YUSUF NEVZAT ŞENGÜN
21601720

CS-223 PROJECT REPORT
SECTION - 01

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Physical modules I used on Basys-3

- **Switches**
  I used switches in order to increment and decrement the number of passengers waiting on a floor. When an increment switch is turned on, the number of passengers increases one by one on the rising edge on the clock. When the opened switch is turned off the increment operation stops. For decrement switches the way of operation is the same. While the switch is turned on the number of passenger is decreased one by one on the rising edge of the clock.
- **Leds**
  I used first two leds for observing the position of the elevator. When the elevator moves the first two leds show the position of the elevator as binary numbers. I used other twelve leds for the passengers. It shows the number of passengers waiting on each floor as binary number. First four leds show the number of passengers waiting on the first floor as binary and so on. While passengers are moved the the floor the leds changes properly.
- **Seven Segments**
  First three segment shows the time elapsed for the evacuation operation. As the elevator moves the time is increased one by one. For one movement of the elevator the time increases 3 times, for taking or leaving passengers the time increases 2 times. I used the most significant segment for showing the direction of the elevator. If the elevator goes upward the segment turns clock-wise, if the elevator goes downward the segment turns counter-clock-wise and for waiting operations the segment stays at the waiting position.
- **Buttons**
  I used two buttons for this project. The first one is for resetting the system. When the button is clicked the elevator goes to the base floor and passengers are released from board. The other button is used for execution. When it is clicked the operation starts.

Physical modules I used on beti board

- **8*8 Display Module**
  I used this module to show the evacuation operation. Left side of the module is used for the position and state of the elevator. For empty places on the elevator blue light is turned on and for the busy places on the elevator red light is turned on. The passengers waiting on each floor is indicated on the module as well. For each passenger waiting on a floor, a red light is turned on on the floor where the passenger is waiting. As the elevator is working and passengers are lifting the lights on the module changes accordingly.

Modules

- **top**
  This is the top module of my project. All other modules are placed somewhere in this module. All main variables and datas are changed in this module.
- **ClockDivider**
  This is a clock divider. This is used for changing the states. Before execution this clock outputs for 1s, after execution this clock output for every 2s or 3s depending on the state of the elevator. If the elevator stops the clock counts 2s, if the elevator moves the clock counts 3s.
- **ClockDividerDirection**
  This is a clock divider. This clock divider is used for the direction indicator that is placed on the most significant segment of the seven-segment. For the circular movement of that segment, change on the segment occurs as this clock changes.
- **ClockDividerCount**
- This is a clock divider. This clock divider is used for the time that is placed on the seven-segment module. The time on seven-segment changes on the rising edge of this clock.
- **nextCollectLogic**
  This module calculates the next collect array. Collect array indicates the passangers that will lifted to the base floor for this movement of the elevator. For each turn this module calculates it again.
- **nextStateLogic**
  This module calculates our state for the next turn by using the previous values.
- **nextDirectionLogic**
  This module calculates the next direction of the elevator. It calculates the direction by looking at the next state and the collect array.
- **nextElevatorLogic**
  This module calculates the next state of the elevator. In other word, how many people will be placed on the elevator for the next state is calculated in this module.
- **nextPassangerLogic**
  Passenger array keeps the passengers waiting on each floor. This module calculates the next state of this array.
- **outputLogic**
  The lights on the 8x8 display module is set in this module. This module takes the position of the elevator and passengers and turns the lights on according to the given datas.

Ready codes used in the project

- 8x8 display module from unilica
- seven segment module from unilica