D22 Exam 2000
2.5 Hours

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Answer THREE Questions

1. The following 11 terms are commonly used in a object-oriented software engineering context. Give a short explanation for each of them: polymorphism, use case, aggregation, encapsulation, methodology, system function, conceptual model, message, abstraction, collaboration, pattern language

    [3 marks each]

    [Total 33 marks]

2. Below is the draft specification for a proposed software system:

    "A system is required to maintain an inventory of the contents of a warehouse. Items are delivered for storage at any time during the day and must be allocated space. An identification label must be attached to each item before storage and some items need to be stored in a refrigerated unit. An item can be stored for any period of time but some items have an expiry date by which they must be removed from the warehouse.

    When items are removed they need to be labelled, packaged for delivery and put on the correct delivery truck. The truck driver should be given a list of delivery addresses for the items.

    The system should be able to generate reports showing the current contents of the warehouse and the last day's deliveries and collections."

    a) Create an UML class diagram for the warehouse software system. Make sure each class is labelled with any key attributes or operations.

    [20 marks]

    b) Create an UML object interaction diagram for the delivery and storage of an item in the warehouse.

    [13 marks]

    [Total 33 marks]

3. a) What is software architecture?

   [4 marks]

   b) Describe the layers of change idea, outlining each of the layers and their relationships to one another.

   [8 marks]

   c) Why is software design hard? In what ways do software architecture and the layers of change guide the design process?

   [12 marks]

   d) Is software development a craft, an engineering process or something in between? Discuss the issues.

   [9 marks]

   [Total 33 marks]

4. a) What are the key features and mechanisms of the object-oriented approach to software development?

   [12 marks]

   b) Outline the prototyping process. How do the items given in your answer to part a) aid or hinder prototyping?

   [12 marks]

   c) Give a set of guidelines for the organisation of a software development team that will be following the prototyping approach.

   [9 marks]

   [Total 33 marks]

5. a) Describe the role of design patterns in the design and programming process. What benefits might be gained from exploiting patterns?

   [10 marks]

   b) How is a design pattern documented? Briefly describe the role of each section in a pattern description.

   [10 marks]

   c) How can the quality of software design and implementation be measured?

   [13 marks]

   [Total 33 marks]

END OF PAPER