SOFTWARE ENGINEERING – 1MARK

2019

(a) Define the term software reliability.

Software Reliability refers to the probability of a software system functioning correctly under specified conditions for a given period. It is a measure of how consistently a software application performs its intended functions without failure.

(b) Write down some advantages of the waterfall model.

Advantages of the Waterfall Model:

- **Simplicity and Ease of Use**: The linear approach is straightforward and easy to understand.
- **Structured Approach**: Clear phases help in organizing and managing the project efficiently.
- **Effective for Small Projects**: Works well for smaller projects where requirements are well understood from the beginning.
- **Documentation**: Strong emphasis on documentation at each stage enhances clarity and maintainability.

(c) State various components of a software.

Various Components of Software:

- **User Interface**: The means by which users interact with the software.
- **Database**: Where data is stored, managed, and retrieved.
- **Business Logic**: The rules and algorithms that determine how data is processed.
- **Application Programming Interface (API)**: Interfaces that allow different software components to communicate.
- **Security Features**: Mechanisms that ensure data protection and user privacy.

(d) Differentiate between verification and validation.

Verification vs. Validation:

- **Verification**: The process of ensuring that the software meets specified requirements and is being built correctly. It answers the question, "Are we building the product right?"
- **Validation**: The process of ensuring that the software fulfills its intended use and meets the needs of the end-users. It answers the question, "Are we building the right product?"

(e) What is process framework?

Process Framework refers to a structured set of processes that provide guidance and best practices for managing and executing software development projects. It typically includes phases, activities, tasks, and roles necessary to deliver high-quality products systematically.

(f) Define software measurement.

Software Measurement is the quantitative assessment of software characteristics or attributes. It includes measuring aspects like size, complexity, performance, quality, and productivity to enable better management, improved performance, and informed decision-making.

(g) What is a data dictionary?

Data Dictionary is a centralized repository that contains definitions and descriptions of the data elements used in a database or software application. It includes details such as data types, formats, relationships, and usage to ensure consistency and understanding among stakeholders.

(h) What is software prototyping?

Software Prototyping is the process of creating early samples or models of the software application to demonstrate its functionality and user interface. Prototypes can range from low-fidelity wireframes to high-fidelity interactive models, allowing stakeholders to refine requirements and identify potential issues before full-scale development.

2021

A) What is Software Engineering?

- **Definition**: A discipline that involves the application of engineering principles to software development.
- **Key Aspects**:
    - Requirements analysis
    - Design
    - Implementation
    - Testing
    - Maintenance

B) What is DFD?

- **Full Form**: Data Flow Diagram
- **Purpose**: Visual representation of data flow within a system.
- **Components**:
    - Processes
    - Data stores
    - External entities
    - Data flows

C) What is the Full Form of SDLC?

- **SDLC**: Software Development Life Cycle
- **Phases**:
    - Planning
    - Analysis
    - Design
    - Implementation
    - Testing
    - Deployment
    - Maintenance

D) What is Computer Software?

- **Definition**: A collection of programs and related data that instructs a computer on how to perform tasks.
- **Types**:
    - System software (e.g., operating systems)
    - Application software (e.g., productivity applications)

E) What are Function Points?

- **Definition**: A standardized unit of measurement that quantifies the functionality delivered by a software application.
- **Use**: Helps in estimating the size, complexity, and delivery of software.

F) What is SRS?

- **Full Form**: Software Requirements Specification
- **Purpose**: A document that outlines all expected functionalities, features, and constraints of a software system.

G) Define CFG.

- **Full Form**: Context-Free Grammar
- **Definition**: A set of recursive rules used to generate patterns of strings in a formal language.

H) Write Down One Disadvantage of the Spiral Model.

- **Disadvantage**: Can be complex and costly to manage due to its iterative nature, leading to potential challenges in planning and predicting project costs and timelines.

2022

a) Full Form of COCOMO

- **COCOMO**: Constructive Cost Model

b) Difference Between Computer Program and Computer Software

- **Computer Program**:
    - A specific set of instructions written to perform a task.
    - Typically refers to a single application or script.
- **Computer Software**:
    - A broader term that encompasses all types of programs, libraries, and systems that facilitate computer operations.
    - Includes applications, operating systems, and utilities.

c) Finding the Size of a Software Product

- **Methods**:
    - **Lines of Code (LOC)**: Counting the number of lines in the program.
    - **Function Points**: Assessing the functional requirements based on inputs, outputs, and user interactions.
    - **Use Case Points**: Evaluating the complexity and number of use cases.

