

Traffic Light Controller

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FINAL PROJECT

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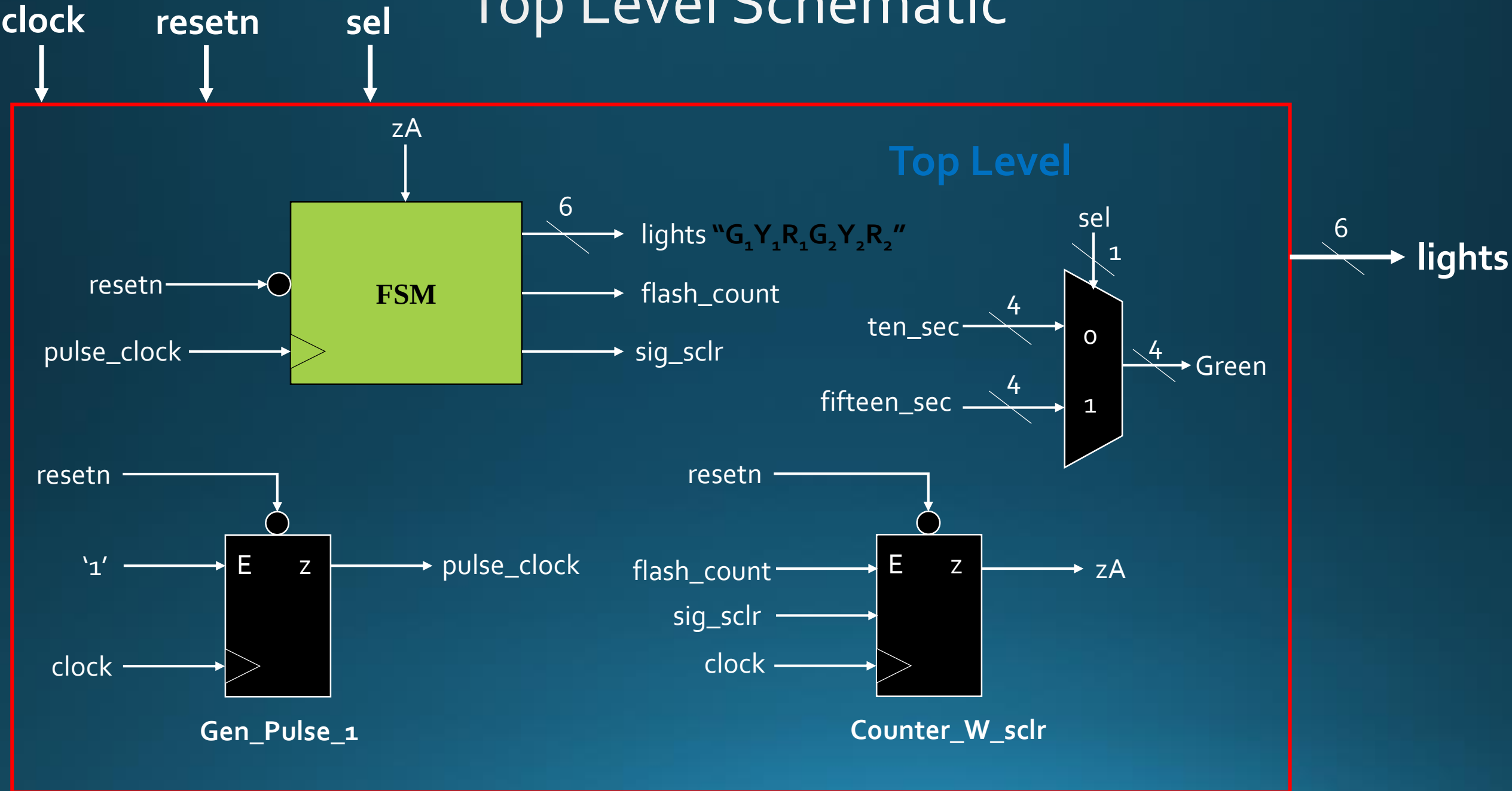
The 4-way intersection

- Use labeled pin on the FPGA board to control the lights
- Time is changeable by coding
- Rush hour situation
- Flashing section in the 'midnight'

