



ELEVATOR SYSTEM DESIGN FOR 6-STOREY BUILDING

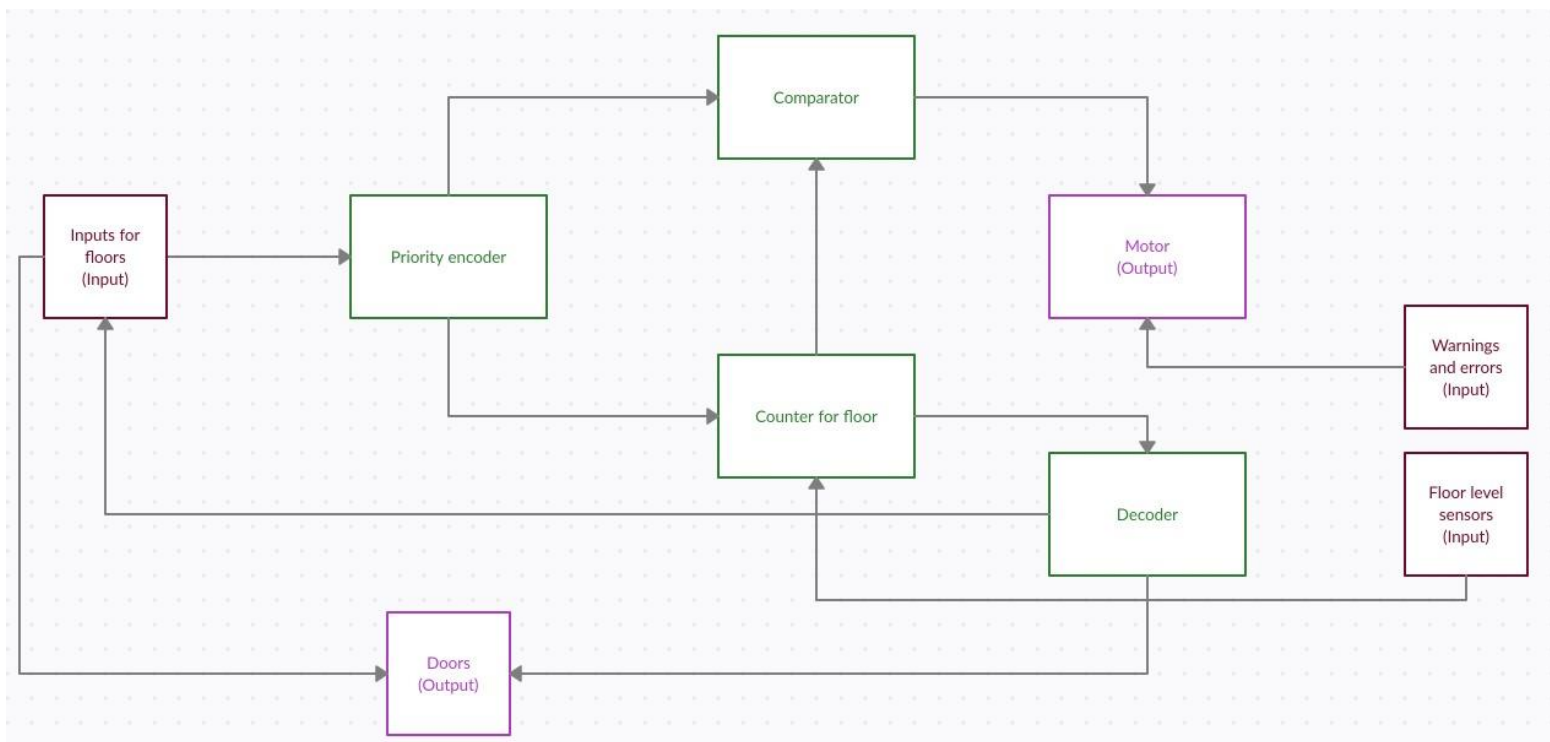
DESIGN TOPIC

Designing an elevator system in a 6 storey building. We make an assumption that the elevator moves in steps of 1 floor each.

