SMART TRAFFIC SIGNAL

ECE 278 Fall 2016

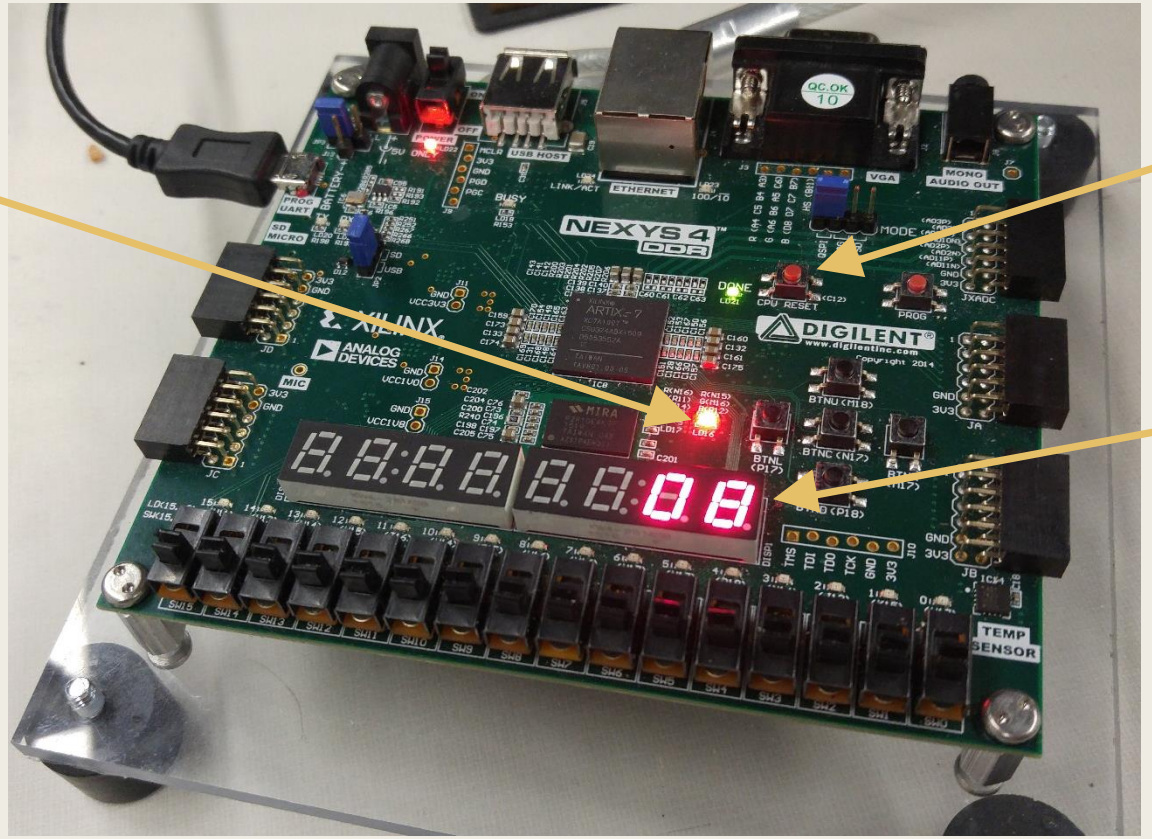
Andrew Carle, Hiba Azooz, Mark Heiser, Moody Romolino


WHY WON'T IT TURN GREEN!?!?!

Introduction

- Purpose of this technology is to build a traffic signal that adapts to the amount of traffic as to increase efficiency at roadway intersections.
- Counters, Decoders, Multiplexers, Finite State Machines (FSM)
- Main problem was adjusting the 7-segment display for both up and down counts

