Traffic Light Controller

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Introduction

- Traffic controller for 4-way intersection
- Day and night mode
  - Day mode: 13 second green/red. 2 second yellow/red. 1 second red/red.
  - Night mode: Flashing red and yellow.

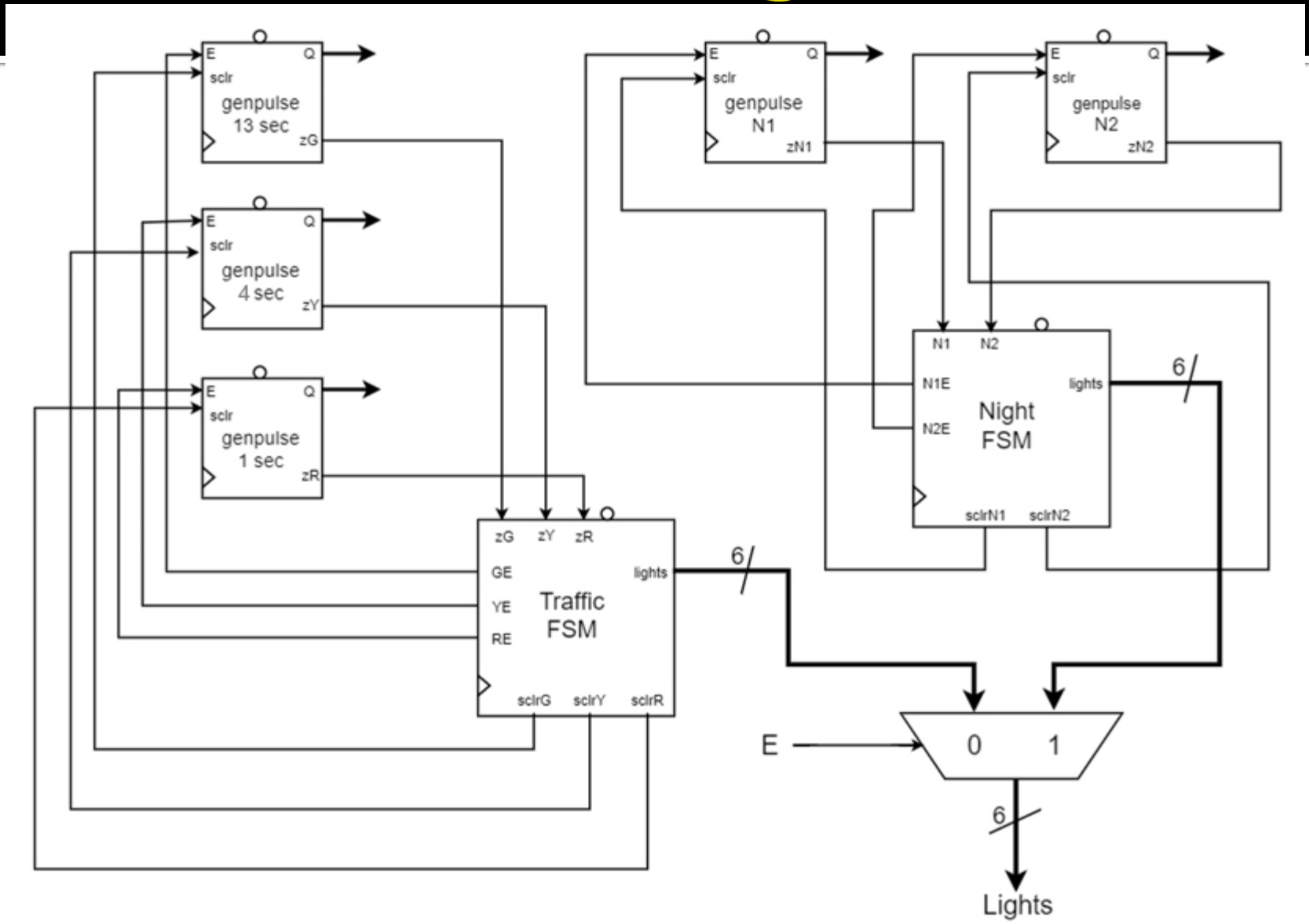
Components

- Nexys A7 using Vivado 2019.3
- 5 Counters (Pulse Generators)
- 2 Finite State Machines
- 1 Multiplexer
- Breadboards
- 12 LEDs
- 12 Resistors