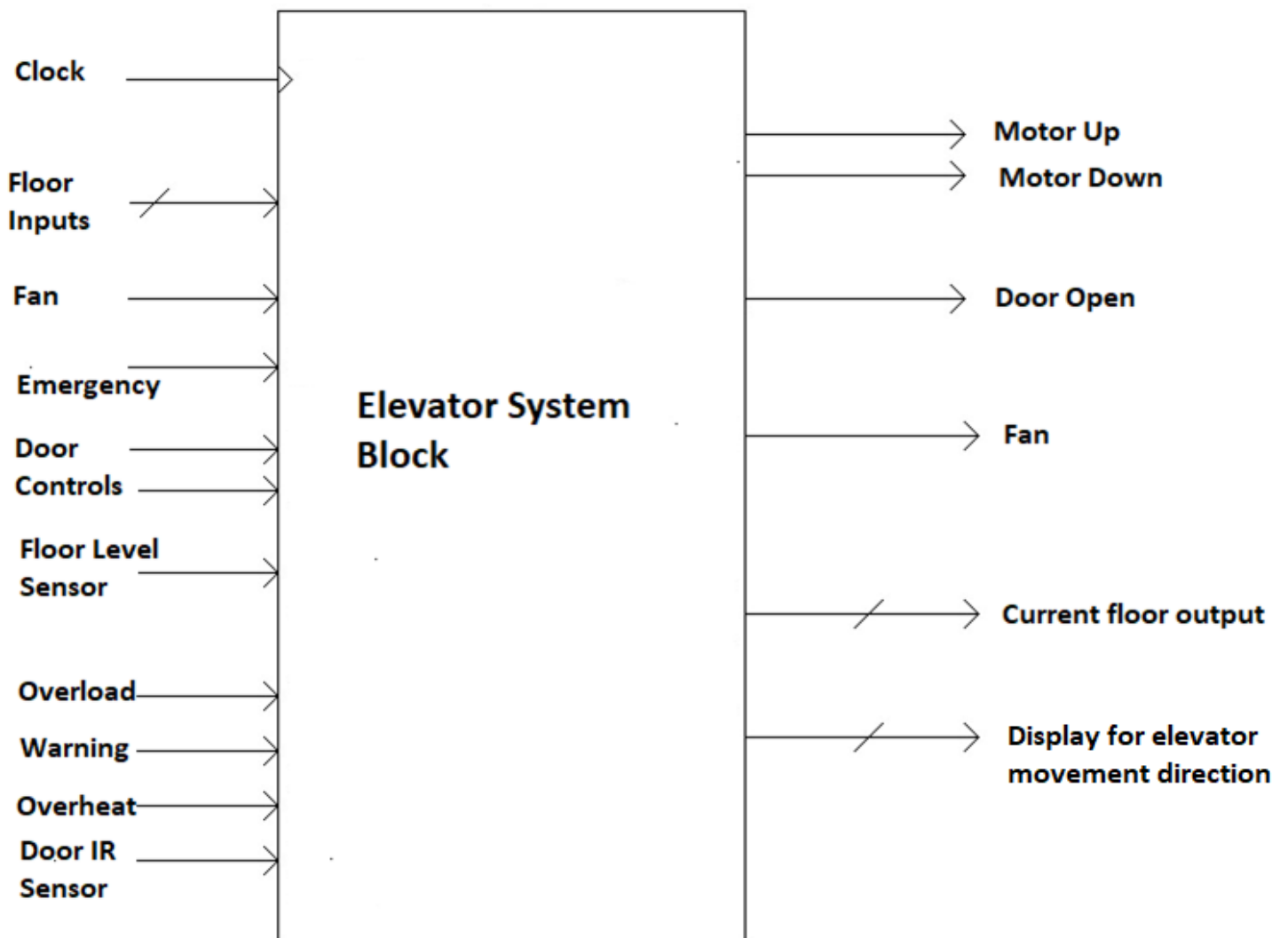
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TOP LEVEL BLOCK DIAGRAM



