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

Autonomous Institute Affiliated to VTU

August 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 20CS5PCSEG **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.

UNIT - I

1	a)	Analyze a software system to be developed to manage the records of patients who enter the hospital for treatment. The records include records of all regular patient monitoring (Temperature, BP etc.), treatments given, patient reactions and so on. After treatment, the records of their stay are sent to patient's doctor who maintains their complete medical record. Identify the principal viewpoints which might be taken into account in the specification of this system and organize these using a view point hierarchy diagram.	**6**
	b)	Discuss the responsibilities that the software engineers should have towards professional and society. State ACM/IEEE principles that software engineers should adhere to the code of Ethics and professional practice.	**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 signalled 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.	**8**

OR

2	a)	A software system is to be developed to manage the records of the candidates who register for the National Level Hackathon. The record includes the records of all participants (Name, date of birth, start and end time for submission and so on). After the completion of the Hackathon, the participant has to take up a presentation and qualify with certain minimum requirement criteria for certification. Classify and explain the Non-functional requirements hierarchy diagram for the above software system.	**8**
	b)	Write the complete scenario for Online shopping system: You may make any reasonable assumptions about the system such as objects involved in interaction, online shop interface, Item-list, Purchase-interface, Checkout, Payment Option.	**6**

c) Explain the metrics for specifying non-functional requirements. **6**

UNIT - II

3 a) Draw a Data flow model showing the interactions involved when a student's registers for a course in an university. Courses may have limited enrolment, so the registration process must include checks that enrolment is available or not. Assume that the student accesses an electronic course catalogue to find out about various courses **8**

b) Assume you are responsible for writing the specification for a software system that controls a network of EPOS (Electronic Point Of Sale) terminals in a store. The system accepts bar code information from a terminal, queries a product database and returns the item name and its price to the terminal for display. The system must be continually available during the store's opening hours. Draw the Context model for the above scenario. **6**

c) Draw a state machine model for an automatic washing machine that models different programs for different types of clothes. **6**

UNIT - III

4 a) Using the UML graphical notation for object classes, design sequence diagram showing interactions of objects for the following : **6**
A group diary and time management system is intended to support the timetabling of meetings and appointments across a group of coworkers. When an appointment is to be made that involves a number of people, the system finds a common slot in each of their diaries and arranges the appointment for that time. If no common slots are available it interacts with the user to rearrange his or her personal diary to make room for the appointment.

b) Analyze the system and suggest an appropriate structural model for the following. Give reasons for your answers. **8**

i) An automated ticket-issuing system used by passengers at the railway station.

ii) A computer-controlled video conferencing system that allows video, audio and computer data to be visible to several participants at the same time.

Analyze the system and suggest an appropriate control model for the following. Give reasons for your answers

i) A television controller that responds to signals from a remote control unit

ii) A batch processing system that takes information about hours worked and pay rates and also prints salary slips, bank credit transfer information..

c) Describe the strategies used for decomposing a sub-system into modules with relevant diagrams. **6**

UNIT - IV

5 a) If a team produces 250 lines of code per month at a burdened labor rate of $10200 per month. Calculate the project cost and estimated effort in person months for developing a library system which spans 21000 LOC. **6**

	b)	Design a Task Network for Library Management system assuming the tasks involved and also show milestones.	**6**
	c)	What types of risks are likely to be encountered during the software build process and as the technical leader how do you assess the overall risk associated with the software?	**8**

UNIT - V

6	a)	Explain Clean Room Software development with a neat diagram.	**8**
	b)	Discuss why program inspections are an effective technique for discovering errors in a program. What types of checks are used to discover errors through inspections?	**6**
	c)	Differentiate between Whitebox and Blackbox testing.	**6**

OR

7	a)	Analyze the following Scenario. Implement Payment Collection. Payment may be made in 3 different ways. The user selects which way they wish to pay. If the user has a library subscription, then they can input the subscriber key which should be checked by the system. Alternatively, they can input an organizational account number. If this is valid, a debit of the cost of the article is posted to this account. Finally, they may input the 16-digit credit card number and expiry date. This should be checked for validity and if valid a debit is posted to that credit card account. Write the Test case description for credit card validity with the following details. Input, Tests, Output	**8**
	b)	Explain the principles of Agile method.	**6**
	c)	Design the flow graph for path testing for binary search and list the different paths.	**6**

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