

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.

Here's a breakdown of each SDLC model:

Waterfall Model:

Advantages:

Sequential approach makes it easy to understand and manage.

Well-suited for projects with stable requirements and a clear understanding of the end product.

Each phase has specific deliverables, making it easier to measure progress.

Disadvantages:

Lack of flexibility; difficult to accommodate changes once a phase is completed.

Testing occurs only after development is complete, which can lead to issues being discovered late in the process.

Client involvement mainly at the beginning and end of the project.

Applicability:

Ideal for projects where requirements are well-understood, and the technology being used is well-established. Suitable for critical systems with minimal changes expected during development.

Agile Model:

Advantages:

Highly flexible and adaptive to changes in requirements.

Continuous delivery of working software, allowing for early and frequent feedback.

Close collaboration between developers and clients throughout the project.

Disadvantages:

Requires active involvement and commitment from stakeholders throughout the project.

Lack of emphasis on documentation may lead to difficulties in maintaining project

knowledge.

Not suitable for projects with fixed scope and strict deadlines.

Applicability:

Well-suited for projects with evolving requirements, where frequent deliveries and adaptability are crucial. Often used in software development, especially for startups and projects where innovation and responsiveness are key.

Spiral Model:

Advantages:

Incorporates iterative development with risk management, allowing for early identification and mitigation of risks.

Flexibility to accommodate changes during the development process.

Emphasizes prototyping, which can help in gathering early feedback from stakeholders.

Disadvantages:

Can be complex and time-consuming due to the iterative nature and risk analysis involved.

Requires significant expertise in risk assessment and management.

May not be suitable for small projects with limited resources.

Applicability:

Ideal for projects where risk management is crucial, and requirements are not fully understood upfront. Often used in large-scale projects with high levels of uncertainty, such as complex software systems or projects involving cutting-edge technology.

V-Model:

Advantages:

Each phase of development has a corresponding testing phase, ensuring thorough validation of each stage.

Emphasizes verification and validation throughout the development lifecycle.

Well-defined deliverables and milestones.

Disadvantages:

Can be rigid and inflexible, making it challenging to accommodate changes once the development process has begun.

Testing activities may become bottlenecked towards the end of the project.
Requires extensive documentation and planning upfront.

Applicability:

Suitable for projects with clearly defined requirements and where thorough testing is essential, such as safety-critical systems or projects with regulatory compliance requirements.

In summary, the choice of SDLC model depends on factors such as project size, complexity, level of uncertainty, and client/stakeholder involvement. Each model has its own strengths and weaknesses, and selecting the most appropriate one requires careful consideration of these factors.