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

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 23CS4PCSED **Max Marks: 100**
Course: Software Engineering

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.

		UNIT - I	CO	PO	Marks
1	a)	i) Differentiate between Software Engineering and System Engineering. ii) Illustrate the four important attributes which all software products should have. Identify and Suggest four other attributes that may sometimes be significant for a Fire Alarm system.	CO2	PO 2	8
	b)	Consider an interactive coffee vending system that allows different people to find different flavors of coffee and select one of them, Identify the Non-functional requirements for this system and classify them and arrange in a hierarchy diagram.	CO 2	PO 2	6
	c)	A train protection system automatically applies the brakes of a train if the speed limit for a segment of track is exceeded or if the train enters a track segment that is currently signaled with a red light (i.e., the segment should not be entered). Assuming that the signal status and the speed limit for the track segment are transmitted to on-board software on the train before it enters that track segment. Design a template using structured natural language to capture the requirements for the above system.	CO 3	PO 3	6
		OR			
2	a)	As a Software professional working for a reputed company, you have been approached by your friend to share a confidential information of the organization. Discuss the ethical dilemmas that this request raises and the professional and ethical responsibilities of software engineer that you would be violating if the request is addressed. State Code of Ethics and Professional Practice as specified by ACM/IEEE-CS joint task force.	CO 1	PO 1	8
	b)	Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems: (i)A system to control anti-lock braking in a car (ii)A virtual reality system to support software maintenance	CO 1	PO 1	6

			(iii)An interactive system that allows railway passengers to find train times from terminals installed in stations Explain each of the model with relevant diagrams			
		c)	Design a Software requirements document for an Online furniture ordering System	***CO 3***	***PO 3***	**6**
			UNIT - II			
	3	a)	Draw a Data flow model and object generalization diagram showing the interactions involved when a student registers for a course in a university. Courses may have limited enrolment, so that the registration process must include checks that places are available. Assume that the student accesses an electronic course catalogue to find out about various courses	***CO 3***	***PO 3***	**8**
		b)	Consider an Online stationary ordering System. • List the actors involved and explain the relevance of each actor. • Prepare the use case diagram for the system. • Prepare the sequence diagram for ordering stationeries and online payment	***CO 3***	***PO 3***	**6**
		c)	Draw a state machine model for a microwave oven that models different programs for different types of cooking.	***CO 3***	***PO 3***	**6**
			UNIT - III			
	4	a)	(i)Suggest an appropriate control model for the following: 1. Car Remote that responds to signals from remote control unit 2. A set of software tools that are produced by different vendors, but which must work together (ii) Differentiate between the two kinds of concurrent objects.	***CO 2***	***PO 2***	**8**
		b)	Using the UML graphical notation for object classes, design Sequence diagram for a petrol or gas station to be set up for fully automated operation	***CO 3***	***PO 3***	**6**
		c)	Consider an environmental monitoring system that collects data from a set of air quality sensors situated around a city. There are 5000 sensors organized into 100 neighborhoods. Each Sensor must be interrogated four times per second. When more than 30% of the sensors in a particular neighborhood indicate that the air quality is below an acceptable level, local warning lights are activated. All the sensors return the readings to a central computer, which generates reports every 15 minutes on the air quality in the city. Identify an appropriate structural model and design an architecture for the same.	***CO 3***	***PO 3***	**6**
			UNIT - IV			
	5	a)	Consider the task of developing a software for Automated University marks card generation system. The scheduling of this system must account for the following requirement: Initially the work should start with design of a control terminal (T0) class for no more than eleven working days; Next, the classes	***CO 3***	***PO 3***	**8**

			for student user (T1) and faculty user (T2) should be designed in parallel, assuming that the elaboration of student user takes no more than six days, while the faculty user needs four days; When the design of student user completes network protocol (T4) is to be developed , it is a subtask that requires eleven days, and simultaneously network management routines (T5) is to be designed that takes up to seven days; After the termination of the faculty user subtask, a database directory (T3) should be made for nine days to maintain information about the marks of students and their information; The completion of the network protocol and management routines should be followed by design of the overall network control (T7) procedures for up to eight days; the Database directory design should be followed by a subtask elaboration of users of the system (T6), which takes eleven days; the software engineering process terminates with testing (T8) for no more than four days. Design Time-Line chart for the above System along with milestones			
		b)	(i)An organizations average productivity is 15 FP/pm. The average labor rate is $18600 per month. If a proposed project has a count total of 560 and the Value Adjustment factor(VAF) is 38. Calculate: (1) Cost per Functional Point (2) Overall Project Cost (3) Estimated effort in person-months	***CO 1***	***PO 1***	**6**
		c)	Identify the different organizational paradigms for software engineering teams as specified by Constantine and explain each of them in detail	***CO 2***	***PO 2***	**6**
			UNIT - V			
	6	a)	Analyze the key strategies of clean-room approach to software development with relevant diagram.	***CO 2***	***PO 2***	**8**
		b)	Describe path testing approach of test case design by drawing a flow graph for a binary search routine. Determine and write the different paths that are executed.	***CO 1***	***PO 1***	**6**
		c)	Justify how practices of extreme programming fit into principles of agile methods	***CO 2***	***PO 2***	**6**
			OR			
	7	a)	Justify that program inspections are an effective technique for discovering errors in a program. List and explain the types of errors that are likely to be discovered through inspections	***CO 2***	***PO 2***	**8**
		b)	Differentiate between Whitebox and Blackbox testing with relevant example and diagram	***CO 2***	***PO 2***	**6**
		c)	Identify the range of factors to be considered while assessing the technical quality of a legacy application system.	***CO 2***	***PO 2***	**6**

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