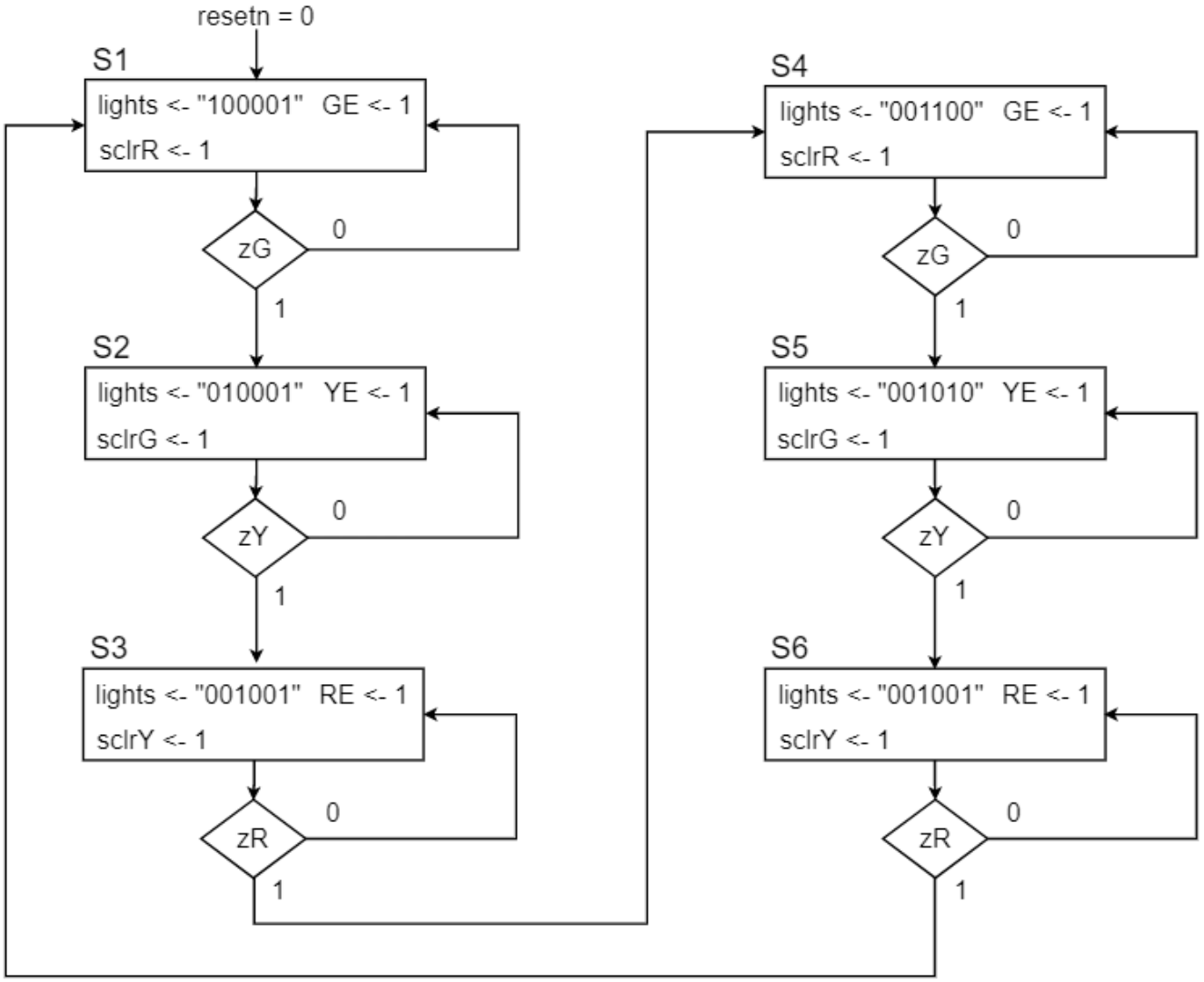
How it works

- The counters determine how many seconds have elapsed for active green, yellow and red lights.
- The FSM's control the switching of the lights (states) based on the counters.
- A multiplexer is used to switch between day and night mode. This function is implemented with a switch on Nexys A7.
- Reset connected to CPU RESET on Nexys A7.

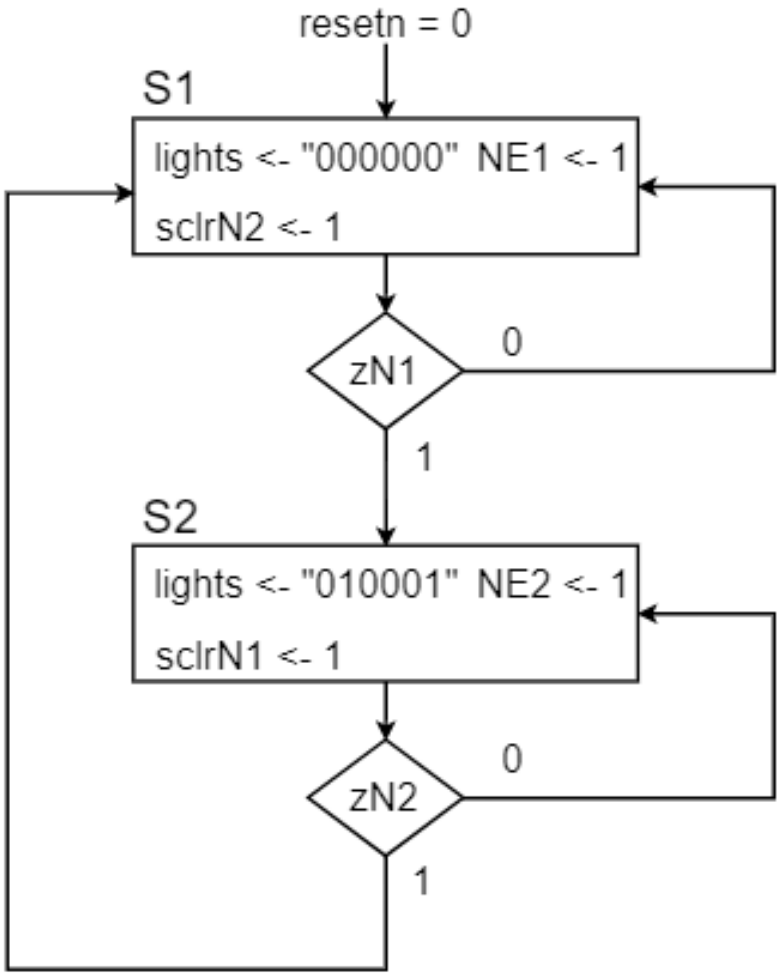
Block Diagram



Day Mode ASM State Diagram



Night Mode ASM State Diagram



Issues and Improvements

- Issues
  - Went through a couple of designs
  - Behavioral Simulations
  - Timing
- Improvements
  - Sensors
  - More FSM's for different traffic scenarios