Background

A research group is creating a small-scale city for use in testing the navigation abilities of a small self-driving vehicle. The group is planning to implement the stoplight control code you already wrote, but now the researchers want to add in a bus stop to the crossroads in only the N/S direction. In this assignment, you will write the logic to simulate a N/S bus arriving at the intersection.

For this implementation, the user will not be able to enter the light durations. Instead, the researchers have decided to use 8 seconds for the green light and 2 seconds for the yellow light with a 90 second total simulation run time.

The bus travels on the N/S road only and always arrives at the intersection with a period of 24 seconds (i.e., the bus arrives every 24 seconds exactly). Every time the bus arrives, it picks up a random number of passengers between 0 and 10, and it takes each passenger 1 second to get on the bus. If the N/S light is green once the bus has picked up all the passengers, then the bus can depart the intersection right away. If the N/S light is yellow or red once the bus has picked up all the passengers, then the bus must wait at the intersection until the N/S light turns green.

In addition to displaying the N/S and E/W stoplight colors in real time, the researchers also want you to display when the bus arrives at the intersection, how many passengers the bus picked up after it has picked up them all, and when the bus departs the intersection. All of these updates should appear on the screen in real-time and with a timestamp label for the amount of time elapsed since the beginning of the simulation run.

Instructions
- Complete the C31-1 assignment which introduces timing in C.
- Create a new program and implement both the stoplight control code and new code to control the bus features. There is a provided skeleton code which uses a **state machine** for the stoplight code and which you may use, or you may write your own code if you want to use the stoplight control code you already wrote.
- A pre-compiled example output file is also provided for you to reference. Your final code should execute in a similar manner but does not need to be formatted exactly the same.
- Both `APP_C31_1_EXT_SKELETON.cpp` and `APP_C31_1_EXT_OUTPUT.out` can be copied from:

    `/share/EED/class/engr1281/students/c/Class_31/Application/`

- **Hint:** In order to generate random numbers for the number of passengers, you will need to use two functions:
    - `srand()`
        - Seeds the random number generator with an input of a "random" number.
        - What is a "random" number that you just learned how to access and that you could use to seed this?
    - `rand()`
        - Returns a random integer between 0 and the largest possible integer for the architecture.
        - To get a number in a more specific range, you can use the modulus operator.