d) Modular Cohesion

- **Definition**:
    - A measure of how closely related and focused the responsibilities of a single module are.
    - Higher modular cohesion indicates a well-structured module, where all components contribute to a single task or purpose.

e) Software Scope

- **Definition**:
    - Refers to the boundaries of a software product, including the range of functions, features, and limitations.
    - Defines what is included in the project and what is excluded, guiding the development process.

f) Names of Two Project Management Tools

- **Examples**:
    - **Trello**
    - **Asana**

g) Modularization

- **Definition**:
    - The process of dividing a software system into small, manageable, and interchangeable components (modules).
    - Aids in simplifying development, maintenance, and understanding of the software.

h) CASE Tools

- **Definition**:
    - Computer-Aided Software Engineering tools that help in software development processes.
    - Includes tools for automated code generation, design modeling, testing, and project management.

2023

a) What is software engineering?

- Software engineering is the application of engineering principles to software development in a methodical way. It involves the use of systematic methods, tools, and techniques to create software that meets requirements.

b) What is the full form of CMMI?

- Capability Maturity Model Integration.

c) Write down one advantage of the waterfall model.

- One advantage of the waterfall model is its straightforwardness and clarity, making it easy to understand and manage since each phase has specific deliverables.

d) What is computer software?

- Computer software is a collection of data or computer instructions that tell the computer how to work. It can be categorized into system software, application software, and middleware.

e) What are function points?

- Function points are a standardized unit of measure that quantifies the functional requirements of software based on the business functions it delivers to users.

f) What is SRS?

- SRS stands for Software Requirements Specification, a document that describes the intended purpose and environment for software under development.

g) Define ERD.

- ERD stands for Entity-Relationship Diagram, which visually represents the relationships between entities in a database, illustrating the structure of the data.

h) What is the full form of SDLC?

- Software Development Life Cycle.

2023-24

a) What do you mean by software engineering?

- **Definition**: Software engineering is a systematic approach to the development, operation, maintenance, and retirement of software. It involves applying engineering principles to software creation, emphasizing processes, methods, and project management.

b) Define SDLC.

- **SDLC (Software Development Life Cycle)**: A framework defining the stages of software development, including:
    - **Requirement Analysis**
    - **Design**
    - **Implementation**
    - **Testing**
    - **Deployment**
    - **Maintenance**

c) What is a Function Point?

- **Definition**: Function points are a standardized unit of measurement that quantifies the functionality of software based on the requirements and the user's perspective. They help in estimating development effort and productivity.

d) What is Programming?

- **Definition**: Programming is the process of creating a set of instructions that a computer follows to perform specific tasks. It involves writing code in various programming languages, such as Python, Java, C++, etc.

e) Define SRS.

- **SRS (Software Requirements Specification)**: A document that describes the intended behavior of a software system. It details functional and non-functional requirements, providing a blueprint for development.

f) Define Waterfall model.

- **Waterfall Model**: A sequential software development process where progress flows in one direction — resembling a waterfall. Key phases include:
    - Requirement Analysis
    - System Design
    - Implementation
    - Verification (Testing)
    - Maintenance

g) Define COCOMO model.

- **COCOMO (Constructive Cost Model)**: An algorithmic software estimation model used to predict the cost, effort, and schedule associated with software development. It considers project size, complexity, and team capability.

h) What is DFD?

- **DFD (Data Flow Diagram)**: A graphical representation used to visualize the flow of information within a system. It shows how data moves between processes, data stores, and external entities, helping in system analysis and design.

INTERNAL 2023-24

1. **Important Features of Software**
    a. Software should be reliable, efficient, and maintainable.
    b. User-friendly interface and performance issues are vital.
    c. It must be adaptable and scalable.

2. **Technical Feasibility**
    a. It assesses whether a project can be developed with the available technology and resources.
    b. Involves evaluating hardware, software, and operational requirements.

3. **Limitations of Classical Waterfall Model**
    a. Rigid structure; difficult to accommodate changes once a phase is completed.
    b. Poor for projects where requirements are unclear or evolve.
    c. Late testing may lead to discovering fundamental issues too late.

4. **Software Metric**
    a. A standard of measurement used to quantify various properties of software products.
    b. Metrics could include lines of code, function points, complexity measures, etc.

5. **Thrown-Away Prototyping**
    a. A development approach where a prototype is built, used to gather feedback, and then discarded.
    b. Helps refine requirements before building the actual product.

6. **Coupling**
    a. A measure of how closely connected different modules or components of a software system are.
    b. Low coupling is desirable for better maintainability and flexibility.

7. **Functional Independence**
    a. The degree to which a module performs a single task without relying on other modules.
    b. Enhances module reusability, maintainability, and reduces the complexity of interactions.