M.Sc. (Informatics) – IV Semester - 2018
## IT-45- Software Engineering II

Time: 3 Hrs.

Max. Marks: 75

Note: Answer five questions in all. All questions carry equal marks.

Q 1   What is Capability Maturity Model (CMM). Describe different CMM levels. Why maturity levels should not be skipped?   15

Q 2   Describe Software Quality. How do you classify software quality? Why standards are important for software development? What are software quality standards?   15

Q 3   What is design? Describe the difference between conceptual design and technical design. Discuss the objectives of software design. How do we transform an informal design to a detailed design?   15

Q 4   What are risk management activities? Is it possible to prioritize the risk? Is it possible to estimate software size before coding? Justify your answer with suitable example.   15

Q 5   What is software maintenance? Describe various categories of maintenance. Which category consumes maximum effort and why? Explain the steps of software maintenance with help of a diagram.   15

Q 6   Consider a simple elevator, moving people up and down between two floors. As shown in the picture. In the elevator, there are three buttons: One for going up, one for going down, and one "Stop" button. On each floor, there is a "Call" button. Furthermore, each floor has a sensor, indicating if the elevator is on that floor or not. There is also a sensor in the elevator, checking if the door to the elevator is closed or not. The elevator is moved up and down by a motor that is on the roof of the building. The motor is controlled by two signals, "Motor_Up" and "Motor_Down".   15

The idea is that you will implement the control system for this elevator. The control system looks at the buttons that are being pressed and the sensors that say where the elevator is and if the door is open, and then decides if the motor should move the elevator up or down, or do nothing. For simplicity, we do not make a difference between if someone on floor 2 presses the "Call" button and if someone in the elevator pressed the "Up" button. Similarly, for the "Call" button on floor 1 and the "Down" button in the elevator.
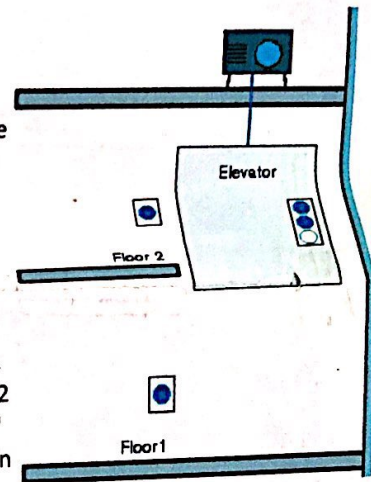
In order to understand in more detail what the control system of the elevator is supposed to do, here is a list of safety requirements that any decent control system should obey.

R1   The elevator may only move when the door is closed and the "Stop" button is not pressed.
R2   The elevator may not pass the end positions (that is: go through the roof or through the floor.)
R3   A moving elevator only stops if either the "Stop" button is pressed, or the door is opened, or the elevator has arrived at a floor.
R4   The elevator must stop before changing direction.
R5   The signals sent to the motor may not be contradictory.

The signals "Floor_1" and "Floor_2" represent the output of the floor sensors. The signal "Door_Closed" is the output of the door sensor. The signal "Call_1" is true if and only if someone has pressed the "Call" button on floor 1 or the "Down" button in the elevator. Similarly for "Call_2". The output signals "Motor_Up" and "Motor_Down" will be directly sent to the motor.

Please draw control flow of keeping in mind the requirements (R1-R5) and write a suitable algorithm to substantiate your control flow.

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