VIT-AP UNIVERSITY	Final Assessment Test – Winter 2023-24 Semester - May 2024	
	Max Marks: **100**	Duration: **3 Hours**
Course Code: **CSE1005**	Course Title: **Software Engineering**	
Question Paper ID: **009696**	Exam Type: **CLOSED BOOK**	School: **SCOPE**
Date: **09/05/2024**	Slot: **A1+TA1**	Session: **AN**

Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice.

General Instructions if any:

1. "*fx* series" - non Programmable calculator is permitted: No
2. Reference tables permitted: No

Section - 1: Answer any 10 questions. (10 × 10 = 100 Marks)

		Marks	CO	BL
Q1.	Explain about the general principles that we follow for software practices. Compare and contrast between linear process model and V model.	**10**	**1**	**1**
Q2.	What is the importance of component based software development in software engineering? How does it affect the software development process? Explain.	**10**	**2**	**1**
Q3.	Consider a biometrics-based attendance system for students. The students are supposed to register their attendance twice a day (check-in and check-out). The time gap between check-in and check-out must be 6 hours; else the student will be marked absent. Single check-in/check-out will also be marked absent. Draw the sequence diagram for the same.	**10**	**3**	**1**
Q4.	Explain the importance of cohesion and coupling in software design. How do you assess the software design quality? Mention about the guidelines to be followed.	**10**	**3**	**1**
Q5.	Which one is superior between black box testing and white box testing? Justify your answer. Explain boundary value analysis based black box testing with a suitable example.	**10**	**4**	**1**
Q6.	Consider the following program to calculate the cyclomatic complexity:	**10**	**5**	**1**

```
int main() {
  int num, originalNum, remainder, result = 0;
  printf("Enter a three-digit integer: ");
  scanf("%d", &num);
  originalNum = num;
  while (originalNum != 0) {
    remainder = originalNum % 10;
    result += remainder * remainder * remainder;
    originalNum /= 10;
  }
  if (result == num)
    printf("%d is an Armstrong number.", num);
  else
    printf("%d is not an Armstrong number.", num);
  return 0;
}
```

Q7.	A system has 12 external inputs, 24 external outputs, fields 30 different external queries, manages 4 internal logical files, and interfaces with 6 different legacy systems (6 EIFs). All these data are of average complexity (weight = 5) and the overall system is relatively simple. Compute FP for the system.	**10**	**6**	**1**
Q8.	Between function point and LOC, which one is a superior metrics for evaluation of process? Describe briefly about the attributes used for object-oriented metrics.	**10**	**6**	**1**

Q9. **A.** A project size of 200 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the effort, and development time requirement for the project. The values of the multiple factors are given in the table. **10** **4** **1**

Software Projects	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

B. In the project spectrum, THE PEOPLE have an important role to play to form teams. Describe about different types of team structure for successful execution of a project.

Q10. An organization is entrusted with the execution of a project, which is comprised of 45 planned tasks. The estimated efforts required is 480 man-days. Currently, 5 tasks have been successfully completed. Compute the SPI, schedule variance, percent scheduled for completion, and percent complete using earned value analysis. **10** **2** **1**

Task	Planned Effort	Actual Effort
1	10	11
2	12	12
3	11	15
4	10	10
5	10	10

Q11. Compare and contrast between software reengineering and reverse engineering. Elaborate about the software reengineering activities. **10** **5** **1**

Q12. Is it possible to assess the quality of software if the customer keeps changing what it is supposed to do? Can a program be correct and still not be reliable? Explain. **10** **6** **1**

*****End of Question Paper*****

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	Max Marks: **100**	Duration: **3 Hours**
Course Code: **CSE1005**	Course Title: **Software Engineering**	
Question Paper ID: **009855**	Exam Type: **CLOSED BOOK**	School: **SCOPE**
Date: **10/05/2024**	Slot: **A2+TA2**	Session: **AN**

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2. Reference tables permitted: No