SIMPLIFIED BLOCK DIAGRAM



ASSUMPTIONS FOR THE CIRCUIT

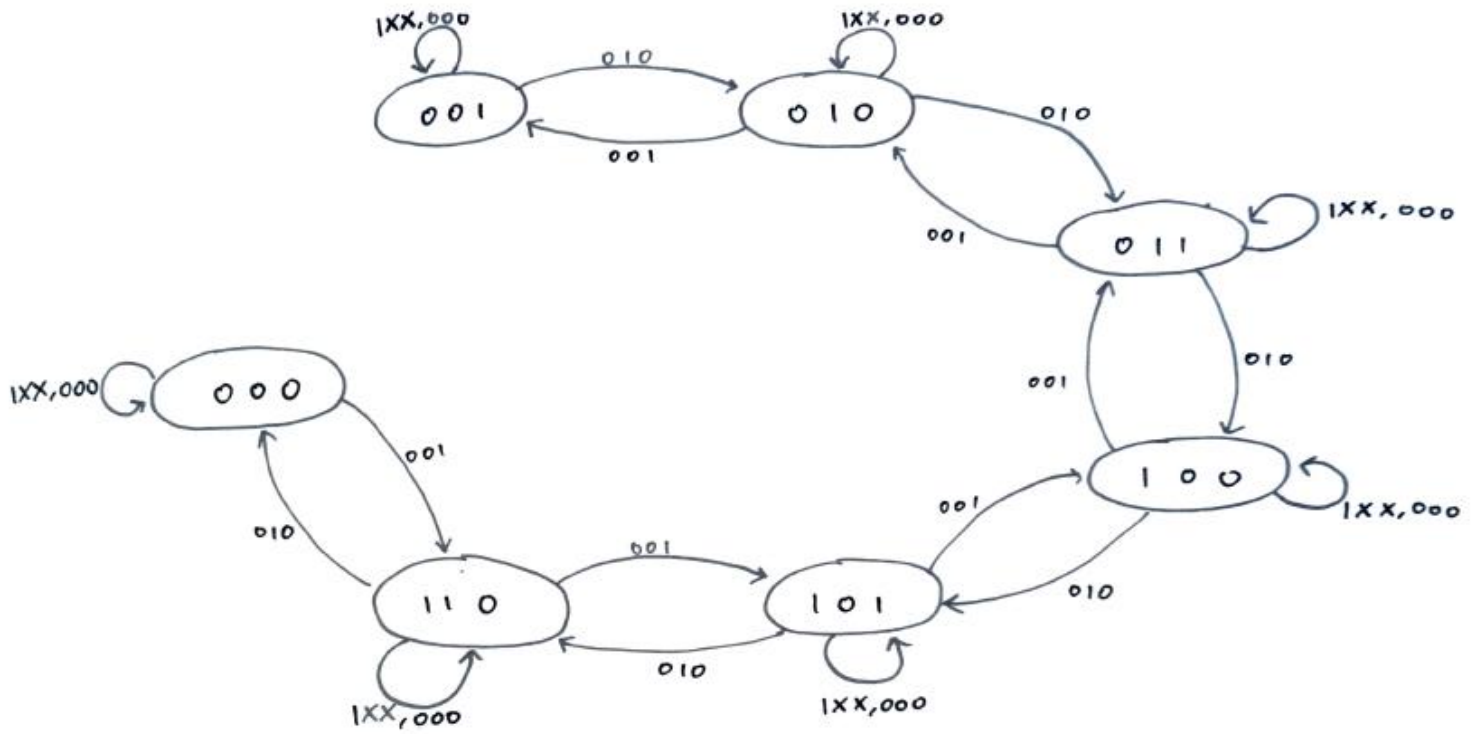
The assumptions for the design problem have been listed out below:

- The elevator system moves in steps of 1 floor each while moving from one floor to another.
- The buttons are a result of or input from the buttons inside and outside the elevator.
- There is only a need of 1 elevator in the building so a load balancer is not required.
- The floor sensors give a spike to indicate that the next floor has been reached. They would be infrared sensors which give an output of 1 when the floor indicators would come near them.
- The signals for the motor and door don't control the components directly, but send a signal to another logic circuit of when to do so.
- The signals for overheat, overload and warning are coming from an external source like a microprocessor or other logic circuits.

