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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

Branch: Information Science and Engineering **Duration: 3 hrs.**

Course Code: 22IS7PESAD **Max Marks: 100**

Course: Software Architecture and Design Patterns

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

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.

			CO	PO	Marks
		UNIT - I			
1	a)	Discuss the properties of patterns for Software Architecture	CO1	PO1	**10**
	b)	Discuss the pattern description template in detail	CO1	PO1	**10**
		OR			
2	a)	Discuss the pattern by taking an example of Model-View-Controller	CO1	PO1	**10**
	b)	Explain the sentence "Patterns as mental building blocks" and explain why patterns are essential for addressing recurring problems and promoting reusable, proven solutions across various fields	CO1	PO2	**10**
		UNIT - II			
3	a)	Discuss four categories of architectural pattern and explain the consequences of using layered architectural pattern	CO2	PO1	**10**
	b)	Could you explain how the Broker architectural pattern helps manage communication between different distributed components?	CO2	PO2	**10**
		OR			
4	a)	In what scenarios is the Blackboard architectural pattern most beneficial, and how does it facilitate collaboration among different components to solve complex problems? Could you explain its structure and how it manages communication between various knowledge sources?	CO2	PO2	**10**
	b)	Can you explain how user input is processed in an MVC architecture, and how each component (Model, View, Controller) handles data flow using a dynamic	CO2	PO2	**10**

			UNIT - III			
	5	a)	Discuss about design patterns and explain the categories in design patterns in briefly	*CO3*	*PO1*	**10**
		b)	Briefly explain the implementation steps in Master-slave design pattern	*CO3*	*PO2*	**10**
			OR			
	6	a)	Discuss the detail structure of command processor design pattern	*CO3*	*PO1*	**10**
		b)	Explain the undo operation in TEDDI with a suitable diagram	*CO3*	*PO3*	**10**
			UNIT - IV			
	7	a)	How idioms and style influence software architecture and design can be better understood with a practical example	*CO4*	*PO2*	**10**
		b)	In what ways does the Counted Pointer idiom, such as C++'s std::shared_ptr, effectively manage memory by preventing issues like memory leaks and dangling pointers	*CO4*	*PO3*	**10**
			OR			
	8	a)	How do you implement the Counted Pointer idiom in C++ to manage dynamic memory allocation and ensure proper memory cleanup using reference counting?	*CO4*	*PO3*	**10**
		b)	What are the seven steps involved in the procedure for selecting a specific design pattern, and how do they guide the decision-making process?	*CO4*	*PO1*	**10**
			UNIT - V			
	9	a)	What are the key principles and considerations that software architects must address when designing scalable, maintainable, and secure software systems?	*CO4*	*PO1*	**10**
		b)	Discuss the important Non-functional Properties of Patterns and Software Architectures	*CO4*	*PO1*	**10**
			OR			
	10	a)	Elaborate the most important enabling techniques for software architecture	*CO4*	*PO2*	**10**
		b)	What makes the 'shepherding' process unique in fostering collaboration and improving submissions at PLoP and EuroPLoP?	*CO4*	*PO2*	**10**

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