Assignment 3

Research and compare SDLC models suitable for engineering projects. Present findings on Waterfall, Agile, Spiral, and V-Model approaches, emphasizing their advantages, disadvantages, and applicability in different engineering contexts.

Waterfall Model:

Advantages:

- Sequential approach makes it easy to understand and manage.
- Well-suited for projects with clear and stable requirements.
- Each phase has specific deliverables, making progress measurable.
- Documentation is thorough and created at each stage.

Disadvantages:

- Lack of flexibility, difficult to accommodate changes once a phase is completed.
- Testing occurs late in the process, which can lead to higher costs if errors are found.
- Client feedback is typically not incorporated until the later stages.

Applicability:

Best suited for projects with well-defined requirements where changes are unlikely or costly, such as certain infrastructure projects or regulatory compliance initiatives.

Agile Model:

Advantages:

- Highly flexible and responsive to changes.
- Frequent iterations allow for regular feedback and adjustments.
- Prioritizes working software over comprehensive documentation.
- Encourages collaboration and teamwork.

Disadvantages:

- Requires active involvement and commitment from stakeholders throughout the project.
- May be challenging to implement in large-scale projects with strict regulatory requirements.
- Continuous changes can lead to scope creep if not managed effectively.

Applicability:

Ideal for projects with evolving requirements or where rapid development and deployment are crucial, such as software development or product prototyping.

Spiral Model:

Advantages:

- Incorporates risk management at each phase, reducing the likelihood of project failure.
- Allows for iterative development and refinement.
- Flexibility to adjust requirements and features as the project progresses.
- Suitable for projects with high levels of uncertainty or complexity.

Disadvantages:

- Can be time-consuming and costly due to its iterative nature.
- Requires skilled personnel to effectively identify and manage risks.
- Documentation may be less comprehensive compared to the Waterfall model.

Applicability:

Well-suited for large-scale projects with changing requirements or where early risk identification is critical, such as system development for aerospace or defence industries.

V-Model:

Advantages:

- Emphasizes testing and validation throughout the development lifecycle.
- Each stage has a corresponding testing phase, ensuring quality at each step.
- Helps in early detection and resolution of defects.
- Provides a structured approach with clear deliverables.

Disadvantages:

- Can be rigid and less adaptable to changes.
- May require extensive documentation and testing resources.
- Testing activities may become time-consuming, especially in complex projects.

Applicability:

Suitable for projects with strict regulatory compliance requirements or where thorough testing is essential, such as medical device development or safety-critical systems engineering.