RGB LED
Red – <20 s
Green – 8 s
Blue (yellow) – 3 s

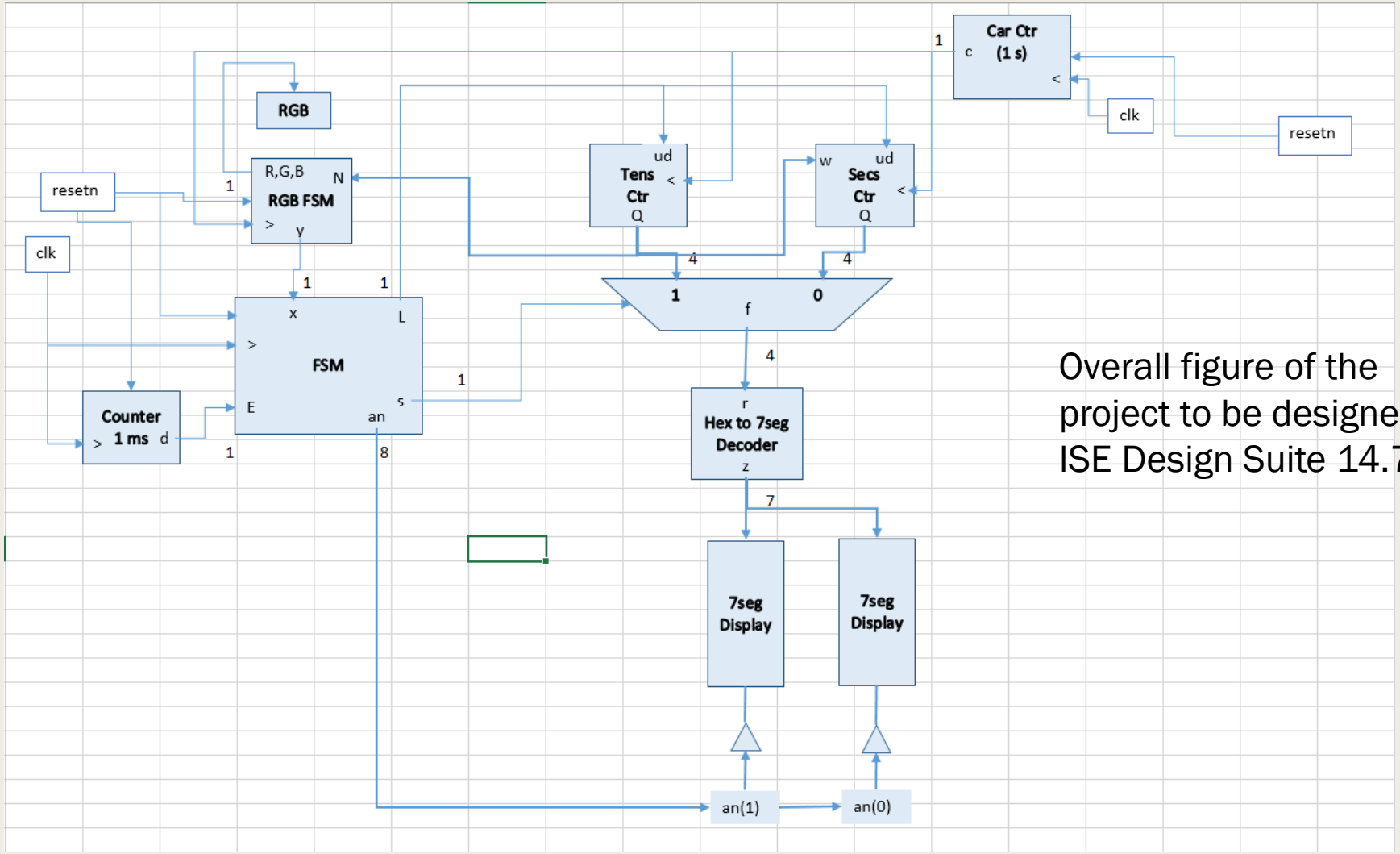


Resetn button
resets LED to Red

7-segment displays
shows how many cars are waiting at the traffic light

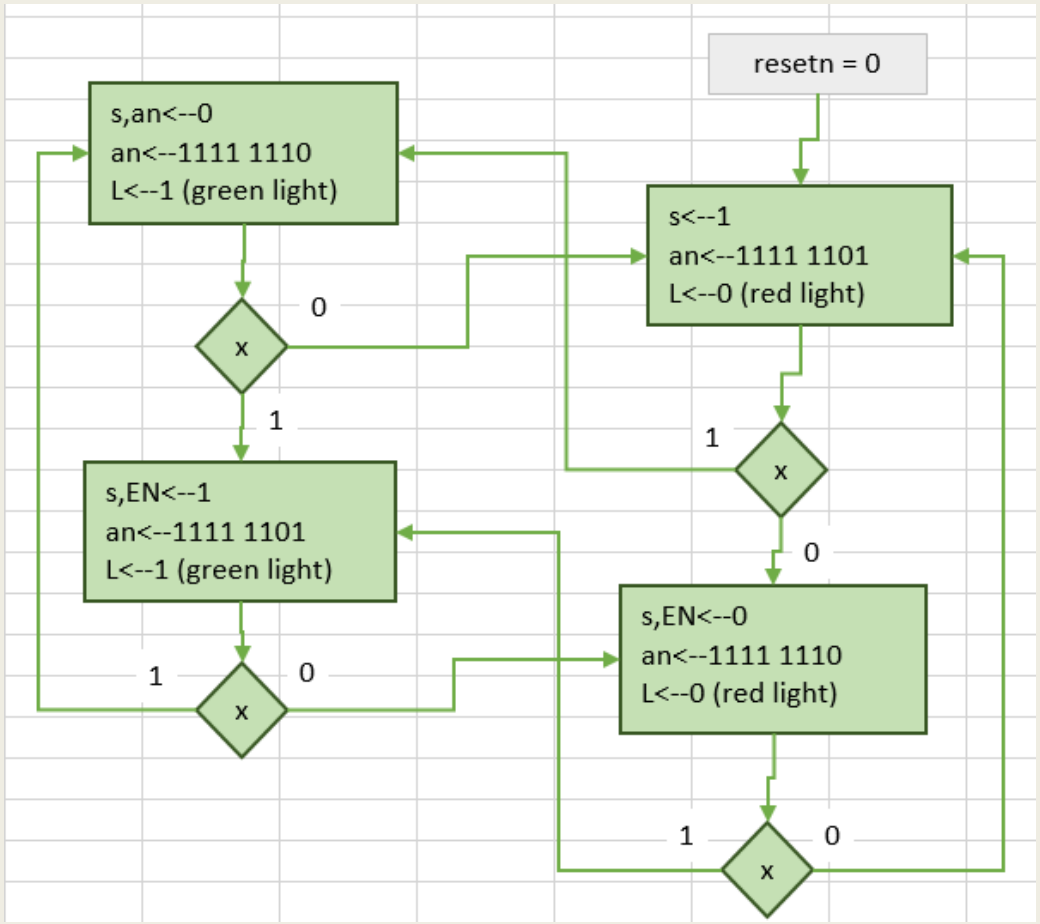
