CmpE 124 Lab 7: Traffic Lights

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***Abstract*—Traffic light is one of the most important design in the world. The main challenge is to figure out when to switch the light.**

I. Introduction

The lab was divided into three part. The first part required to design basic traffic signals, the second part wanted to have a timed traffic signals, and the last part needed to combined part two together to design a real-world traffic signal.

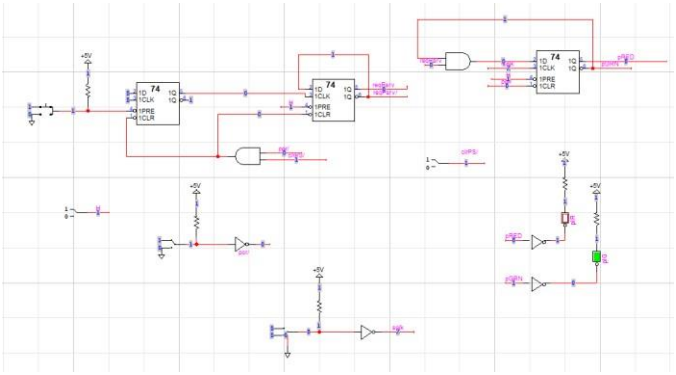

Figure 1: The Simple Pedestrian Switch Circuit Design

II. Design Methodology

A. Parts List

- SN7474
- SN74109
- LED (red, yellow, green)
- SN7404
- SN74163
- SN7408
- SN7421
- 5V power supply
- Resistors
- Binary Switch
- GND
- Button
- Binary Prob

