Traffic Light Controller

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Introduction

Currently world is facing a lot of traffic related problems, causing accidents and injuries. Hence it is of utmost importance to control traffic. By implementing some digital system, we can ensure smooth functioning of roads.

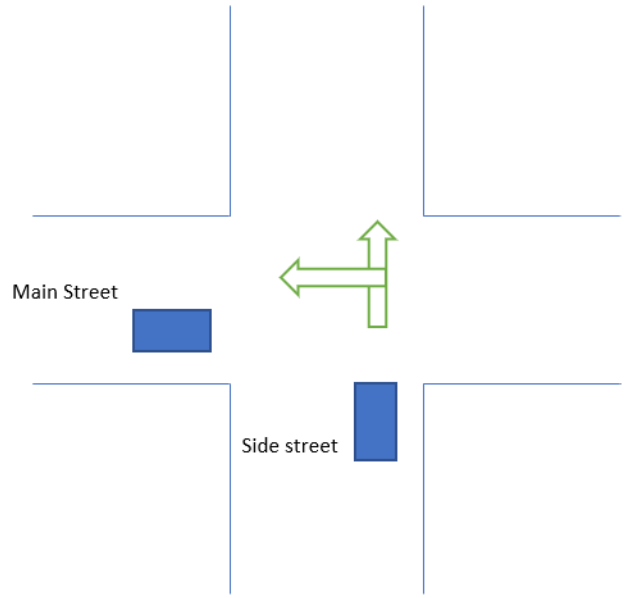


Fig. 2: Street Representation

System Overview

A block diagram of the system is given in Fig. 1.

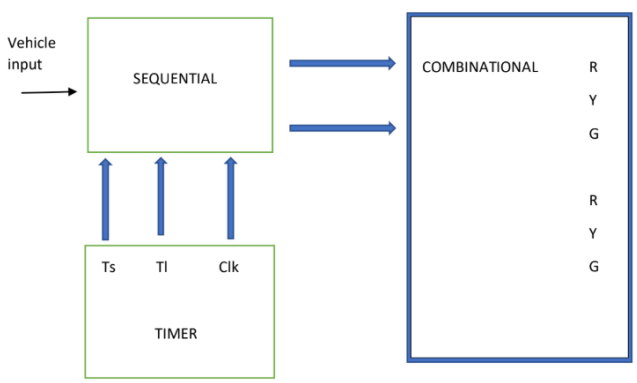


Fig. 1: block diagram.

We implement a fully functional traffic signal controller for a four-way intersection. We have two streets named StreetN and StreetE. StreetN runs from north to south while the other one run from east to west. A traffic light at the intersection of the two streets goes through the following cycle of states:

- StreetN yellow, StreetE red for at least 3 sec when there is a car in streetN
- StreetN green, StreetE red for maximum 30 seconds
- StreetN yellow, StreetE red for 3 seconds
- StreetN red, StreetE yellow for at least 3 sec when there is a car in streetE
- StreetN red, StreetE green for maximum 30 seconds
- StreetN red, StreetE yellow for 3 seconds

Implementation Details

To implement the 4 way traffic control signal, we will be using 4 LED of each color (red,yellow and green), which will be connected to the ep2c5t144c8n mini-board via the breadboard. We'll use a timer to keep track of the 30 sec and 3 secs. The sequential block takes the vehicle sensor input. The sequential block is basically the finite state machine which gives the present state and the output.