Design:
Red is 20s unless ten or more cars are at the light. If so, the light speeds up 3x the speed.

Methodology – Datapath



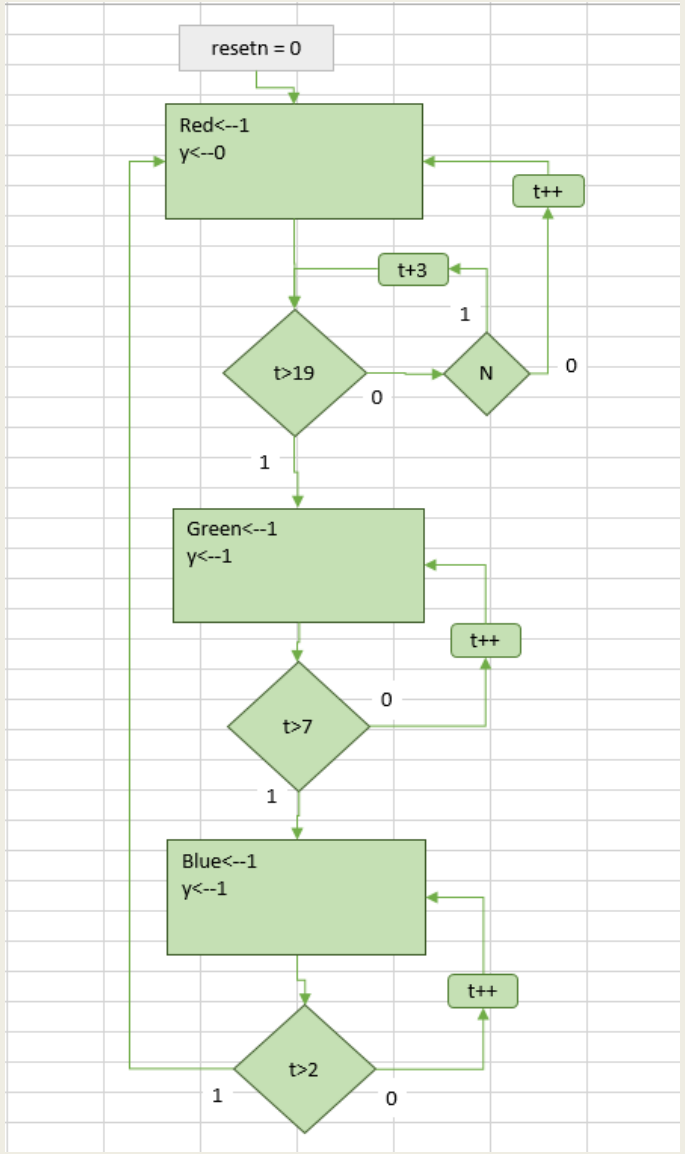
Overall figure of the project to be designed in ISE Design Suite 14.7

