

Digital Circuits and Systems Lab

Laboratory report submitted for the partial fulfillment
of the requirements for the degree of

Bachelor of Technology
in
Electronics and Communication Engineering

by

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Chapter 1

Experiment - 10

1.1 Name of the Experiment

To study traffic light controller using state machines

1.2 Theory

To solve the traffic related problems, we have to build new convenient infrastructure but at the same time make it smart. The only drawback of making new roads with advanced facilities is that it makes the surroundings more congested, but then this will lead us to a way to have new ways to ease the traffic. Perhaps all the countries are working to accommodate the traffic flow and advance transportation along with reduced demand of vehicle use. We have to build new facilities and infrastructure making it's use smarter in order to use them efficiently. For this, many ideas about the traffic light systems have come up in the recent past to simplify the complex problem of the traffic congestion. Mostly we see that the time allocation is fixed for east and west side, similarly for north and south direction in a traffic light controller at crossroads.

The traffic light sequence works on the specific switching of Red, Yellow and Green lights in a particular way with stipulated time form. The normal function of traffic lights requires sophisticated control and coordination to ensure that traffic moves as smoothly and as safely as possible and that the pedestrians feel safe and protected while crossing the roads.

1.3 Coding Techniques used

In order to know how the circuit behaves, behavioral modeling is considered highest abstraction level as compared to data-flow or structural models. The VHDL synthesizer tool decides the actual circuit implementation. The VHDL behavioral model is widely used in test bench design, since the test bench design doesn't care about the hardware realization.