Results

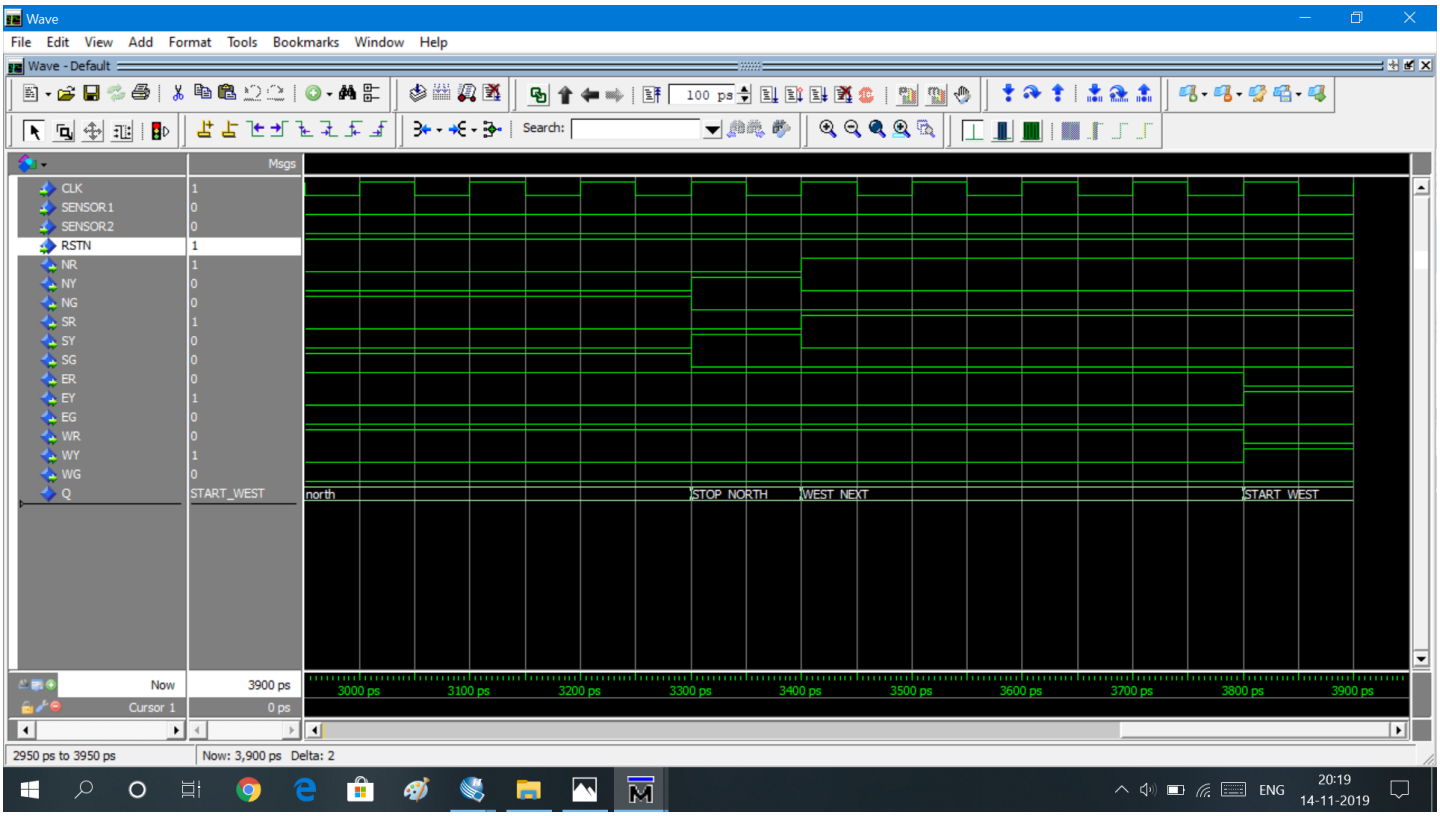


Fig. 3: RTL Simulation when there is no car

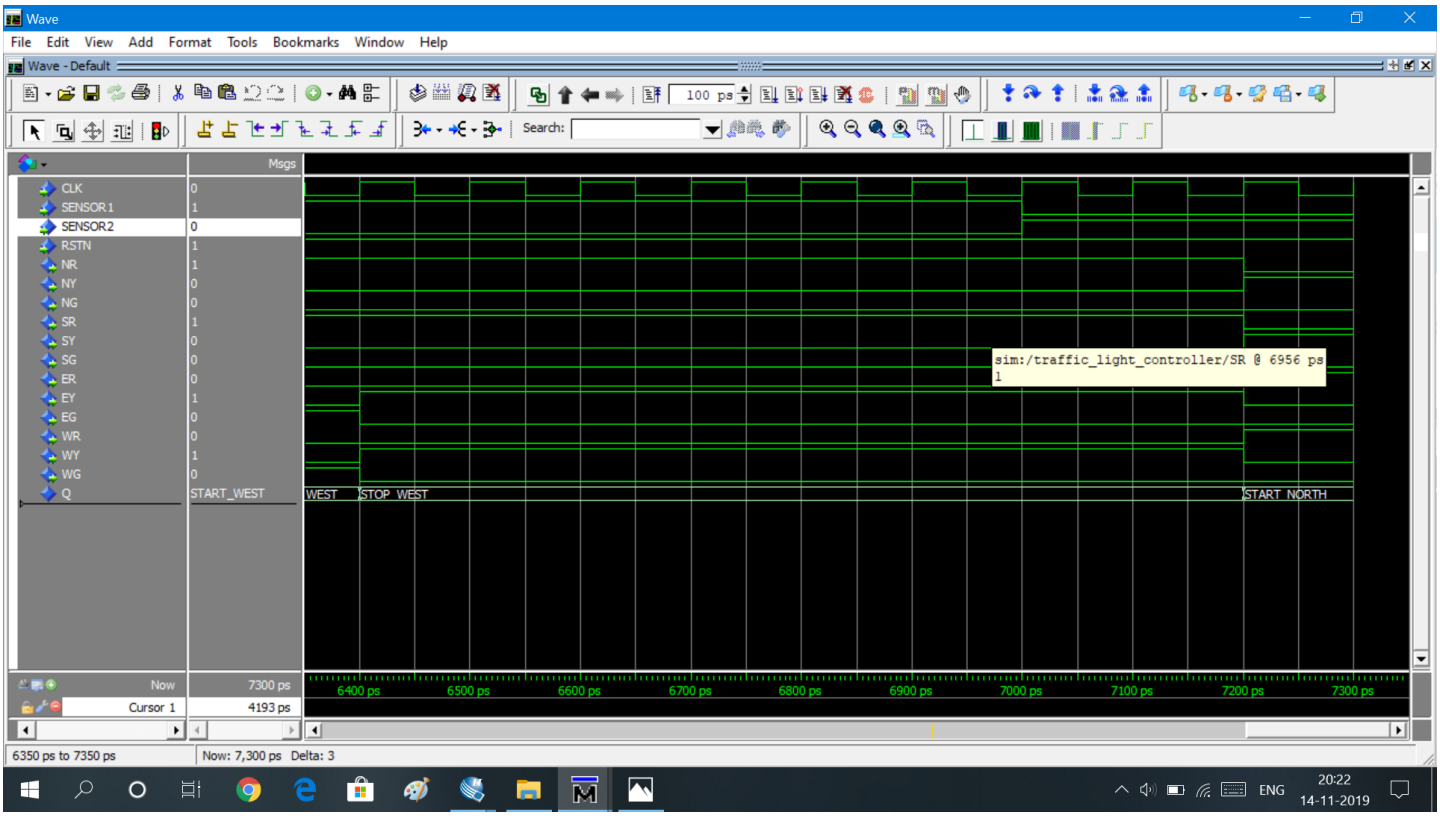
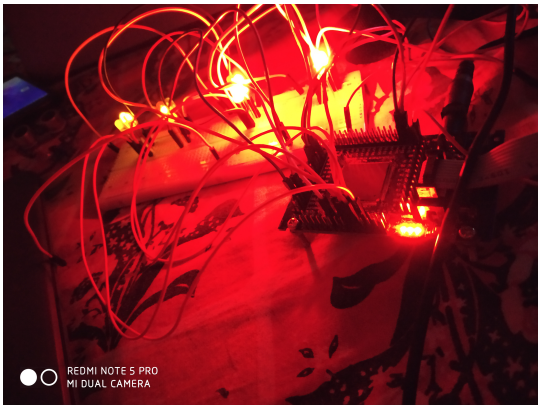
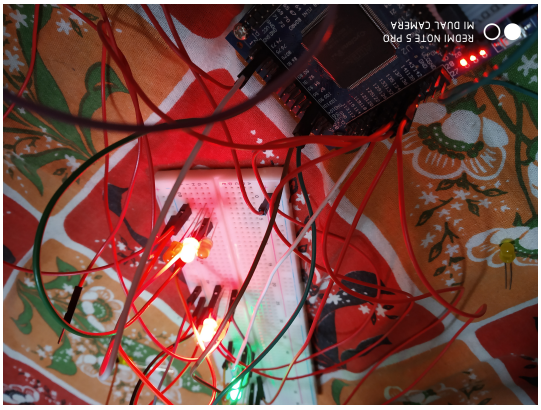
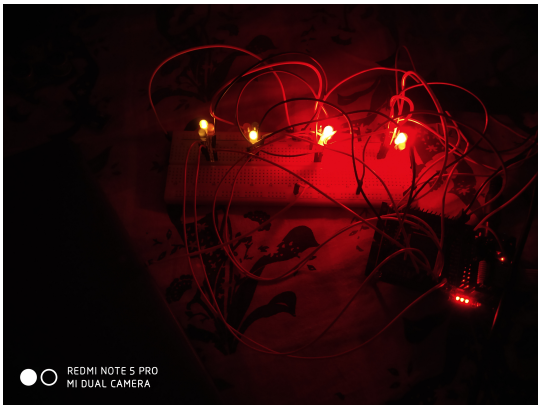


Fig. 4: RTL Simulation when there is car

LED OUTPUT







Conclusion

For the traffic signal, we implemented sequential and combinational blocks which include finite state machine of our block diagram.