CPE301L: Lab 3

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1 Introduction

In this lab, we are responsible for programming an Arduino similarly to a stoplight. Like a stoplight, we are tasked with controlling 4 LEDs: red, yellow, green, and blue for a pedestrian light. The red, yellow, and green lights must cycle in a set interval, each light lasting 5, 3, and 5 seconds, respectively. As for the blue light, it would blink continuously for the duration of the red light before turning off. For an added layer of difficulty, the second part of the lab tasks us with accomplishing these tasks with registry-level programming.

2 Results

2.1 Circuit

To create our circuit, we set up the ground and power connections between the appropriate rails. Our LEDs were connected by pull-up resistors to the following pins: red to pin 9, yellow to pin 8, green to pin 7, and blue to pin 10. Then, the Arduino was connected to our computer via the serial port. The final circuit and button configurations can be found in **Table 1**.

2.2 Code

2.2.1 Part 1

The code for part 1 was made with Arduino IDE, and was designed primarily with the stoplight timing in mind, with light changes delineated by whitespace. In the setup function, the ports are initialized and set up for digital output for the LEDs that represent a traffic light. The loop function simply repeats the sequence:

- Green (5s)
- Yellow (White) (3s)
- Red + Blue Flashing (5s)

2.2.2 Part 2

The code for part 2 is similar, but uses the port registers to operate on the LED's. For example, the green LED, connected to port 7 is represented as 'on' with the binary expression '0b00010000'.

View code on GitHub.

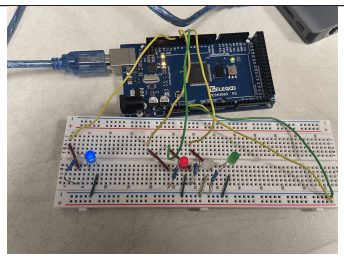
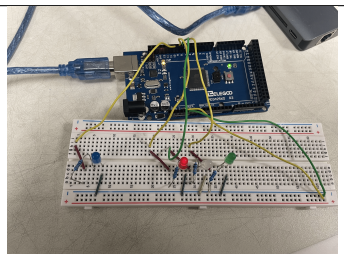
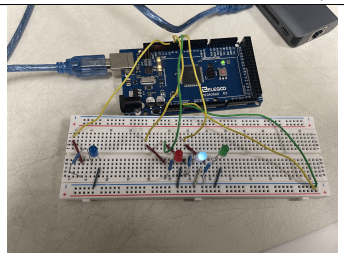
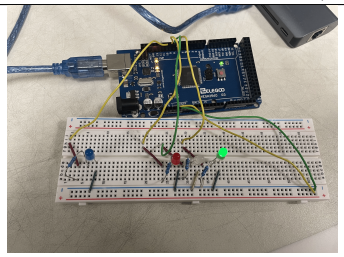
 Red light with pedestrian light on (blinking).	 Red light with pedestrian light off (blinking).
 Yellow light.	 Green light.

Table 1: The various light configurations that result from the circuit.