Section - 1: Answer any 10 questions. (10 × 10 = 100 Marks)

		Marks	CO	BL
Q1.	Discuss the V-Model in software development, emphasizing its validation and verification processes. Explain why it is suited for certain types of projects and not others, and outline the primary advantages and disadvantages of using the V-Model.	**10**	**1**	**1**
Q2.	A small local bakery that currently uses paper and pen to track orders, inventory, and sales is planning to modernize its operations by implementing a digital system to manage orders, track inventory levels, and streamline the sales process. Discuss and apply the framework activities to guide the bakery owner through this transition. Identify the umbrella activities that will ensure the successful implementation of the new digital system.	**10**	**1**	**2**
Q3.	A software development team is tasked with creating a new social media platform. How would the requirement engineering process be applied in this context, and what specific steps would the team undertake to ensure the project's success?	**10**	**2**	**3**
Q4.	TechGear Online Store is planning to develop a basic e-commerce platform to sell electronic gadgets. The platform should allow customers to browse products, add items to their cart, and place orders. Additionally, administrators should be able to manage product listings, process orders, and generate sales reports. As the lead developer, outline a use case diagram and class diagram to visualize the fundamental functionalities and key classes of the system.	**10**	**2**	**4**

Q5.	Consider the below-given code segment and perform the following • Draw the Control Flow Graph • Find the Cyclomatic Complexity • Identify the independent paths	**10**	**3**	**5**

```
int num1, num2;
input num1, num2;
if (num1 > num2)
{
Print ("num1 is greater than num2");
}
else if (num1 < num2)
{
Print ("num2 is greater than num1");
}
else
{
Print ("num1 and num2 are equal");
}
```

Q6.	Consider an e-commerce platform that integrates various subsystems such as inventory management, payment processing, and order fulfillment. What are the common approaches to integration testing that the team could employ to ensure seamless communication across these interconnected components? Justify the need for drivers and stubs implementation with the necessary diagrams.	**10**	**3**	**6**
Q7.	Justify the need for software quality metrics and explain in detail the various metric computations.	**10**	**4**	**6**
Q8.	Consider yourself as a Project Manager in a software project in developing an Online Test portal for the interview process. Consider the following domain characteristics of the project and compute the Functional Point metrics assuming the adjustment factor to be complex for all the characteristics and the complexity adjustment factor to be average. External Inputs = 66 External Outputs=52 External Inquiries= 30 Internal Logical Files= 8 External Interface Files=5	**10**	**4**	**5**
Q9.	A semi-detached project of size of 600 KLOC is to be developed. The software development team has average experience on similar types of projects. The project schedule is not very tight. Calculate the effort, development time, and the number of persons required using basic and intermediate COCOMO models.	**10**	**5**	**4**
Q10.	Explain how Earned Value Management (EVM) can be used to control costs and measure project performance with a suitable example.	**10**	**5**	**4**
Q11.	Company XYZ identifies the need to implement the CMM to enhance its software development processes. Propose a roadmap outlining the steps necessary to reach CMM Level 5. Assess the potential challenges and benefits associated with each stage of maturity.	**10**	**6**	**3**
Q12.	Discuss the significance and steps involved in software re-engineering within the context of software maintenance. With a suitable diagram explain the process involved in the Business process reengineering model.	**10**	**6**	**4**

*****End of Question Paper*****

VIT-AP UNIVERSITY	Final Assessment Test – Winter 2023-24 Semester - May 2024	
	Max Marks: **100**	Duration: **3 Hours**
Course Code: **CSE1005**	Course Title: **Software Engineering**	
Question Paper ID: **009906**	Exam Type: **CLOSED BOOK**	School: **SCOPE**
Date: **11/05/2024**	Slot: **B1+TB1**	Session: **AN**

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General Instructions if any:

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2. Reference tables permitted: No

Section - 1: Answer any 10 questions. (10 × 10 = 100 Marks)

