B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 20CS6PCOMD **Max Marks: 100**
Course: Object Oriented Modelling and Design **Date: 12.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

<div style="writing-mode: vertical">**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.</div>

			UNIT - I	CO	PO	Marks
1	a)		Discuss the stages in object oriented methodology.	CO1	PO1	**6**
	b)		Analyze and identify a list of classes that you would expect each of the following system to handle: i) A catalog store order enter system. ii) A Speed fast courier system. iii) A ticketing system in metro rail service. iv) A voice mail system with delivery options, message forwarding and group lists.	CO2	PO2	**6**
	c)		Prepare a class diagram for each group of classes mentioned below. Add at least 10 relationships (association and generalizations) to each diagram. Use association names and association end names where needed. Also use qualified associations and show multiplicity. Write attributes and methods for the classes. **file system, file, ASCII file, binary file, directory file, Disc, drive, track, sector**	CO3	PO3	**8**
			UNIT - II			
2	a)		Illustrate the restructuring technique used to deal the multiple inheritance issue with relevant examples.	CO1	PO1	**6**
	b)		Analyze the following relationships into generalization, aggregation, association and n-ary associations. Explain your answers. i) A drawing object is text, a geometrical object, or a group. ii) A person uses a computer language on a project. iii) Modems and keyboards are input/output devices. iv) A route connects two cities. v) A file contains records. vi) A polygon is composed of an ordered set of points.	CO2	PO2	**6**

				CO	PO	
		c)	Design the State diagram for phone line with activities.	CO3	PO3	**8**
			OR			
	3	a)	Illustrate with example the different types of events in state modeling.	CO1	PO1	**6**
		b)	Differentiate between (a)Aggregation and Composition with relevant example (b)Abstract class and Concrete class with example	CO2	PO2	**6**
		c)	Prepare & explain a class diagram for a graphical document editor that supports grouping. Assume that a document consists of several sheets. Each sheet contains drawing objects, including text, geometrical objects, and groups. A group is simply a set of drawing objects, possibly including other groups. A group must contain at least two drawing objects. A drawing object can be a direct member of at most one group. Geometrical objects include circles, ellipses, rectangles, lines, and squares.	CO3	PO3	**8**
			UNIT - III			
	4	a)	Define Concurrency. Illustrate any two ways of handling concurrency in state modeling with an example for each.	CO1	PO1	**6**
		b)	Construct an activity diagram for awarding frequent flyer credits. In the past, TWA awarded a minimum of 750 miles for each flight. Gold and red card holders received a minimum of 1000 miles per flight. Gold card holders received a 25% bonus for any flight. Red card holders received a 50% bonus for any flight.	CO3	PO3	**6**

		c)	Consider a physical bookstore, such as in a shopping mall.
			   a. List at least 3 actors that are involved in the design of checkout system. Explain the relevance of each actor.
			   b. Identify the use cases. Summarize the purpose of each use case with a sentence.
			   c. Prepare a use case diagram for a physical bookstore checkout system.
			   d. Prepare a normal and exception scenario for any two use cases that you have identified.
			   e. Prepare a sequence diagram corresponding to each scenario
				CO3	PO3	**8**

			OR			
	5	a)	Explain the Use Case Relationships with example for each.	CO1	PO1	**6**
		b)	A customer decides to upgrade her PC and purchase a DVD player. She begins by calling the sales department of the PC vender and they tell her to talk to customer support and they put her on hold while talking to engineering. Finally, customer support tells the customer about several supported DVD options. The customer chooses the DVD and is shipped by the mail department. The customer receives a DVD, installs it satisfactorily and then mails her payment to accounting. Construct an activity diagram for this process. Use swimlanes to show various interactions.	CO3	PO3	**6**

				CO3	PO3	**8**
		c)	Consider the scenario for online course enrollment system where the student enrolls for the specific course. Instances of course can be in the Proposed, Scheduled, Open for Enrollment, Full, and Closed to Enrollment states. An object starts in an initial state and can end up in a final state. After the completion of the course the student has to appear for exams, for getting certified. Analyze and prepare the state diagram for the above scenario.			
			UNIT - IV			
6	a)		Consider the following Problem statement (given below) for ATM System: "Design the software to support a computerized banking network including both human cashiers and automatic teller machines (ATMs) to be shared by a consortium of banks. Each bank provides its own computer to maintain its own accounts and process transactions against them. Cashier stations are owned by individual banks and communicate directly with their own bank's computers. Human cashiers enter account and transaction data. Automatic teller machines communicate with a central computer that clears transactions with the appropriate banks. An automatic teller machine accepts a cash card, interacts with the user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system requires appropriate recordkeeping and security provisions. The system must handle concurrent accesses to the same account correctly. The banks will provide their own software for their own computers; you are to design the software for the ATMs and the network. The cost of the shared system will be apportioned to the banks according to the number of customers with cash cards." What criteria would you take into consideration to find relevant classes? Analyze with an example how to select the good classes from the set of ATM classes that are identified from the knowledge of problem domain.	CO2	PO2	**10**
	b)		Discuss the steps involved in constructing Application Interaction Model for ATM System and illustrate with example for each.	CO1	PO1	**10**
			UNIT - V			
7	a)		Analyze and illustrate with an example the different sources used in making a reuse plan.	CO2	PO2	**10**
	b)		Analyze how Fine-tune classes and Fine-tune generalizations are prepared from analysis and design during implementation modeling.	CO2	PO2	**10**

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