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Final Assessment Test- Jan/Feb 2023

Course: ITA5005 - Object Oriented Software Engineering
Class NBR(s): 5116 / 6228 / 6234 Slot: F2+TF2
Time: Three Hours Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

Answer ALL Questions
(10 X 10 = 100 Marks)

1. For the scenario described below, which life cycle model would you choose? Give the reason why you would choose this model. Explain the stages involved in the model. List the advantages and disadvantages of the model chosen.

   You are interacting with the MIS department of a very large oil company with multiple departments. They have a complex regency system. Migrating the data from this legacy system is not an easy task and would take a considerable time. The oil company is very particular about processes, acceptance criteria and legal contracts.

2. Consider an elevator that has the basic functions such as moving up and down open and close doors and pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to n. There are call buttons in the elevator corresponding to each floor. For every floor except floors 1 and n, there are two floor call buttons for the passengers to call elevator for going up and down. There is only one down call button at floor n and one up call button in floor 1. Then the car stops at a floor, the doors are opened and the elevator light indicating the current direction the elevator is going is illuminated so that the passengers can get to know the current moving direction of the elevator. When the elevator is moving a music audio is played inside the elevator.

   Draw class diagram for designing this system.

3. A mobile device has to be fitted with an alarm clock. The clock has a display unit to show the time of day. Using buttons, the user can set the hours and minutes field individually. It supports a 24-hour display. It is possible to set one or two alarms. When an alarm fires it will set some noise. The user can turn it off, or choose to "snooze". If the user does not respond at all the alarm will turn off itself after 2 minutes. 'Snoozing' means to turn off the sound, but the alarm will fire again after some minutes of delay. This snoozing time is pre-adjustable. **Identify the functional requirements and non-functional requirements for the clock.**

4. **Design a use case model for the scenario discussed in question 3.**

5. **Model a sequence diagram for the following scenario.**

   XYZ super market wants a subsystem to process supply orders via the web. The user will supply via a form their name, password, account number and a list of supplies along with an indication of the quantities desired. The subsystem will validate the input, enter the order into a database and generate a receipt with the order number, expected ship date and the total cost of the order. If the validation step fails, the subsystem will generate an error message describing the cause of the failure.

6. **Model a state transition diagram for the following scenario. Here is what happens in a micro wave oven:**

- The oven is initially in an idle state with door open, when the light is turned on.
- When the door is closed it is now in idle but the light is turned off.
- If a button is pressed, then it moves to initial cooking stage, where the timer is set and lights are on and heating starts.
- At any moment the door may be opened, the cooking is interrupted, the timer is cleared and heating stops.
- Also, while cooking, another button can be pushed and extended cooking state starts, where the timer gets more minutes. At any moment door can be opened here also.
- If the timer times out, then cooking is complete, heating stops, lights are off and it sounds a beep.
- When the door is open, again the oven is in idle state with the door open.

7. a) List out the principles leading to good software design. **[4]**

b) Discuss on the need for minimizing coupling and maximizing cohesion in the design of software. **[6]**

8. "Building on the work and experience of others" – Considering this statement, discuss the most commonly used reusable techniques practiced by software engineers during software development.

9. Assuming you are designing a server for the following classes of applications, list the kinds of main activities that you might expect the server to do:

(a) A server for an airline reservation system.

(b) Your favorite site for buying books on the Internet.

10. What is the difference and similarity between Agile and Scrum? When and where Agile and scrum are used? Is there any drawback of the Agile model? If yes, explain.

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