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**COURSE CODE: COM 324**

**COURSE TITLE: INTRODUCTION TO SOFTWARE ENGINEERING**

**PRACTICAL ASSIGNMENTS.**

**1. What is software Engineering?**

**Software Engineering** is the systematic application of engineering approaches to the development of software.It involves the design, development, maintenance, testing, and evaluation of software systems to ensure they are reliable, efficient, maintainable, and meet the requirements of users.The field applies engineering principles to software development to produce high-quality software in a cost-effective manner.

**2. List the needs for Software engineering**

**i) Handling complexity:** Software systems are becoming increasingly complex, requiring structured methods to manage this complexity.

**ii) Quality assurance:** Ensures the development of reliable, maintainable, and efficient software.

**iii) Efficient resource management:** Helps in the effective use of time, budget, and human resources.

**iv) Meeting user requirements:** Ensures that the software meets the needs and expectations of its users.

**v) Adaptability:** Helps in adapting to new technologies and changing requirements over time.

**3. Explain the 5 Major steps in a software development life cyclei) Requirements Analysis:** Gathering and analyzing the needs and requirements of the stakeholders.

**ii) Design:** Creating the architecture and design specifications for the software based on the requirements.

**iii) Implementation (Coding):** Writing the code for the software based on the design.

**iv) Testing:** Verifying that the software meets the requirements and identifying any defects.

**v) Maintenance:** Updating and modifying the software after deployment to correct faults, improve performance, or adapt to a changing environment.

**4. List 5 tools needed at each step in question 3.**

**Requirements Analysis:**

JIRA, Confluence, IBM Rational DOORS, Microsoft Visio, Trello.

**Design:**

Lucidchart, Enterprise Architect, Visual Paradigm, UMLet, Balsamiq.

**Implementation (Coding):**

GitHub, Visual Studio Code, IntelliJ IDEA, Eclipse, Bitbucket.

**Testing:**

Selenium, JUnit, TestRail, Postman, QTest.

**Maintenance:**

Jenkins, Nagios, New Relic, ServiceNow, Splunk.

**5. List 5 Software development methodologies**

Agile, Waterfall, Scrum, DevOps, Lean.**6. Draw and explain the Waterfall Model, V model and Spiral Model**

**7. Explain Functional and Non-Functional requirements of a software, give examples**

**Functional Requirements:** These are specific behaviors or functions the software must perform. They define the tasks that the system is supposed to accomplish. Examples include user authentication, data processing, and report generation.

**Non-Functional Requirements:** These define how the system performs a function, including performance, security, usability, and reliability. Examples include system response time, data encryption, and user interface design.

**8. Explain 3 types of Software testing**

**Unit Testing:** Testing individual components or modules of a software to ensure they work as expected. It’s often done by developers during the coding phase.

**Integration Testing:** Testing the interaction between different modules or services to ensure they work together correctly.

**System Testing:** Testing the complete and integrated software to evaluate the system's compliance with its specified requirements.

**9. What is a software CASE tool?**

**CASE (Computer-Aided Software Engineering) tools** are software applications that provide a framework for software development and are used to support software analysis, design, coding, testing, and maintenance. These tools help automate various activities in the software development process, improving productivity and ensuring quality.

**10. Mention 5 types of software CASE tools**

**i) Requirement Management Tools** (e.g., IBM Rational DOORS)

**ii) Design Tools** (e.g., Enterprise Architect)

**iii) Code Generation Tools** (e.g., CodeSmith)

**iv) Testing Tools** (e.g., Selenium)

**v) Project Management Tools** (e.g., JIRA)