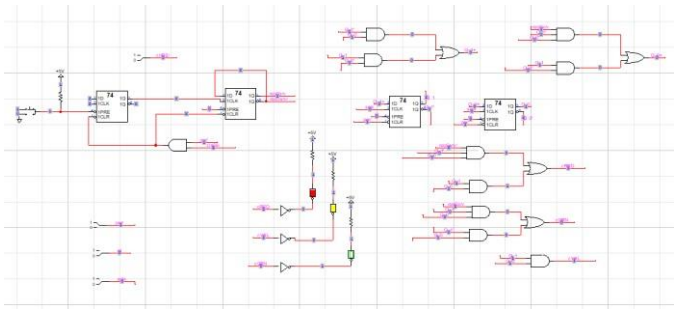

Figure 2: The Simple Car Switch Circuit Design

B. Schematics

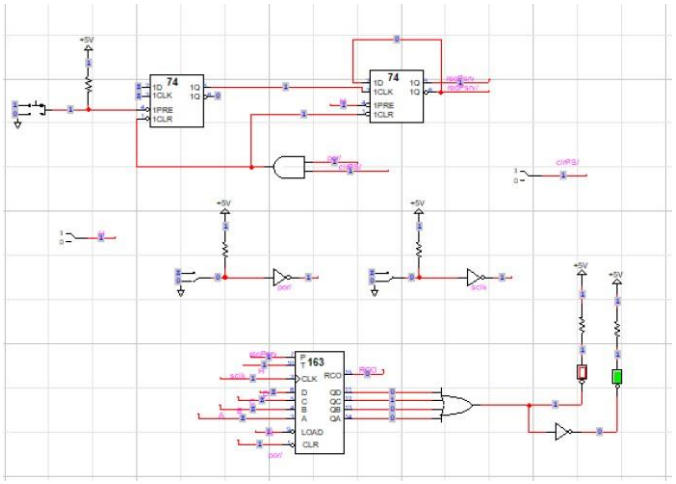

Figure 3 Timed Pedestrain Switch Circuit Design

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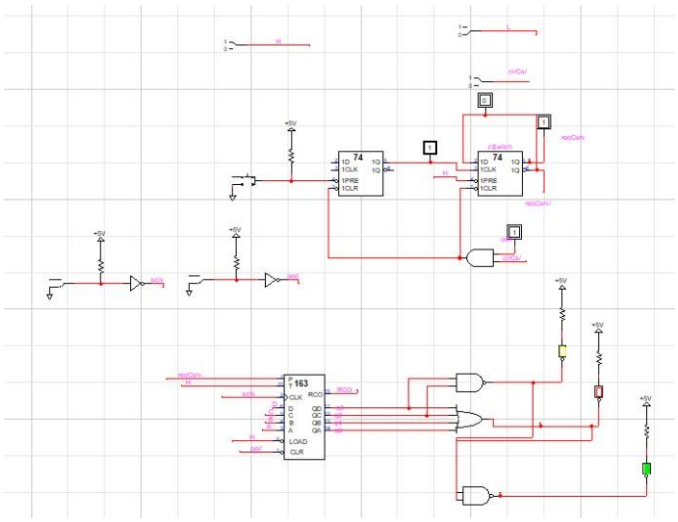

Figure 4 Timed Car Switch Circuit Design

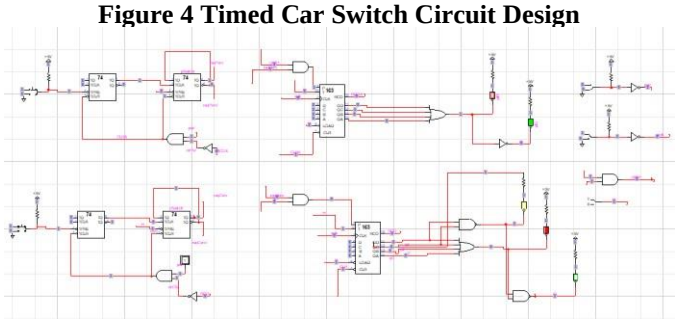

Figure 5 Interlocked Traffic Signals Design

III. TESTING PROCEDURES

The testing procedure should be broken down into steps:

Part 1:

1. Copying schematics from the lab manual.
2. Designing the traffic light with both pedestrian switch and car switch.

Part 2:

1. Redesigning the circuit in part 1 to turn green light on for specific number of clockers.

Part 3:

1. Modifying the circuit in part 2.
2. Adding interlock design between pedestrian switch and the car switch.

IV. TESTING RESULTS

In the first part, the traffic light would not change unless the button was pressed.

In the second part, the traffic light would automatically change after 3-time clockers.

In the third part, when the pedestrian switch was pressed and the traffic light was in green, the traffic light would change to yellow first, then turned to red. Otherwise, the traffic light would change after 3-time clockers.

V. CONCLUSION

The lab was divided into three parts. Starting from the simplest design of pedestrian switch circuit and car switch circuit, then add timing clocker to control the traffic light, and eventually combined both design with interlock control between pedestrian switch and car switch. By using LogicWorks, each circuit works perfectly, and matched the requirement from lab manual.

VI. APPENDICES AND REFERENCES

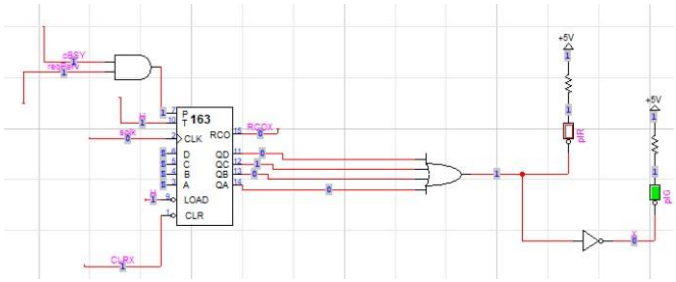

Figure 6 Part 3 Pedestrain Light Design.

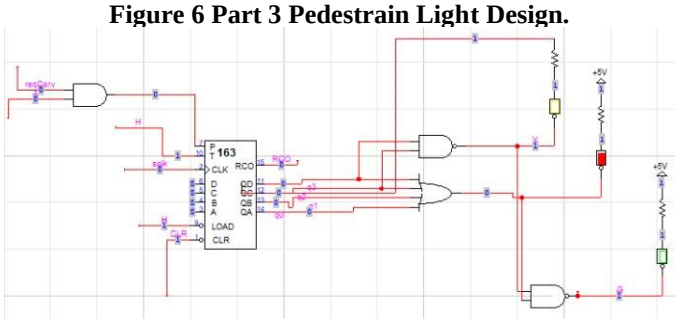

Figure 7 Part 3 Car Light Design