Methodology - Main FSM



- X is an input that determines whether the counter is counting up or down
- Loop between each display in order to continuously update the amount of traffic
- If x stays ‘0’, will stay in the red state. If x stays ‘1’, will stay in the green state

Methodology – RGB FSM



- State one: the light is red
- Input signal N is used to determine if 10 or more cars are present at the red light. Then the counter will increase 3x to get to the green light state more quickly
- Once in the green light state, move into the third state where the light turns blue after 8 seconds
- Stays in state three for 3 seconds
- The process then starts over and is repeated.

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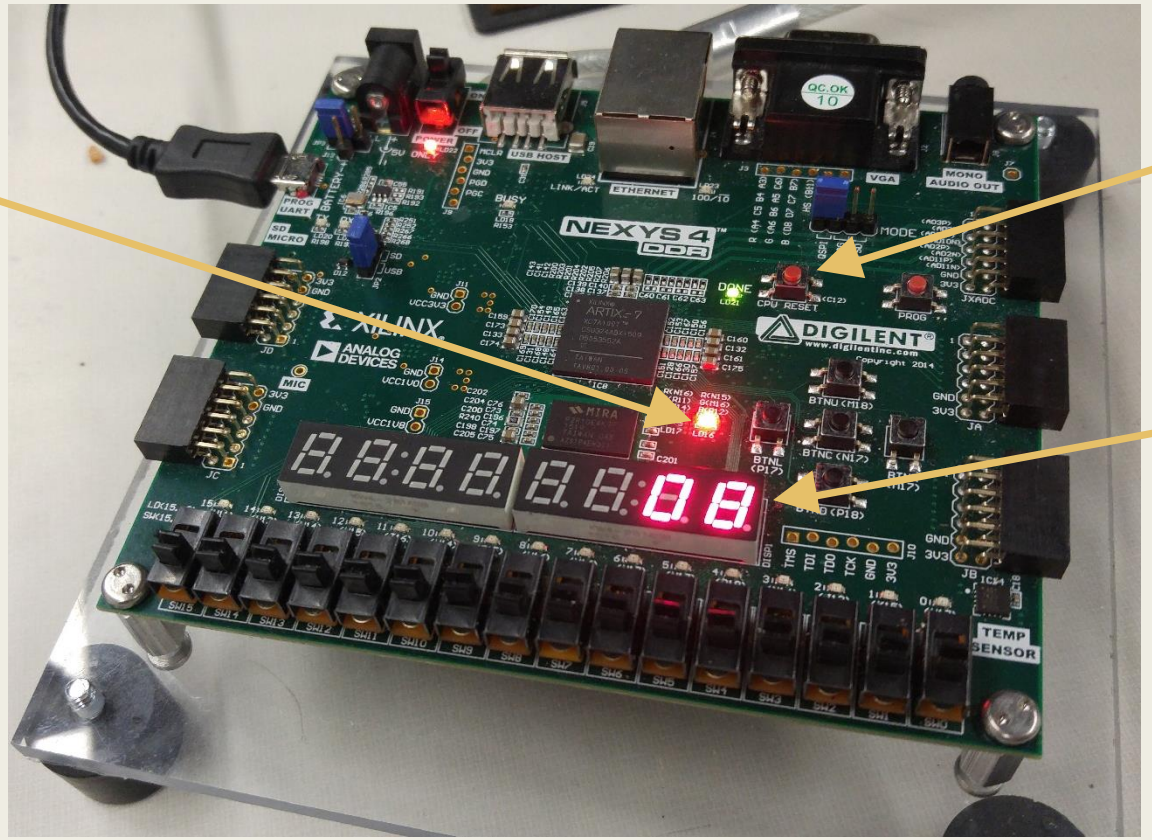

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Demonstration!

Conclusions

- Traffic controller adapts to amount of traffic at a stoplight successfully
- Able to change the counter values and light times as to adapt to various traffic intensive situations.
- Applied knowledge learned in this course.

Possible Improvements

- Actually make yellow light yellow

- Addition of a speed element, where cars would travel through the intersection more quickly and allow user to control speed through switches.
  1. *This would allow for a more accurate model of a traffic controller.*
  2. *System would be more robust and adaptable to different environments.*

- Would like to add a secondary light to make a full intersection.
  1. *Possible through utilizing second RGB LED and second set of 7 segment displays.*

Thank you!
Any questions?