SYSTEM ANALYSIS AND DESIGN

SE103.3

1. **What are the challenges and considerations when selecting and implementing a specific software development methodology for a project?**
    - Project Requirements:
        - Consider the specific requirements of the project, such as its size, complexity, and scope.
    - Team Size and Composition:
        - The development team's size and composition can impact the methodology choice.
    - Project Flexibility:
        - Determine the level of flexibility required for the project. Agile methodologies are known for their adaptability to changing requirements and frequent feedback loops.
    - Time Constraints:
        - Consider the project timeline and deadlines. Some methodologies emphasize iterative and rapid development, which can be beneficial when time is critical.
    - Team Experience and Skills:
        - Evaluate the expertise and skill set of the development team. Some methodologies may require a certain level of familiarity or specific skills to be effectively implemented. Consider the team's experience and whether additional training or support may be necessary.
    - Documentation and Governance:
        - Determine the project's documentation and governance requirements. Some methodologies, such as Waterfall, emphasize comprehensive documentation, while others focus more on minimal documentation and working software.

2. **What is Agile methodology and what are its key principles and values?**

    - Agile methodology is an iterative and incremental approach to software development that emphasizes flexibility, collaboration, and adaptability. It aims to deliver high-quality software quickly and continuously respond to changing requirements throughout the development process.

Principles of Agile Methodology:

1. Customer Satisfaction: The highest priority is to satisfy the customer through the continuous delivery of valuable software.

2. Iterative and Incremental Development: The development process is divided into small iterations or time boxes, where each iteration results in a working increment of the software.

3. Embracing Change: Agile recognizes that requirements are likely to change and welcomes change throughout the project. It emphasizes flexibility in adapting to changing needs.

4. Collaboration: Active collaboration and communication among team members, stakeholders, and customers are crucial to the success of an Agile project. Regular feedback and interactions promote transparency and alignment.

5. Self-organizing Teams: Agile teams are empowered and self-organizing, allowing them to make decisions and adapt to changing circumstances. Team members collaborate and take collective ownership of the project.

6. Timeboxing: Fixed time frames, often called sprints, are used to structure the work. This promotes a regular and sustainable pace of development, ensuring continuous progress.

Values of Agile Methodology:

1. Individuals and Interactions over Processes and Tools
2. Working Software over Comprehensive Documentation
3. Customer Collaboration over Contract Negotiation
4. Responding to Change over Following a Plan

3. How does Agile different from traditional waterfall methodology?

- In the waterfall methodology, the development process is linear and sequential, with defined phases that are executed in a strict order. In Agile is iterative and incremental, with work divided into shorter iterations or sprints, where each iteration results in a potentially shippable product increment.

- Waterfall methodology typically relies on a comprehensive upfront analysis and documentation of requirements. Changes to requirements are often difficult and costly to accommodate once the development process has progressed. Agile, welcomes changing requirements and promotes continuous collaboration with stakeholders and customers, allowing for frequent feedback and adaptability.

- Waterfall methodology is less flexible, as the entire project is planned and executed as a whole. Changes or adjustments to requirements, scope, or design are typically challenging to accommodate. Agile methodology, with its emphasis on adaptability, allows for flexibility and encourages incremental development and frequent iterations, enabling changes to be incorporated easily.

- Waterfall methodology emphasizes extensive documentation, with comprehensive requirements, design documents, and specifications created upfront. Agile methodology focuses on producing working software over comprehensive documentation. While Agile still encourages necessary documentation, it prioritizes lightweight and just-in-time documentation.