

Finite State Machine design for Elevator Control System

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Abstract—This paper presents the design of a finite state machine for elevator controller system, that describes a system which takes user input from the lift button there are options for going up, down, lift door open and close and to stop the lift. Lets say the elevator is designed to for a 10 floor building if the user is at 2nd floor and wishes to go for 5th floor the user gives the desired floor as input and lift decides to go up or down based on the current floor, when the user reaches the desired floor the lift stops and door gets opened. The design also facilitates a reset option so that the system gets reset if the user selects reset. This FSM can be implemented in real time elevator systems .This FSM can automate the task of elevator system since there is no human intervention it automatically moves to the desired floor by just giving the desired floor number as a user input.

Keywords: Finite state machine, Elevator control system, reset, current floor, desired floor, automate,

I. DESIGN SPECIFICATIONS

- The user selects the desired floor Here I am designing the Elevator system for 30 floors
- Lets say if the user is in 5th floor and wishes to go for 10th floor then the user gives the input as 10, the system checks the value of current floor with the desired floor, if the desired floor is greater than the current floor the lift goes up and if the desired floor value is less than the current floor the lift goes down and if the value of both desired floor and current floor the lift gets stopped.
- When lift reaches the desired floor the lift door gets opened so door=1 when lift reaches the desired floor and gets stopped.
- If there is a user reset then the lift gets back to its initial position(Ground floor) and stops
- The entire system is designed in verilog and simulated in eda playground which is a open source tool
- For every rising edge of the clock, the desired(next) floor of the lift should be updated to the current floor value, so that during the next transition the model compares with the current floor value and moves to the desired floor

II. STATE DIAGRAM

- The user in the lift can go to the desired floor(from 0 to 30) using the requested floor that is given as input to the model and the output of lift(y) will be updated according to the user input.
- Since it's based on the mealy machine whose output values are determined both by its current state and the current inputs, the lift output changes according to the

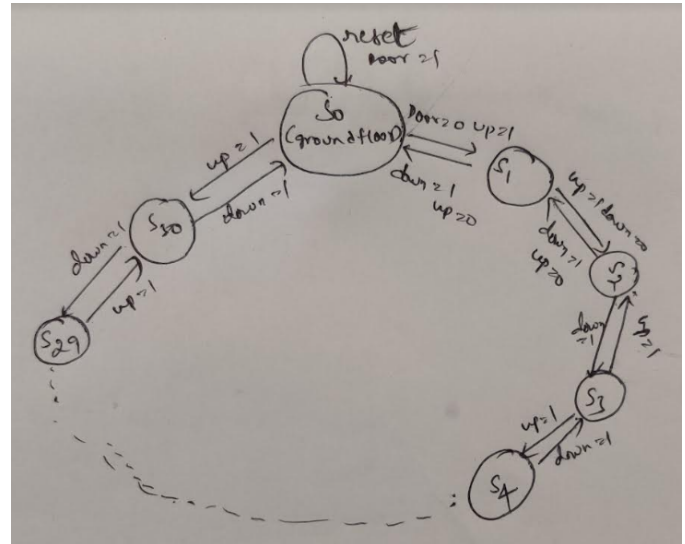


Fig. 1: FSM design of Elevator Control System

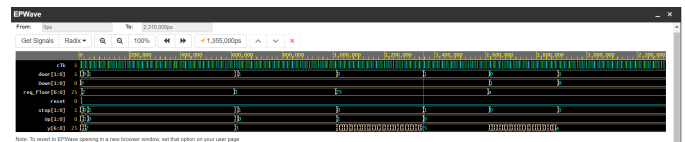


Fig. 2: Simulated Result

user input and the current state value which is given by the signal currentfloor(cf) and moves to desiredfloor(df). The state diagram of the the desired system is shown in figure 1. The design is done as a Mealy FSM. 30 states are used to keep track of each floors(S0 to S30) position. Initial state is S0 which indicates ground floor. If lift is at ground floor signal If desired floor is 5 then the present state changes to S1 then the present state is changed to S2 and finally reaches S5 and stops and door gets opened so door and stop signal is triggered and during lift is moving up, up signal is triggered.

III. REFERENCES

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- <https://github.com/sandeep1404/Elevator>