		Marks	CO	BL
Q1.	Outline the different software process activities in the generic software process framework and discuss how each activity contributes to successful software development. Include specific details on the roles of 'Communication', 'Planning', 'Modeling', 'Construction', and 'Deployment'.	**10**	**1**	**1**
Q2.	Compare and contrast the Incremental Model and the Spiral Model of software development. Include discussions on their process flows, advantages, and scenarios where each model might be best applied.	**10**	**1**	**2**
Q3.	Discuss the transformation process from the requirements model to the design model in software engineering. Explain how the data/class design, architectural design, and interface design elements evolve from the requirements model to ensure that the developed software aligns with user and system requirements.	**10**	**2**	**2**
Q4.	Explain how the use cases facilitate the requirements elicitation process. Discuss the role of actors, goals, and scenarios in shaping a use case and how these elements contribute to a comprehensive understanding of user requirements and system functionalities.	**10**	**2**	**2**
Q5.	Differentiate between verification and validation within the realm of software testing, elucidating how each is integrated into the software development lifecycle. Include examples to demonstrate their practical application.	**10**	**3**	**2**
Q6.	Suppose you have been assigned to develop a billing system software for a movie theater. The theater offers different types of tickets for moviegoers: Regular tickets and VIP tickets. Your task is to develop a billing system that calculates the total cost for the customers based on their selected tickets, additional services, and any applicable discounts or surcharges. The ticket pricing and calculation rules are as follows: 1. Regular Ticket: · Base Price: $10. · For 3D movies: Additional $2. · For IMAX movies: Additional $3. · For VIP seating: Additional $5. · Children under 12 years old get a 50% discount. 2. VIP Ticket: · Base Price: $20. · For 3D movies: Additional $3. · For IMAX movies: Additional $5. · VIP seating is included in the base price. · No discount for children under 12 years old. Perform the following white box testing steps for the given project. a) Draw the Control Flow Graph **(4M)** b) Find the Cyclomatic Complexity **(4M)** c) Identify the independent paths **(2M)**	**10**	**3**	**4**

Q7.	You have been tasked with leading a software project to develop a mobile application for managing personal finances. a) Provide UML class and sequence diagram for the above-mentioned scenario. **(2M)** b) Identify and discuss the domain characteristics (External Inputs, External Outputs, External Inquiries, Internal Logical Files, External Interface Files) **(4M)** c) Compute Functional Point metrics for this project. (Assume the adjustment factor to be average across all identified characteristics.) **(4M)**	**10**	**4**	**4**
Q8.	Using metrics for software quality, analyze how maintainability can be improved in a software system that currently has a high Mean-Time-To-Change (MTTC). Propose specific changes to the development process to reduce MTTC. Discuss the role of maintainability in software quality and suggest process improvements.	**10**	**4**	**3**
Q9.	Compare and contrast various software estimation techniques, such as empirical estimation models, decomposition techniques, and specialized estimation techniques for Agile and WebApp projects. How do these techniques ensure more accurate project planning and resource allocation?	**10**	**5**	**2**
Q10.	Examine the LOC-based estimation provided for the major software functions of a library management system: User Interface, Database Management, and Report Generation. Calculate the expected value (EV) for each function using the provided optimistic (S_{opt}), most likely (S_m), and pessimistic (S_{pess}) lines of code. Discuss how these estimates would inform the project planning and resource allocation. The provided estimates for lines of code are as follows: • S_{opt} LOC estimates: User Interface = 5000, Database Management = 7000, Report Generation = 6000 • S_m LOC estimates: User Interface = 7500, Database Management = 8000, Report Generation = 7000 • S_{pess} LOC estimates: User Interface = 10000, Database Management = 10000, Report Generation = 8000	**10**	**5**	**4**
Q11.	Evaluate how software quality management contributes to user satisfaction. Include a discussion on the dimensions of software quality and how these dimensions influence the compliance, quality, and delivery of software products within budget and schedule.	**10**	**6**	**3**
Q12.	Define the Capability Maturity Model and describe its five levels. Discuss how moving through these levels can help a software organization improve its processes and product quality.	**10**	**6**	**1**

