

# EEE 102 Lab 7 - Car Driving Mode Selector

## Introduction:

In this lab, I have designed a circuit that selects different driving modes in a car such as: "Eco", "Normal", "Sport", and "Track". Therefore, I have implemented said circuit using a 4-state Moore Machine and a single input to cycle through the states. In every state, the circuit outputs a 4-bit binary number corresponding to the estimated fuel consumption in the selected state.

## The Circuit:

As this is an FSM the circuit can be designed in three parts: "Next State Logic", "State Register", and "Output Logic". State register consists of only 2 d-flipflops forming a 2-bit register. Next state logic consists of a 2-bit incrementer from 2 xor-gates and 1 and-gate. Finally, the output logic consists of a 2-to-4 decoder that is implemented via 4 and-gates and 2 not-gates. It should be noted that the set and preset of the D-flip flops were connected to 5V since they're active LOW.

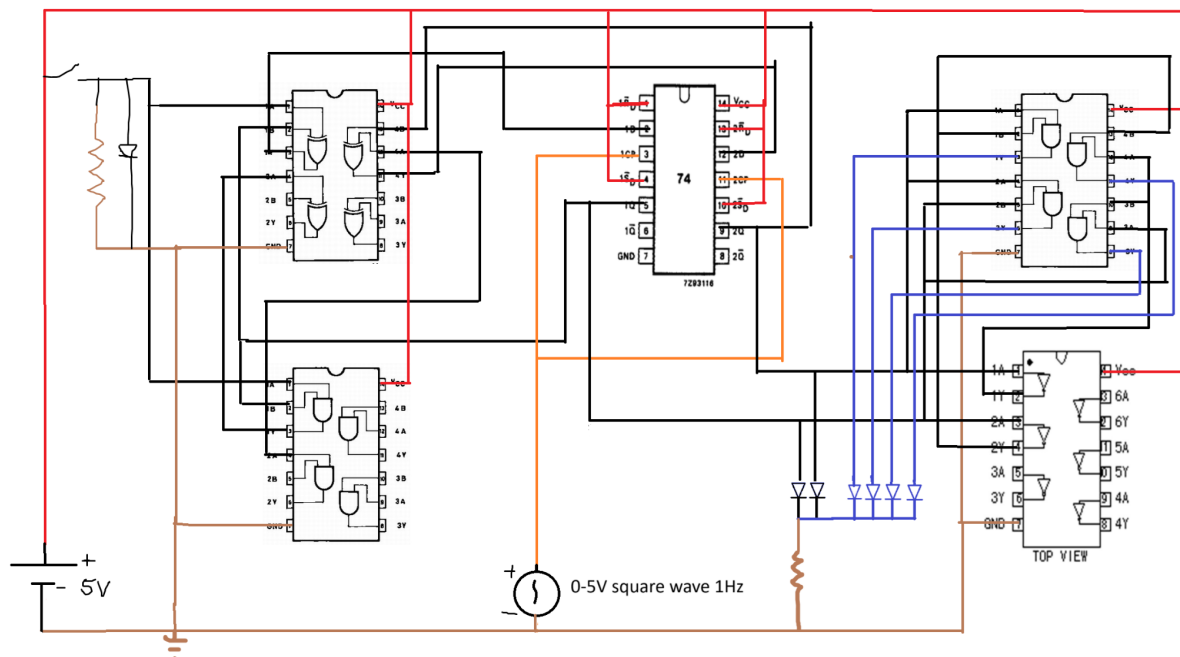


Figure 1: Wiring Schematic of the Circuit

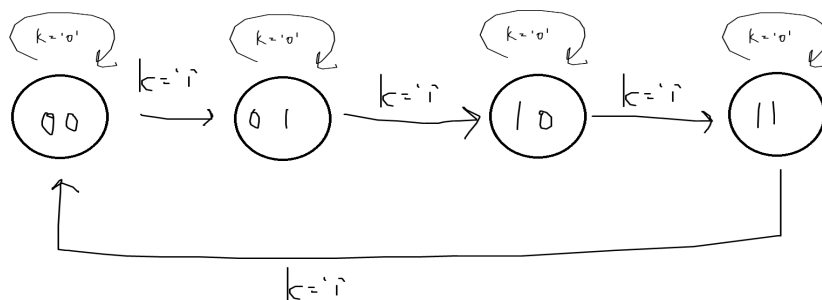


Figure 2: State Diagram of the Circuit

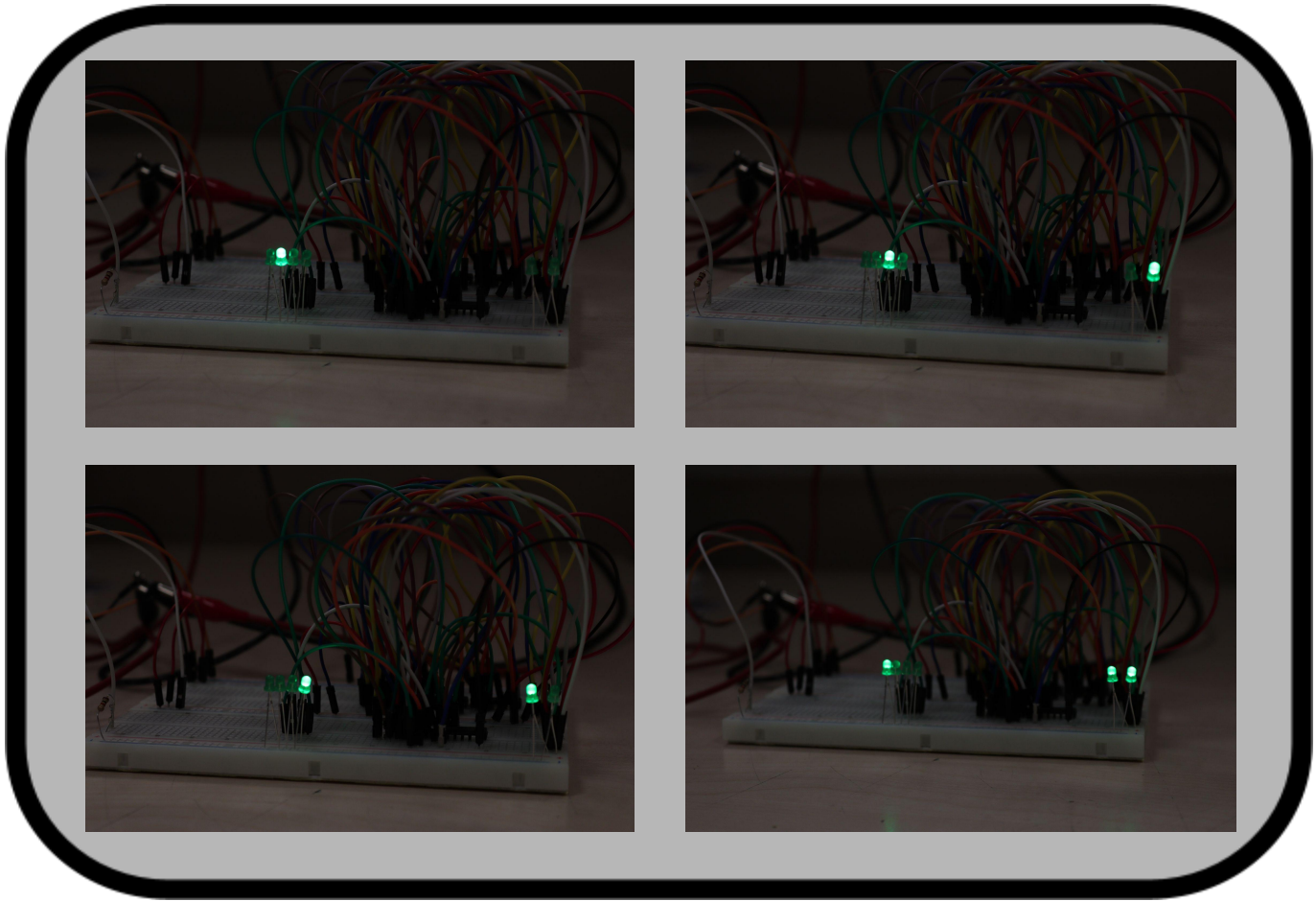


Figure 3: The Circuit in 4 Different States

$Q_1(t)$	$Q_2(t)$	Button	$Q_1(t+1)$	$Q_2(t+1)$
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	1	0
1	0	1	1	1
1	1	0	1	1
1	1	1	0	0

Figure 4: Truth Table of the Circuit

### Conclusion:

In conclusion, in this lab, we implemented an FSM on a breadboard that we designed. The truth table, state diagram, pictures, and schematic of this FSM were calculated and they have been provided above. We have learned the methodology of wiring for button, d-flip flop, and logic gates we have used previously in lab 3.