

Week 1 Assignment

1. **Software Engineering -**

This is a branch of computer science that deals with the design, development, testing, and maintenance of software applications.

2. What is software engineering, and how does it differ from traditional programming? Software Development Life Cycle (SDLC):

In Software engineering process, most effort goes into building new designs and features. Whereas in SDLC development may be a less structured process that involves writing, testing and deploying the software.

3. Explain the various phases of the Software Development Life Cycle. Provide a brief description of each phase. Agile vs. Waterfall Models:

According to [AWS](#) these are the different stages of life cycle

Plan

* This phase includes tasks like cost benefit analysis and resource estimation.

Design

* Software engineers analyze requirements and identify the best solutions to the software

Implement

* The development team codes the product. They analyze the requirements to identify smaller coding tasks.

Deploy

* When teams develop software, the code and test on a different copy of the software than the one they have access to.

Maintain

* In this phase, among other tasks, the team fixes bugs, resolves customer issues and manages the software

4. Compare and contrast the Agile and Waterfall models of software development. What are the key differences, and in what scenarios might each be preferred?

[Agile Model](#) This development approach is based on iterative development. It breaks tasks into smaller iterations, does not directly involve long term planning.

[Waterfall Model](#) This model has five phases: Requirements analysis and specification, design, implementation, and unit testing, integration and system testing, and operation and maintenance. The steps always follow in this order and do not overlap

5. What is requirements engineering? Describe the process and its importance in the software development lifecycle. Requirements Engineering (RE) is a critical phase in the software development lifecycle (SDLC) that involves identifying, documenting, analyzing, and managing the requirements of a software system.

Process of Requirements Engineering

- **Elicitation:**

Gathering requirements from stakeholders through various techniques such as interviews, surveys, workshops, brainstorming sessions, and observation.

Understanding the problem domain and the needs of the users.

- **Analysis:**
Examining the gathered requirements to understand their feasibility, clarity, completeness, and consistency.
- **Specification:**
Documenting the requirements in a clear, detailed, and unambiguous manner.
Creating various types of requirement documents such as Software Requirements Specification (SRS), user stories, use cases, and functional specifications.
- **Validation:**
Ensuring that the documented requirements accurately reflect the needs and expectations of the stakeholders.
Conducting reviews, inspections, and walkthroughs with stakeholders to confirm the requirements are correctly captured and understood.
- **Management:**
Continuously managing and maintaining the requirements throughout the project lifecycle.
Handling changes to requirements through a structured change control process to ensure any modifications are well-documented and communicated.

6. Explain the concept of modularity in software design. How does it improve maintainability and scalability of software systems?

Modularity refers to the design principle that breaks down a software system into smaller, manageable, and independent components or modules. Each module encapsulates a specific functionality and can be developed, tested, and maintained independently.