*****End of Question Paper*****

VIT-AP UNIVERSITY	Final Assessment Test – Winter 2023-24 Semester - May 2024	
	Max Marks: **100**	Duration: **3 Hours**
Course Code: **CSE1005**	Course Title: **Software Engineering**	
Question Paper ID: **009845**	Exam Type: **CLOSED BOOK**	School: **SCOPE**
Date: **12/05/2024**	Slot: **B2+TB2**	Session: **FN**

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General Instructions if any:

1. "*fx* series" - non Programmable calculator is permitted: No
2. Reference tables permitted: No

	Section - 1: Answer any 10 questions. (10 × 10 = 100 Marks)	**Marks**	**CO**	**BL**
Q1.	a) List and explain various process framework activities in SDLC. b) Explain the about concept of layered engineering in software development	**10**	**1**	**1**
Q2.	Umbrella activities occur throughout the software process. Do you think they are applied evenly across the process, or are some concentrated in one or more framework activities?	**10**	**1**	**1**
Q3.	Prepare a SRS Document for the E-commerce website with the Purpose, Scope, Intended audience, Modules required etc.,	**10**	**2**	**3**
Q4.	Consider the process of ordering a pizza over the phone. Draw the use case diagram and also sketch the activity diagram representing each step of the process from the moment you pick up the phone to the point where you start eating the pizza. Include activities that others need to perform. Add exception handling to the activity diagram you developed. Consider at least two exceptions. (Ex: Delivery person wrote down wrong address, deliver person brings wrong pizza)	**10**	**2**	**3**
Q5.	Testing proceeds in an outward manner. It starts from testing the individual units, progresses to integrating these units, and finally, moves to system testing. Justify the statement. What are the test Strategies for Conventional Software? Explain with an example?	**10**	**3**	**2**
Q6.	Illustrate black-box and white-box testing each with one example. Write a program to check whether a number is prime or not? Draw the control flow graph and compute the cyclomatic complexity for the same	**10**	**3**	**3**
Q7.	The proposed software system has 42 user inputs, 64 user outputs, 18 inquiries, 10 internal logical files, 12 external interface files. Various processing complexity factors are: 3, 2, 1, 4, 4, 5, 3, 3, 2, 3, 4, 5, 4, 5. Assume that weighting factors are average for user inputs, internal files, complex for inquiries, simple for outputs, external interfaces. Compute the function point value assuming CAF as average. If the effort the proposed system is 37 person-months then find the productivity of the system	**10**	**4**	**1**
Q8.	a) A legacy software system has 900 modules. The latest release requires that 70 of these modules be changed. In addition, 45 new modules were added, and 10 old modules were removed. Compute the software maturity index for the system b) Differentiate between Product metrics and Process Metrics with examples?	**10**	**4**	**2**
Q9.	Suppose a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three model i.e., organic, semi-detached & embedded by using basic COCOMO Model?	**10**	**5**	**1**
Q10.	What are the four P's of effective project management? Which one of the 4Ps apply to implementation of new proprietary software? What are the basic principles of project scheduling?	**10**	**5**	**2**
Q11.	List and discuss in brief the McCall, Richards, and Walter proposed categorization of factors that affect software quality focusing on three important aspects of a software product with a neat sketch	**10**	**6**	**2**
Q12.	Despite the challenges involved, software maintenance projects require a detailed plan that prioritizes the various maintenance types. Based on your experience, can you share with us, what are the issues and challenges faced while performing software maintenance?	**10**	**6**	**2**

End of Question Paper

VIT-AP UNIVERSITY	Regular Arrear Examinations (2023-24) - July 2024	
	Maximum Marks: 100	Duration: 3 Hours
Course Code: CSE1005	Course Title: Software Engineering	
Set No: I	Exam Type : **Closed Book**	School: School of Computer Science & Engineering
Date: 07/08/2024	Slot: G	Session: FN
Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice		
General Instructions if any: 1. **"*fx* series" - non Programmable calculator are permitted : YES** 2. **Reference tables permitted : NO**		

