Dear Mr. Watchorn,

**Executive Summary:**

I completed the final project for ECE 101, which involved creating a Traffic Light simulation program using the C language. The program implements a state machine to simulate traffic light sequences and responds to user inputs to change states or terminate the program.

**Discussion:**

In designing the program, several important decisions had to be made. I had to choose which headers to include (<stdio.h>, <stdlib.h>, <windows.h>, <conio.h>, and <time.h>), which provide functionality for standard I/O, time tracking, and handling user inputs.

The program's structure was based on a state machine, which allowed easy management of different traffic light sequences. It consists of seven states: Initial, Shutdown, Red-Green (R-G), Red-Yellow (R-Y), Green-Red (G-R), Yellow-Red (Y-R), Red-Red (R-R), and Off-Off (O-O).

As for data types, int was chosen for the state variable because it perfectly suits the purpose of storing integer identifiers for the states. clock\_t was utilized to measure time, as it provides a higher precision suitable for real-time systems.

**Outcomes:**

The program was compiled and executed on a Windows-based system with an AMD Ryzen processor, using the CLion IDE. The program functioned as expected, simulating the traffic light sequences, and responding to user inputs.

Please refer to the attached images showing the traffic light program executing and transitioning between states.

**Conclusions:**

This final project has been a significant learning experience in understanding time-based state machines and how they can be implemented in real-world scenarios, such as traffic light systems. Other examples of time-based state machines include manufacturing assembly lines, digital clocks, and even in-process scheduling in operating systems.

Best Regards,

Michael Dekoski

Attachments

A picture containing text, screenshot, font, design

Description automatically generated

Attachment 1: All states are shown.