**What is SDLC?**

SDLC (Software Development Life Cycle) is a process used by software industry professionals to design, develop, and test high-quality software. It consists of a series of planned activities to ensure software meets customer requirements and is delivered on time.

**Key Phases of SDLC:**

* Requirement Analysis: Gather and analyse business and technical requirements.
* Planning: Define project scope, resources, timelines, and budget.
* Design: Create software architecture, design documents, and UI/UX design.
* Implementation (Coding): Actual coding of the software according to design specifications.
* Testing: Verify the **software** for defects and ensure it meets the requirements.
* Deployment: Release the software to production.
* Maintenance: Perform ongoing maintenance, updates, and bug fixes.

**Types of SDLC Methods**

1. **Waterfall Model:**

Description: Linear and sequential approach.

Steps: Each phase must be completed before moving to the next.

Use Case: Projects with well-defined requirements.

1. **Iterative Model:**

Description: Develops software in iterations (small segments).

Steps: Each iteration is a mini-project involving requirements, design, coding, and testing.

Use Case: Large projects where requirements are expected to evolve.

1. **Spiral Model:**

Description: Combines iterative and Waterfall models, focusing on risk assessment.

Steps: Each cycle involves planning, risk analysis, engineering, and evaluation.

Use Case: High-risk projects with complex requirements.

1. **V-Model** (Validation and Verification):

Description: An extension of the Waterfall model with a focus on testing.

Steps: Each development stage is directly associated with a testing phase.

Use Case: Projects requiring high reliability.

1. **Agile Model:**

Description: Emphasizes flexibility, customer collaboration, and iterative development.

Steps: Work is divided into small increments with minimal planning.

Use Case: Projects needing frequent updates and customer feedback.

**What is Agile Methodology?**

Agile Methodology is an iterative approach to software development that emphasizes flexibility, collaboration, and customer satisfaction.

**Key Principles:**

1. Customer Collaboration: Continuous interaction with customers to gather feedback.
2. Iterative Development: Develop in small, incremental cycles.
3. Flexibility: Adapt to changes even late in the project.
4. Cross-functional Teams: Teams include members from all necessary disciplines.
5. Continuous Improvement: Regular reflection and adjustment of processes.

**What is SCRUM Methodology?**

SCRUM Methodology is a subset of Agile, focused on delivering the highest value in the shortest time through iterative and incremental practices.

1. **Roles**:

Product Owner: Defines and prioritizes product backlog items.

Scrum Master: Facilitates the process and removes impediments.

Development Team: Cross-functional team members who do the actual work.

1. **Events**:

Sprint: Time-boxed iteration (usually 2-4 weeks) where work is completed.

Sprint Planning: Define what will be done in the upcoming sprint.

Daily Stand-up (Daily Scrum): Short daily meeting to synchronize activities.

Sprint Review: Demonstrate completed work and gather feedback.

Sprint Retrospective: Reflect on the sprint and identify improvements.

1. **Artifacts**:

Product Backlog: List of all desired work on the project.

Sprint Backlog: List of tasks to be completed during the current sprint.

Increment: The working product delivered at the end of a sprint.