1.4 Simulation and Results

1.4.1 Traffic Light Controller using State Machines

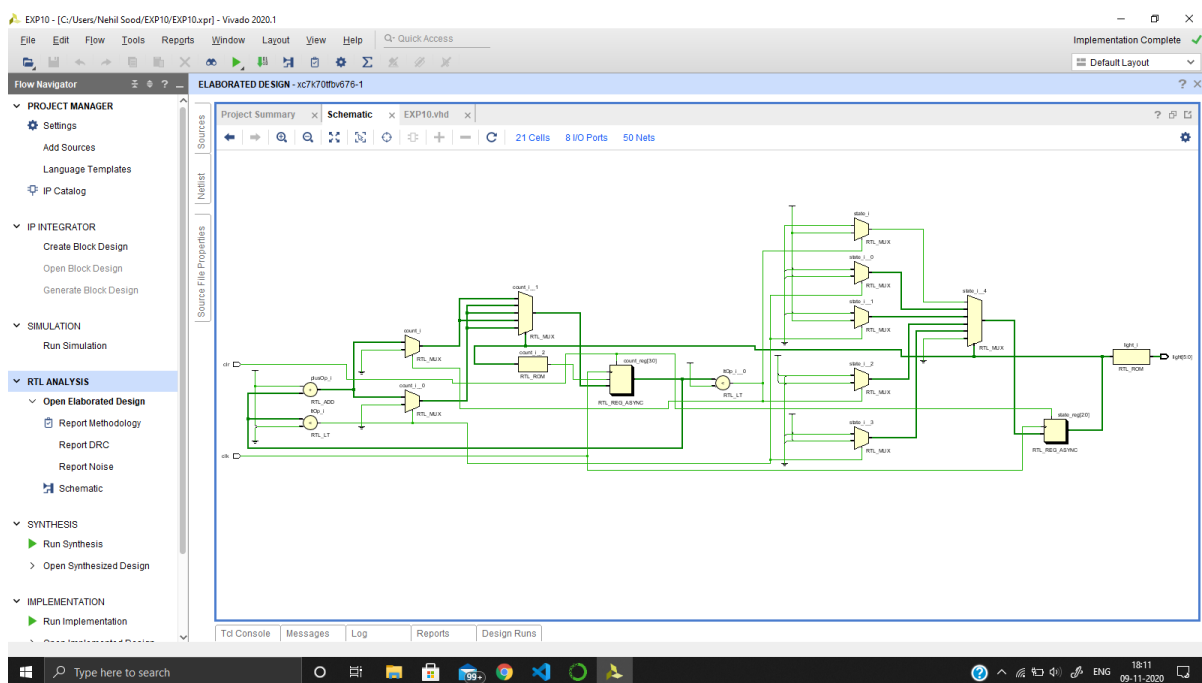


Figure 1.1 Schematic of the traffic light controller using state machines

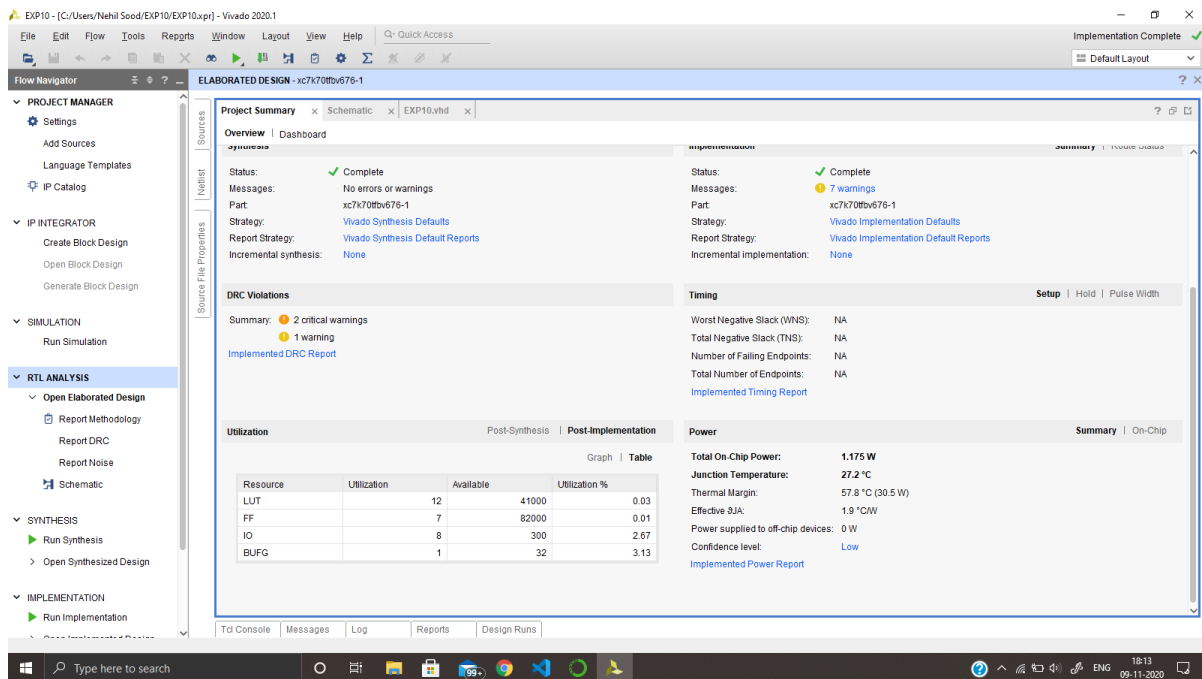


Figure 1.2 Project Summary of the traffic light controller using state machines

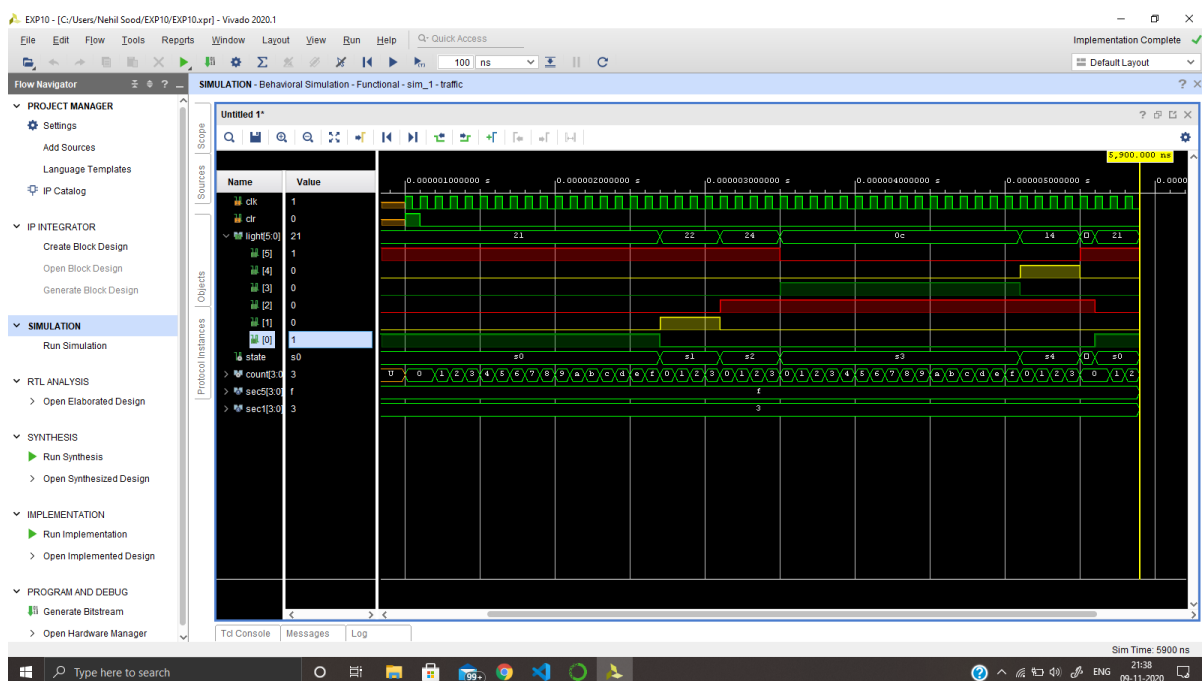


Figure 1.3 Simulation of the traffic light controller using state machines

1.5 Summary

Name of the Entity	No. of LUT used	Total On chip Power
Traffic Light Controller	12	1.175 W

Table 1.1 comparison of Area and power requirements