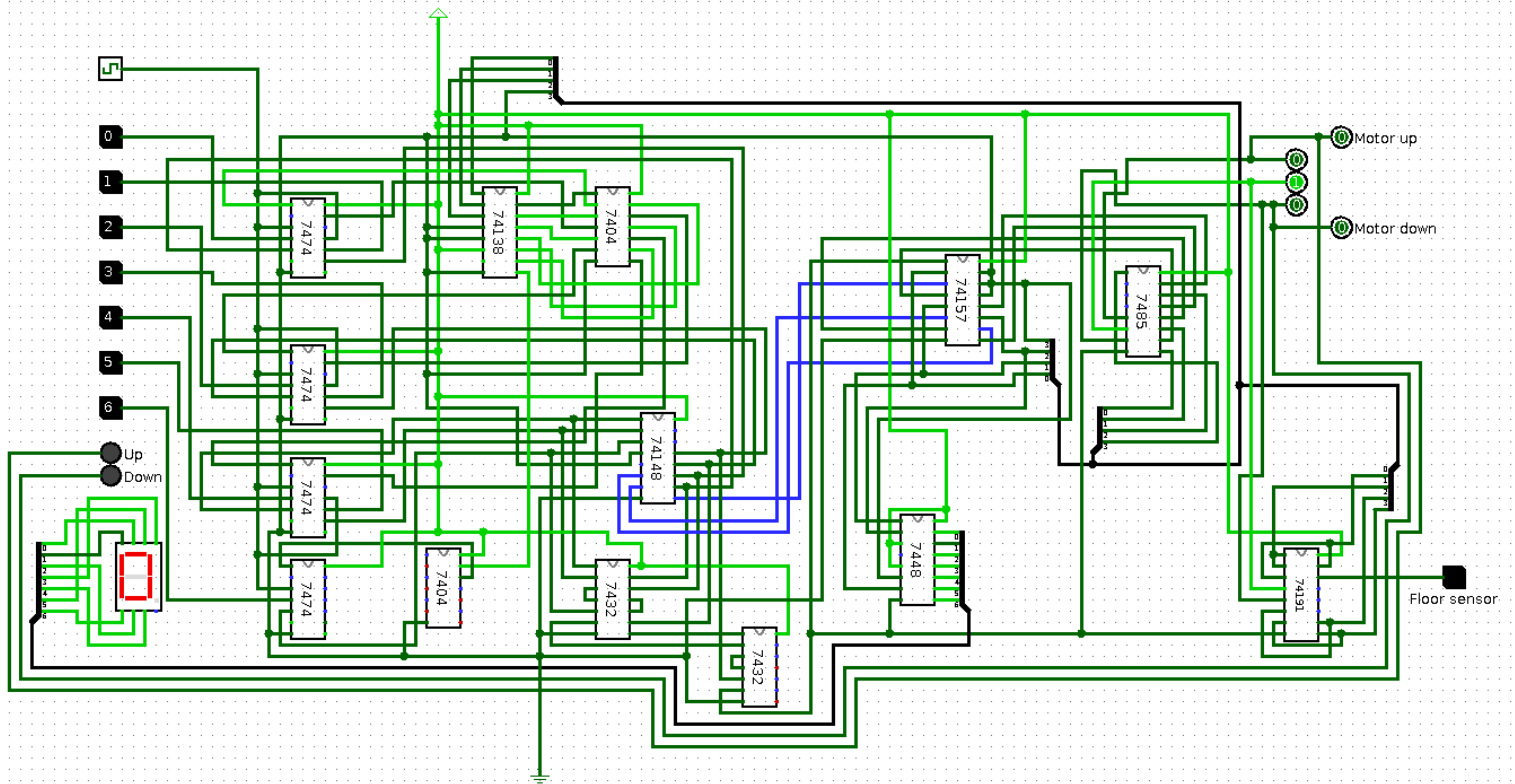
STATE TABLE

Floor	Input(Emergency Motor up Motor down)			
	1XX	000	001	010
000	000	000	X	001
001	001	001	000	010
010	010	010	001	011
011	011	011	010	100
100	100	100	011	101
101	101	101	100	110
110	110	110	101	X

STATE DIAGRAM



PIN-OUT DIAGRAM



LIST OF ADDITIONAL FUNCTIONALITIES IMPLEMENTED

- Sensor inputs for fault conditions added in the circuit for situations under which the elevator might fail to run, or come to a halt for emergency evacuation of people. The normal/warning state of these is visible in the circuit by the respective LED. These sensors are:
 - Lift Overload - gives a warning when there is a weight overload
 - Door IR - responsible for opening the elevator door in case any obstacle blocks it and prevents it from closing.
 - Motor Overheat - gives a warning depicting motor overheat
 - Warning sensor - for activating a warning alarm in the elevator
- Emergency Stop button for stopping the elevator immediately in case of emergency.
- Fan button to switch on/off fan in the elevator.
- Door opening and closing buttons for controlling the door.

BILL OF MATERIALS

Materials	Quantity
74191 Binary Counter	2
74157 2*1 mux	2
74148 Priority Encoder	1
74138 3:8 Decoder	2
7474 Dual D-flip flop	9
7485 Magnitude Comparator	1
7404 Inverter (not gate)	2
7432 Quad or gate	15
Buttons	11
7448 BCD to 7 Segment Display Decoder	1
7 Segment Display	1
IR Proximity Sensor	7
LED	11
LED Display Matrix	1
7476 Dual JK Flip Flop	1
7408 Quad and Gate	5

APPENDIX

The links for datasheets for components used in our circuit are listed below:

- [74191 Binary Counter.pdf](#)
- [74157 2by1 Mux.pdf](#)
- [74148 Priority Encoder.pdf](#)
- [74138 Decoder.pdf](#)
- [7474 D FF Positive Edge Triggered.pdf](#)
- [7448 BCD 7segment Decoder.pdf](#)
- [7485 Magnitude Comparator.pdf](#)
- [7404 Hex Inverter.pdf](#)
- [7432 Or.pdf](#)
- [7476 Dual JK FF.pdf](#)
- [7408 And.pdf](#)