Question Bank - 1

SOFTWARE ENGINEERING KNOWLEDGE, SDLC

1. Define the following terms: (i) Software (ii) Software Engineering (iii) SDLC (iv) Categories of S/W applications.

2. Suggest four reasons why the productivity rate of programmers working as a pair might be more than half that of two programmers working individually.

3. Explain Measures, Metrics and Indicators in terms of Software Engineering.

4. Software Engineering is a layered technology. Explain.

5. Explain, with examples, why different application types require specialized software engineering techniques to support their design and development.

6. Discuss six key problems and challenges that software engineering is facing in the current century.

7. Compare and contrast Hardware and Software (characteristics) in terms of their properties. Also, draw the failure curve for both.

8. Discuss the following terms: People, Process and Product in context of Software Management.

9. Discuss the ways of measuring software process and product.

10. Discuss 4 Ps under Management Spectrum of Software Engineering.

11. What is the most important difference between generic software product development and custom software development? What might this mean in practice for users of generic software products?

12. Differentiate between Software Re-engineering and Reverse Engineering.

13. Explain the generic layered architecture. Also draw a client – server architecture for a film library.

14. Write four important attributes that all professional software should have? Suggest four other attributes that may sometimes be significant.

15. Discuss CASE (Computer-Aided Software Engineering).

16. Explain the importance of Risk Analysis in SE process.

17. List utilization of COTS components (Commercial Off The Shelf components) in SE.

18. Discuss myths of customer, practitioner and management.

19. Why function points are preferred over line-of-codes metrics?

20. Compare size and function oriented metrics.

21. Discuss the most important factors in determining which software engineering methods and techniques are to be used for the applications that are being developed.

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22. Discuss four software engineering fundamentals that apply to all types of software system.

23. Given the following values, compute function point when all complexity adjustment values (3 on scale of 5) and weighting factors are average.

External (User) Input (EI) = 50, External (User) Outputs (EO) = 40, User Inquiries (EQ) = 35, User (Internal Logic) Files (ILF) = 6, External Logic Files / Interface (ELF) = 4. The complexity adjustment values of Fi (1-14) is 3 on scale for each question. **(Answer = 672 FP)**.

24. 19. Given the following values, compute function point when weighting factors are average.

External (User) Input (EI) = 50, External (User) Outputs (EO) = 40, User Inquiries (EQ) = 35, User (Internal Logic) Files (ILF) = 6, External Logic Files / Interface (ELF) = 4. The complexity adjustment values of Fi (1-14) = > [2, 0, 5, 5, 2, 4, 3, 5, 4, 5, 4, 3, 4, 5]. **(Answer = 729 FP)**

PROCESS MODELS

1. 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:

• A system to control anti-lock braking in a car

• A virtual reality system to support software maintenance

• A university accounting system that replaces an existing system

• An interactive travel planning system that helps users plan journeys with the lowest environmental impact

2. Explain the SDLC model which follows iterative nature of prototyping along with controlled and systematic approach of Linear Sequential model.

3. What are the fundamental differences between components as program elements and components as services?

4. Elaborate Rational Unified Process (RUP) on the basis of: **a.** Phases **b.** Workflows **c**. Benefits

5. Describe phases of Evolutionary Spiral Model.

6. Explain how the principles underlying agile methods lead to the accelerated development and deployment of software.

7. When would you recommend against the use of an agile method for developing a software system?

8. Write short notes on: a. Agile method, b. Extreme Programming

9. When to use and not use waterfall model.

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10. Compare / Discuss the advantages and disadvantages of following process models: Waterfall, Prototype, Incremental, RAD, Spiral, Component Assembly model, and Agile.

11. Discuss good practices in RUP.

12. "The RUP is not a suitable process for all types of development but it does represent a new generation of generic processes." Explain.

13. Discuss the classification of Process Models.

REQUIREMENT ENGINEERING

1. Explain Requirement Engineering.

2. List the differences between Functional and Non-functional requirements. Give example of each in context of the railway ticket-issuing system.

3. Explain, with examples, system or software requirement specification (SRS).

4. Discuss the important components of SRS.

5. Discuss the following in brief: a. Functional and Non-functional requirements of Software. b. Elicitation Techniques

6. Discuss four types of Requirement Elicitation Techniques. Give example of each.

7. "The system shall ensure that data is protected from unauthorized access". Justify it as non-functional requirement.

8. Give example of non-functional requirements in ticket-generation system.

9. Explain the Requirement Engineering phases (analysis and specification etc.)

10. Discuss the importance of Requirement analysis and specification.

11. Distinguish between Functional and Non-functional requirements.

12. Discuss the role of business analyst.

13. List and discuss various software requirement elicitation techniques.

14. Discuss the "requirement analysis and specification" and validation.

15. Demonstrate the Requirement analysis phase with use-case modelling.

SOFTWARE MODELLING

1. Write briefly about role and objective of Analysis Modelling in Object Oriented Software Development. Also, list various Diagram types in UML.

2. Differentiate between structural and behavioural UML diagrams. Also, present at least three examples of each diagram types.

3. Draw the following diagrams: (make reasonable assumptions about the functionality that is required here.)

a. Use case diagram involving the role of 'medical receptionist'.

b. Sequence diagram for View User (Patient) information

4. Draw a Use-Case diagram of Document Management System (DMS) by considering the following points:

a. Users: Site user and Web-master.

b. use both include and extend directive.

5. Draw the following diagrams: (make reasonable assumptions about the functionality that is required here.)

i. Use case diagram for 'ATM machine'.

ii. Sequence diagram for Ordering a Pizza through web-application.

6. Draw the Use-Case diagrams for web based Document Management System (DMS).

7. Based on your knowledge of how an OTT platform is used, develop a set of use-cases that could serve as a basis for understanding the requirements for an OTT platform.

8. Explain Data Modeling.

9. Draw Level – 1 Data Flow Diagram (DFD) for cab booking mobile application.

10. Draw Level – 1 Data Flow Diagram (DFD) for Food ordering mobile application.

11. Draw Level – 1 Data Flow Diagram (DFD) for Railway Company's Customer Service (CS) System. Make suitable assumptions of functionalities performed by CS system.

12. Draw Level – 1 Data Flow Diagram (DFD) for Booking a Hotel Room. Make suitable assumptions of functionalities.

13. Draw Level – 1 Data Flow Diagram (DFD) for Movie Rental system. Make suitable assumptions of functionalities.

14. Draw the Zero-level and One-level Data Flow Diagram (DFD) for Movie / Video Subscription on Website (Online Application).

15. Explain Behavioural Modeling.

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16. Develop a sequence diagram showing the interactions involved when a student registers for a course in a university. Also, courses have limited enrolment available.

17. Discuss the elements of Analysis Model. (*Hint*: Scenario, Data, Behavioural, Class)

18. Explain Dynamic Modeling.

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