

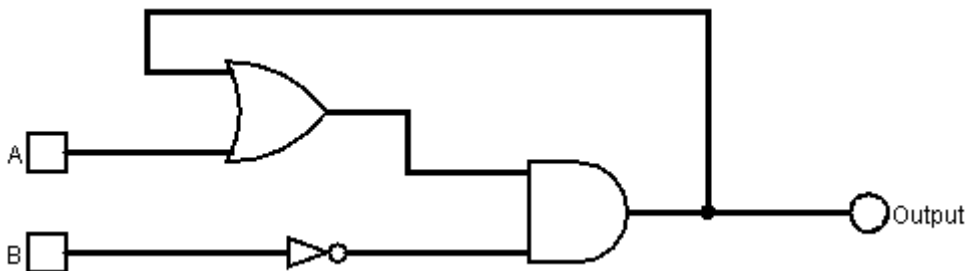
Machine Structures 2 catch up exam (duration 1h30)

Exercise 1 :(4 points)

1. Give a short definition of digital electronics.
2. Trace the truth table and write the logical expression of a tristate buffer.
3. Give the difference between synchronous and asynchronous sequential circuit.
4. Draw the schematics of an RS-Latch, then trace its truth table.

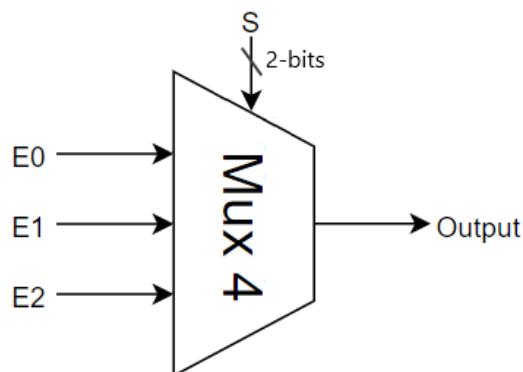
Exercise 2 :(5 points)

Study the asynchronous sequential circuit below. Extract its truth table and name the memory cell that it represents.



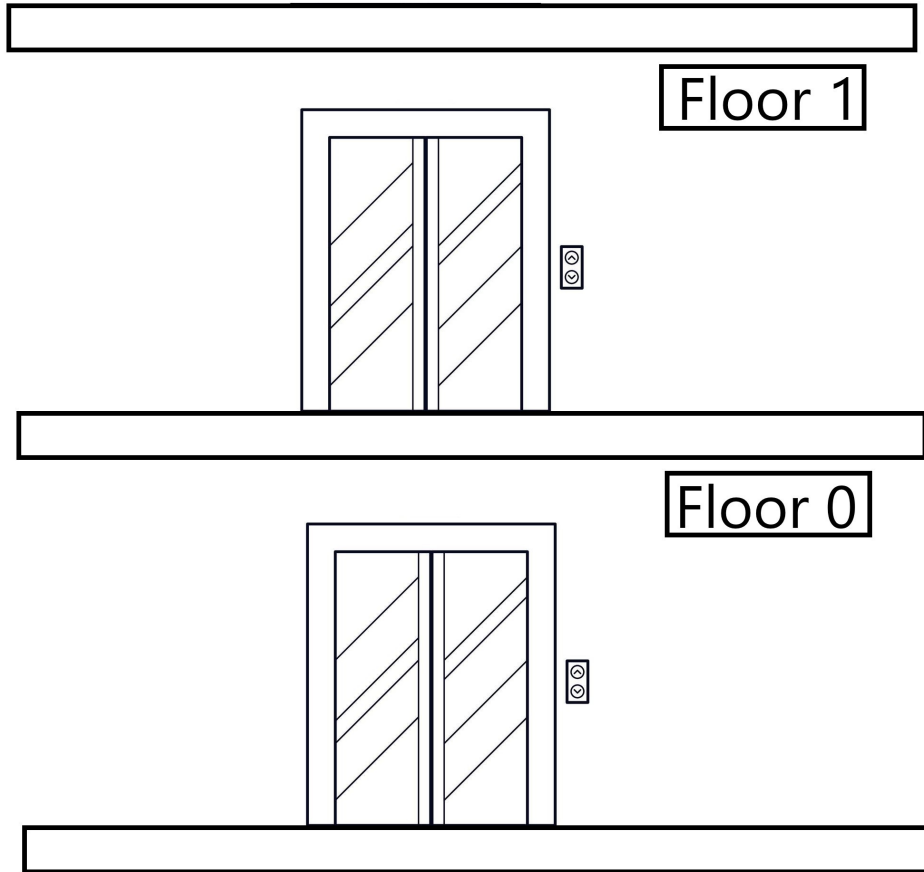
Exercise 3 :(5 points)

1. Using 5-step method, design a Mux 2-1 Multiplexer.
2. Using the slicing method, construct a Mux 4-1 Multiplexer.
3. Modify the previous Mux 4-1 Multiplexer to create a Mux 3-1 Multiplexer, like shown in the figure below, knowing that this Multiplexer produces the value Z if S is put to (1,1).



Exercise 4 :(7 points)

We want to design an elevator (مصعد) Sequential Circuit controller. The elevator is controlled by 2 buttons : UP (صعود) and DOWN (نزول). The 2 buttons are the same (هي نفسها) on the Floor 0 wall (حائط), on the Floor 1 wall, and inside the elevator. Pushing the UP button will rise up (يصعد) the elevator from Floor 0 to Floor 1. And pushing the DOWN button will take down (ينزل) the elevator from Floor 1 to Floor 0.



The controller can move (يحرك) the elevator using a motor (محرك). If the motor receives (يتلقى) the signal 1 from the controller, it will rise up the elevator. If it receives the signal 0, it will take down the elevator. The elevator start at Floor 0 when the circuit is in the initial state.

Q : Use the 7-step method to design the Sequential Circuit of the elevator controller.

دعوة بالتوفيق