Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (W), Mumbai : 400058, India
(Autonomous College of Affiliated to University of Mumbai)

End Semester Examination (Grade Improvement and Special)

August 2023

Maximum Marks: 100
Class: TE Comp/IT
Course code: CS/IT302
Name of the course: Software Engineering

Duration: 3 hours
Semester: V
Branch: CS/IT

Q No		Max Marks	CO	BL
Q1a)	Consider that an **Order**consists of one or more **Items**. Each **Item** contains the name of the item, its quantity and the date by which it is required. Each order item is described by an**Item Specification**object having details such as its vendor addresses, unit price, and manufacturer. What isthe relationship that exists between Item and Item Specification classes? Is it Dependency/ Aggregation/ Generalization/ Composition? Justify. Identify uses cases for an **order processing system** and draw use case diagram. **OR** Consider a smart home system capable of controlling various functionality such as switching on light and adjusting the AC temperature inside the room. The system employs different sensors to understand and adjust to room conditions and react accordingly. The system has photoresistors to detect the light condition of the room to switch on the lights and a thermostat to detect the temperature changes to control the AC. Identify 2 **IS-A** relationship and 2 **HAS-A** relationship in given scenario. Draw class diagram of the system.	2 + 8 2 + 8	CO2 CO2	4 4
Q1b)	Identify 2 reasons for need of a software life cycle model? A mining company named Galaxy Mining Company Ltd. (GMC) has mines located at various places in India. It has about fifty different mine sites spread across eight states. The company employs a large number of miners at each mine site. Mining being a risky profession, the company intends to operate a special provident fund, which would exist in addition to the standard provident fund that the miners already enjoy. The main objective of having the special provident fund (SPF) would be quickly distribute some compensation before the standard provident amount is paid. According to this scheme, each mine site would deduct SPF installments from each miner every month and deposit the same with the CSPFC (Central Special Provident Fund Commissioner). The CSPFC will maintain all details regarding the	2 + 8	CO1	4

	SPF installments collected from the miners. GMC employed a reputed software vendor Adventure Software Inc. to undertake the task of developing the software for automating the maintenance of SPF records of all employees. GMC realized that besides saving manpower on bookkeeping work, the software would help in speedy settlement of claim cases. GMC indicated that the amount it can afford for this software to be developed and installed is Rs. 1 million. Adventure Software Inc. deputed their project manager to create the system. Elaborate the project phases and tasks in each phase assuming the company followed **Incremental life cycle model.**			
Q2a)	Illustrate with an example, balancing of DFD. A supermarket needs to develop the following software to encourage regular customers. For this, the customer needs to supply his/her residence address, telephone number, and the driving license number. Each customer who registers for this scheme is assigned a unique customer number (CN) by the computer. A customer can present his CN to the check out staff when he makes any purchase. In this case, the value of his purchase is credited against his CN. At the end of each year, the supermarket intends to award surprise gifts to 10 customers who make the highest total purchase over the year. Also, it intends to award a 22 caret gold coin to every customer whose purchase exceeded Rs.10,000. The entries against the CN are reset on the last day of every year after the prize winners' lists are generated. Draw level 0, 1, 2 DFD for the scenario. (Level 2 for one DFD process)	2+ 8	CO1	4
Q2b)	Give 2 disadvantages of Function Point estimation. Barry is assigned to a project team to develop a store management system for a chain of sandwich shops. The system must have features to take order, make sandwich, collect payment, hand over order, generate day wise order summary, check inventory etc. Identify the EI, EO, EQ, ILF etc in the system, calculate function point and estimate the effort required for the system. Weighting Factor for computing FP	2 + 8	CO3	4
Q3a)	State the need for prototyping and how this approach save cost, effort and resources. Elaborate the steps followed in Prototype life cycle model.	2 + 8	CO1	4
Q3b)	Suggest a mitigation plan for the risk given below: Software requires interface with other technologies on which the project team has no experience. Explain 5 steps in software risk management.	2 + 8	CO3	4

Parameter	**Simple**	**Average**	**Complex**
External Input (EI)	3	4	6
External Output (EO)	4	5	7
External Inquiry (EQ)	3	4	6
Internal Logical File (ILF)	7	10	15
External Interface File (EIF)	5	7	10

Q.4a)	Consider the following function. Draw Control flow graph. From the control flow graph, determine its Cyclomatic complexity and Find linearly independent paths. Design a test casses for the function.
	
	int find-maximum(int i, int j, int k)
	{
	int max;
	if (i>j) then
	if(i>k) then max = i;
	else max = k;
	else if (j>k) max = j;
	else max = k;
	return (max);
	}
		10	CO4	3

Q.4b)	Explain the metrics for the design Model	10	CO3	2
Q.5a)	How can you apply DevOps for a project. Illustrate with example the different phases of DevOps.	10	CO5	3
Q.5b)	What are the pros and cons of Design Patterns. Illustrate Singleton Pattern with example	10	CO3	2

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