PART – A: Answer any TEN Questions, Each Question Carries 10 Marks (10×10=100 Marks)

1. Describe the key characteristics and phases of the *spiral model.* Explain the advantages and disadvantages of the model using real-life scenarios. **(10 M)**
2. Imagine you are part of a software development team tasked with creating a new payroll system for a mid-sized company. The staff is well aware of the requirements. Additionally, each stage in the development process is sequential and driven by documentation. Identify which linear SDLC model is suitable for the project? Provide a proper illustration, and list the advantages and disadvantages of the identified model. **(10 M)**
3. How does the *Incremental Model* in SDLC enhance project flexibility and risk management compared to traditional development models? Provide examples of scenarios where this model is particularly advantageous. **(10 M)**
4. Suppose you have been appointed as the analyst for a large software development project. Discuss the aspects of the *Software Requirements Specification (SRS)* document of a project. **(10 M)**
5. Design a class diagram for an online food order system. Your diagram should include, but is not limited to, the following classes: *Customer*, *Order*, *Menu*, *Food-item*, *list of Restaurant*, and *Delivery boy*. For each class, define at least three attributes and two methods. Additionally, illustrate the relationships between these classes, specifying the multiplicity where appropriate. **(10 M)**
6. In a finance department taxation system of employees is designed as follows: An employee has £4000 of salary tax-free. The next £1500 is taxed at 10%. The next £28000 after that is taxed at 22%. Any further amount is taxed at 40%. Design the test suite using equivalent class partitioning and boundary value analysis. **(10 M)**
7. Explain the concept of cyclomatic complexity in white box testing. How is cyclomatic complexity calculated, and why is it an important metric for software testing? **(10 M)**
8. Compute the function point value of a company with following information details:
   a. Number of user input: 25
   b. Number of user output: 20

c. Number of user inquiries: 31.
d. Number of files: 5
e. Number of external interfaces: 6

Assume the all value adjustment factor takes complex values. **(10 M)**

9. Consider an embedded software project of size 250 KLOC, then calculate the effort, schedule time and staff size of the project using the basic COCOMO model. **(10 M)**

10. Let us imagine a wind power plant scenario. The project is set to be completed in 10 months with an estimated cost of Rs. 500,000. The project manager visited the project-site after 5 months and found that the team has spent Rs. 220,000 and completed an amount of work worth Rs. 255,000. Find PV, AC, EV, SV, CV from the scenario. **(10 M)**

11. Identify and explain at least five key *software quality factors* as defined by McCall's quality model. For each factor, provide an example of how it can be measured or assessed in a real-world software development project. **(10 M)**

12. What role does *reverse engineering* play in the software development process? Explain with proper justification. **(10 M)**

NUMBER OF QP MAPPING

Q. No.	E/A/T	Module Number	Marks	BL	CO Mapped	PO Mapped	PEO Mapped	PSO Mapped
Q1	E	1	10		1	1, 2, 3	1, 4	1
Q2	A	1	10		1	1, 2, 3	1, 4	1
Q3	E	1	10		1	1, 2, 3	1, 4	1
Q4	E	2	10		2	1,2,3,8,9	1, 2	1
Q5	A	2	10		2	1,2,3, 8,9	1, 2	1
Q6	A	3	10		3	1, 5, 11	1, 3	1
Q7	E	3	10		3	1, 5, 11	1, 3	1
Q8	A	4	10		4	1, 5, 11	4	1
Q9	E	5	10		4	1,2, 4, 6, 8, 10, 11	4	1
Q10	A	5	10		4	1,2, 4, 6, 8, 10, 11	4	1
Q11	A	6	10		5	4, 9,10, 11	4	1
Q12	E	6	10		5	4, 9, 10, 11	4	1