Setup

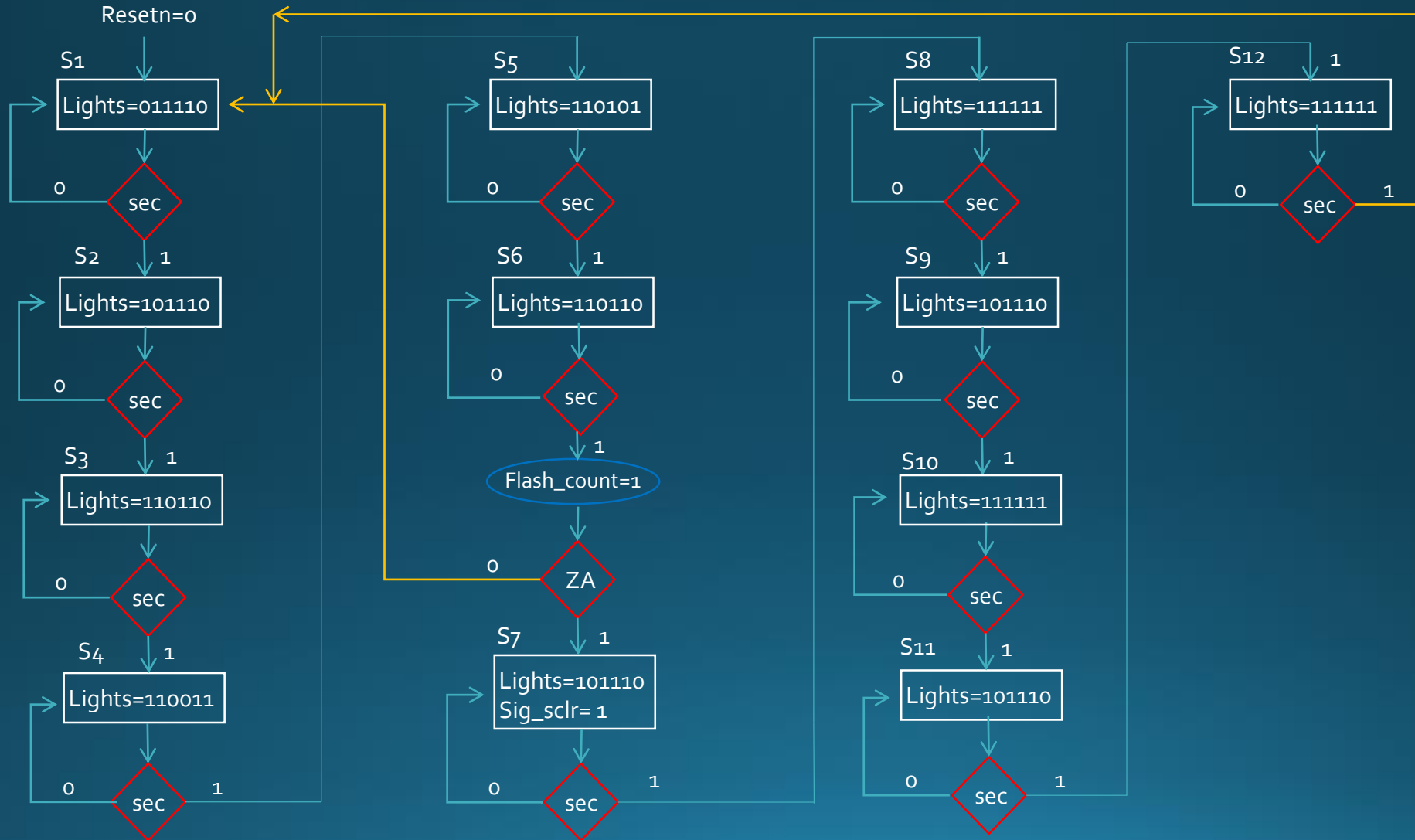
- The following items will be the hardware used for this project:
- USB to micro USB cord
- FPGA board
- Arduino Uno
- Bread board
- Wires
- Red, green, and yellow leds (12 in total)
- Resistors

Top Level Schematic



State Diagram

Lights : G1 Y1 R1 G2 Y2 R2



Timing control

architecture Behavioral of TL_Traffic_Light_Controller is

component Gen_Pulse_1 is

```
    generic (COUNT: INTEGER:= (10**8)/2); -- (10**8)/2 cycles of T = 10 ns --> 0.5 s    port (clock, resetn, E:
in std_logic;          Q: out std_logic_vector ( integer(ceil(log2(real(COUNT)))) - 1 downto 0);          z:
out std_logic);
    end component;
```

component Counter_W_sclr is

```
    generic (COUNT: INTEGER:= (10**8)/2); -- (10**8)/2 cycles of T = 10 ns --> 0.5 s    port (clock, resetn, E,
sclr: in std_logic;          Q: out std_logic_vector ( integer(ceil(log2(real(COUNT)))) - 1 downto 0);
z: out std_logic);
    end component;
```

component MUX_2to1

```
port ( ten_sec, fifteen_sec: in std_logic_vector (3 downto 0);
      sel: in std_logic_vector (0 downto 0);
      MUX_out: out std_logic_vector (3 downto 0));
```

end component;

