Finite State Machine EE 1120

Digital System Design

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The following car was manufactured by the Ford corporation in 1965. Note that the first commercial transistor was produced by Texas Instruments in 1954.

1) If you wanted to take a LEFT turn, first LA would glow, then LB and then LC and then IDLE (all lights off) according to a clock. This process would continue as long as the LEFT signal was active.
2) The process is similar for RIGHT, where the lights on the right side RA, RB and RC, would blink accordingly.
3) If the driver is confused, there can also be a HAZ (hazard) signal, where all lights blink at the same time. This state is similar to the parking lights that we have in contemporary cars.

The objective is to design a circuit for controlling the car lights according to the given information.
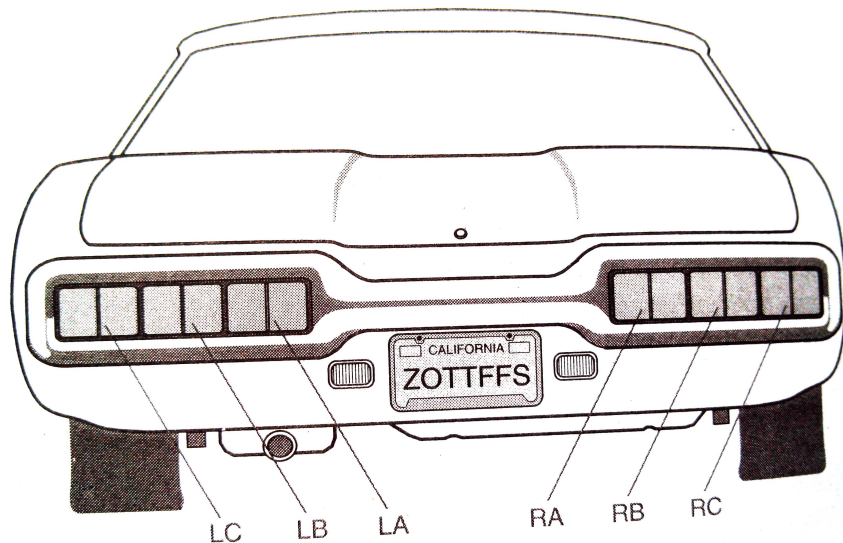
1) List the input signals for the circuit that you wish to design.
2) List all possible states that you are likely to encounter and assign binary numbers to these states
3) Draw the state transition diagram for the circuit.
4) How many flip-flops would you require?
5) Prepare the transition table for the circuit
6) Write the transition equations for the circuit
7) Implement the final circuit using D flip-flops

Such a circuit is also known as a state machine.