Embedded System
ELEE 5000

Lab: Traffic Light by using FSM

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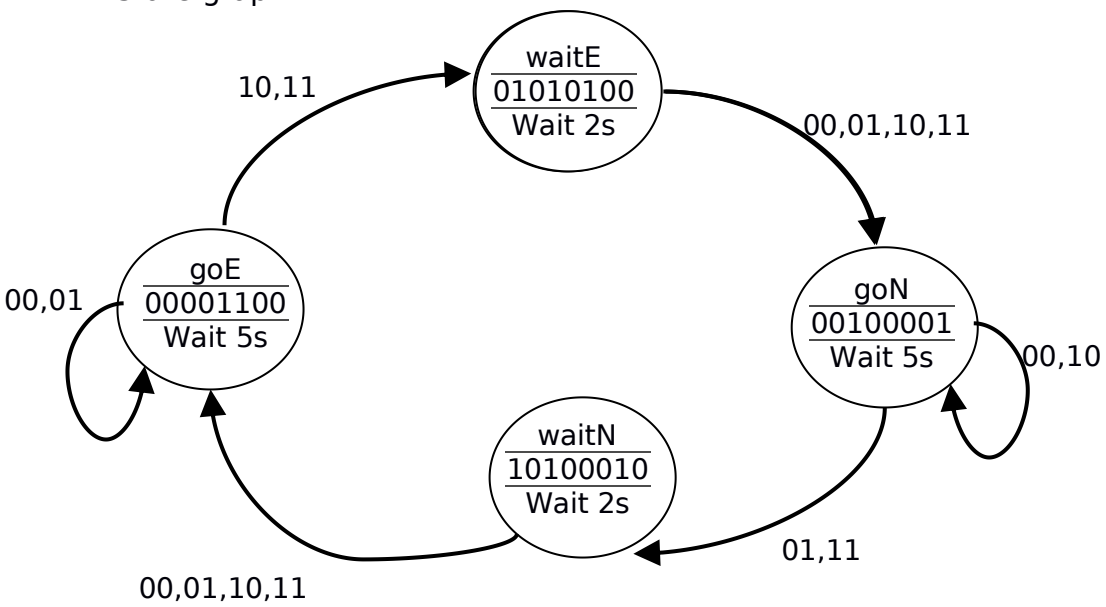
Abstract: For this lab, we were required to use Finite State Machine(FSM) to finish a traffic light project. Most significant at this point was being able to know how Finite State Machine works. Later then, We should demonstrate basic logic about your traffic light circuit.

Finite State Machine

Finite State Machine has set of inputs, outputs, states and transitions. We use state graph defines relationship between inputs and outputs. State means what is your current condition now. State graph is graphical interconnection between states. The controller we use is TM4C1294. It can get inputs from sensor which is our switch and outputs which are our traffic lights. And It will change state according to state graph.

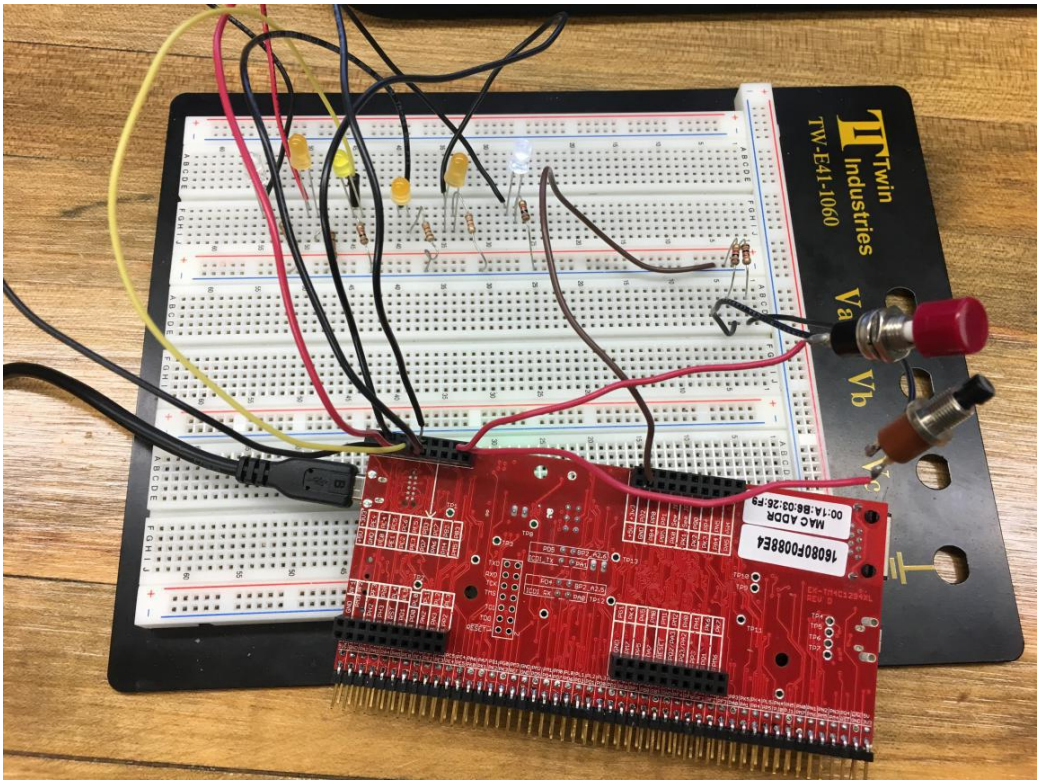
State graph:



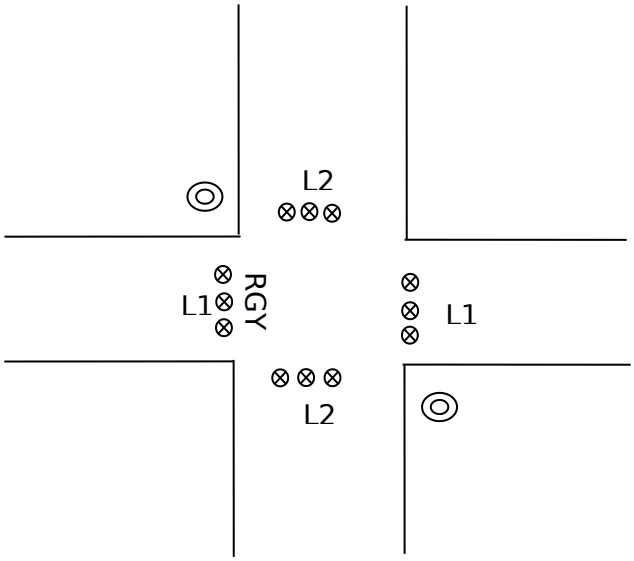
The traffic light from Green to Yellow then to Red regularly. When you press North button, the state will stay in North direction. And some theory in South button.

State table:

Walker		Line 1			Line 2			Input	Output	State
R	G	R	G	Y	R	G	Y	Button	Light (HEX)	Current
0	0	0	0	1	1	0	0	00/01	0X0C	goE
0	1	0	1	0	1	0	0	/	0X54	waitE
0	0	1	0	0	0	0	1	00/10	0X21	goN
1	0	1	0	0	0	1	0	/	0XA2	waitN



Intersection environment:goE



Programming Framework:

Data structure definition: LED,Time,State-array
Main:
Ports and Timer Initialization
First state
    Loop:
        Output to LED
        Time_Interrupts
        Get_inputs
        Go_next_state
    End
End