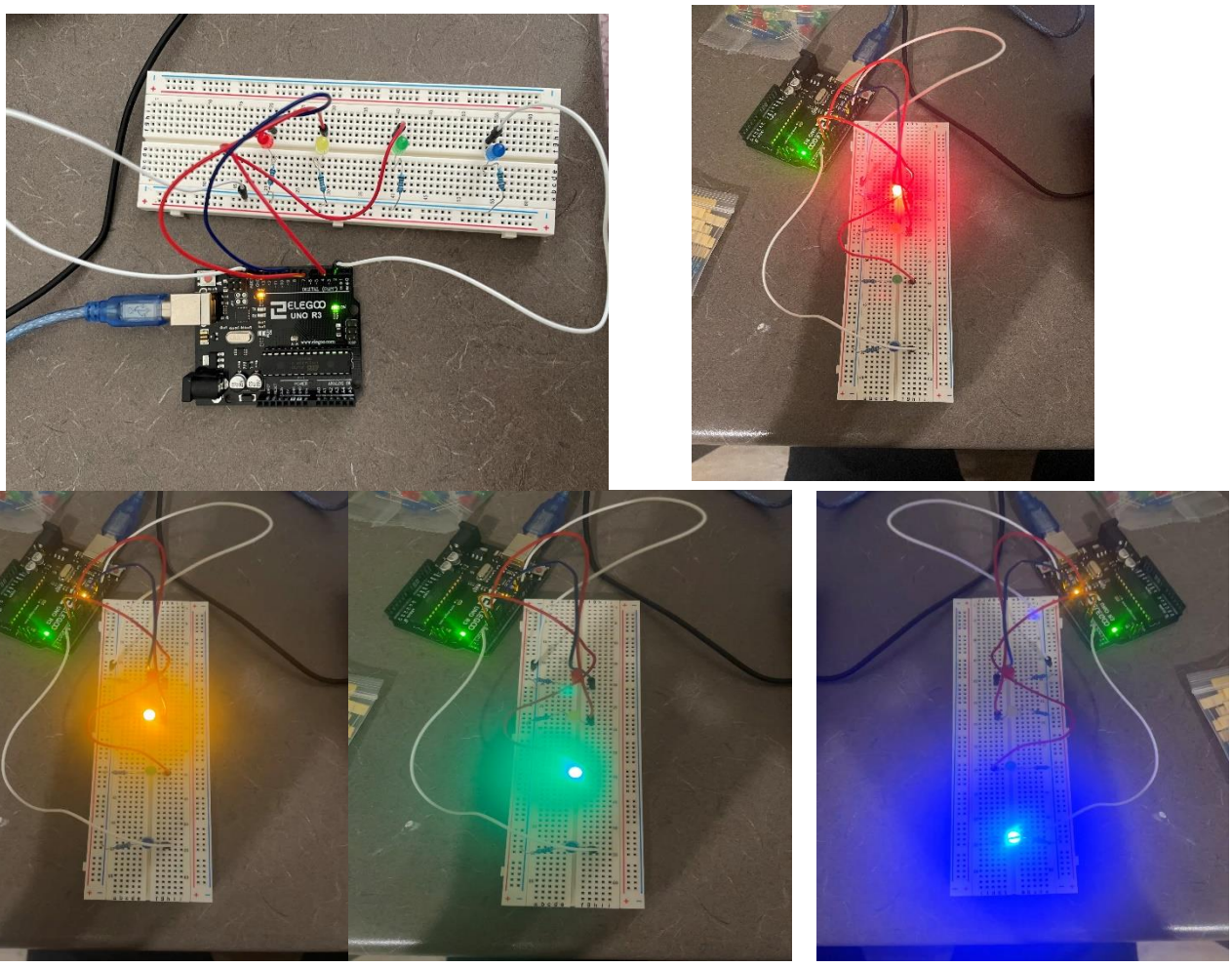
Problem 1:

The positive terminals of four LEDs, colored blue, green, yellow, and red, are connected to digital pins 2, 4, 6, and 8 respectively on the Arduino Uno board. The negative terminals of each LED are connected to separate 220Ω resistors. The other terminal of each resistor is then connected to the ground (GND) pin on the Arduino Uno board. This configuration ensures that each LED has the correct current-limiting resistance, and that all the LEDs share a common ground reference with the Arduino board.

Given the picture of hardware setup :-



Fig; Red, yellow, green and blue led emitting sequentially.

Problem 2:

Delay time =250 ms

```
int red=8;
int yellow=6;
int green =4;
int blue = 2;
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(blue, OUTPUT);
  pinMode(green, OUTPUT);
  pinMode(yellow, OUTPUT);
  pinMode(red, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(blue, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(250);
  digitalWrite(blue, LOW);  // turn the LED on (HIGH is the voltage level)
  delay(250);
  digitalWrite(green, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(250);
  digitalWrite(green, LOW);  // turn the LED on (HIGH is the voltage level)
  delay(250);
  digitalWrite(yellow, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(250);
  digitalWrite(yellow, LOW);  // turn the LED on (HIGH is the voltage level)
  delay(250);       // wait for a second
  digitalWrite(red, HIGH);   // turn the LED off by making the voltage LOW
  delay(250);
  digitalWrite(red, LOW);   // turn the LED off by making the voltage LOW
  delay(250);
                // wait for a second
}
```

Problem 3:

Delay time = 100ms

```
int red=8;
int yellow=6;
int green =4;
int blue = 2;
void setup() {
```

```
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(blue, OUTPUT);
  pinMode(green, OUTPUT);
  pinMode(yellow, OUTPUT);
  pinMode(red, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(blue, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(100);
  digitalWrite(blue, LOW);  // turn the LED on (HIGH is the voltage level)
  delay(100);
  digitalWrite(green, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(100);
  digitalWrite(green, LOW);  // turn the LED on (HIGH is the voltage level)
  delay(100);
  digitalWrite(yellow, HIGH);  // turn the LED on (HIGH is the voltage level)
  delay(100);
  digitalWrite(yellow, LOW);  // turn the LED on (HIGH is the voltage level)
  delay(100);       // wait for a second
  digitalWrite(red, HIGH);   // turn the LED off by making the voltage LOW
  delay(100);
  digitalWrite(red, LOW);   // turn the LED off by making the voltage LOW
  delay(100);
                // wait for a second
}
```

The LEDs will turn on and off more quickly, creating the impression that the sequence is moving more swiftly. This variation in observation is caused by the shift in the duration of each condition. The new length of 100 milliseconds will result in the LEDs turning on and off more quickly than the prior duration of 250 milliseconds, which allowed each LED to remain lighted for a longer amount of time.