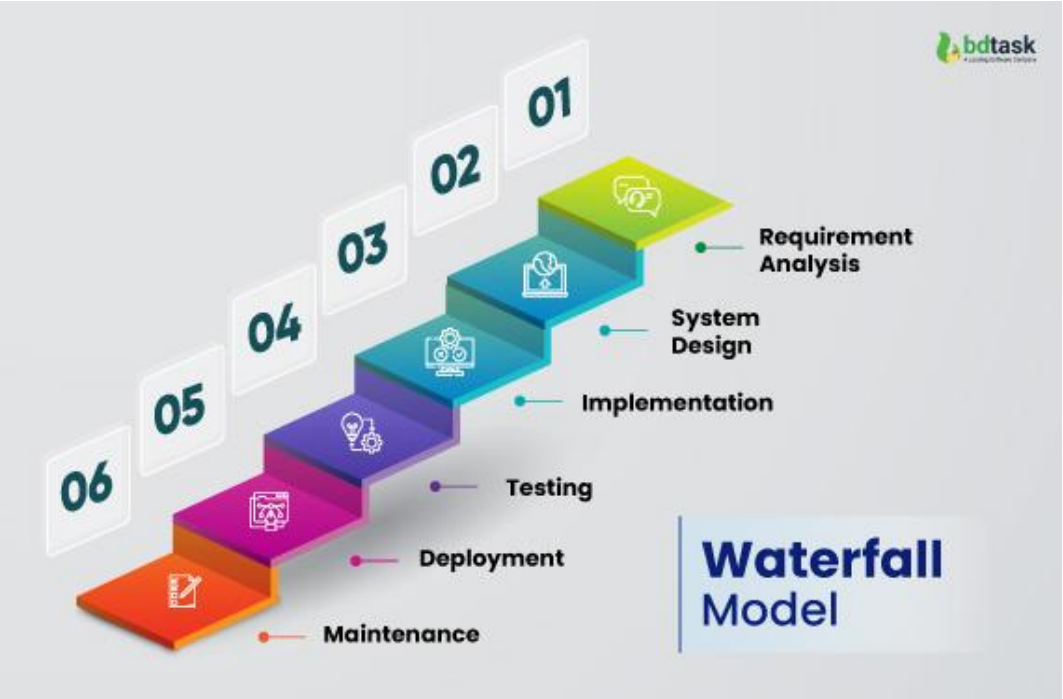
1. Waterfall Model

The Waterfall Model is a linear and sequential approach where each phase flows downwards like a waterfall.



Phases:

- Requirement Analysis
- System Design
- Implementation (Coding)
- Testing
- Deployment
- Maintenance

Advantages:

- Simple and easy to understand
- Clear structure and documentation

Disadvantages:

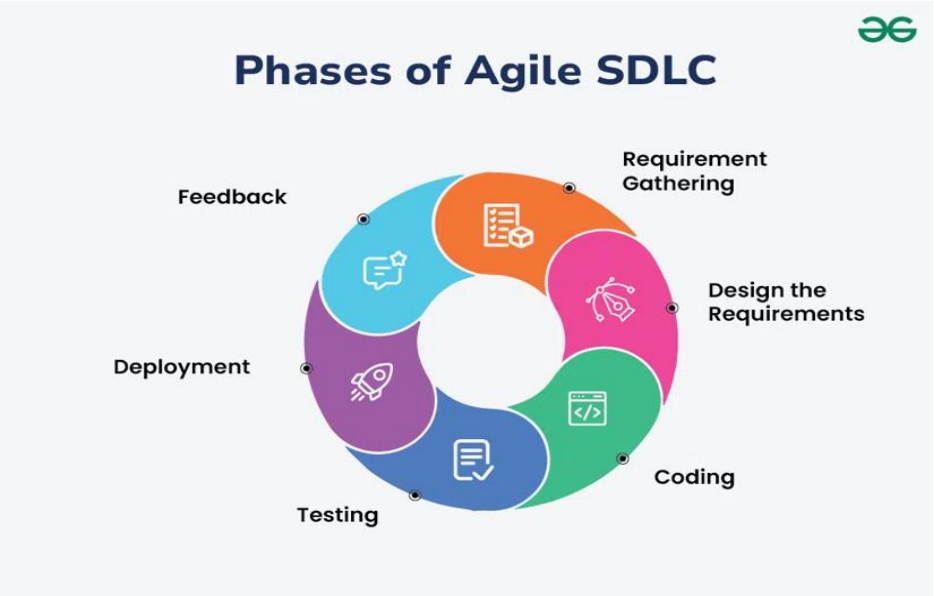
- No flexibility to change requirements
- Testing occurs late

Best Use Case:

- Projects with fixed, stable requirements

2. Agile Model

Agile is an iterative approach that divides work into Sprints (1–4 weeks). It focuses on flexibility, customer feedback, and continuous delivery.



Process:

- Sprint Planning
- Design
- Development
- Testing
- Review & Deployment

Advantages:

- Highly flexible
- Rapid delivery
- Continuous customer involvement

Disadvantages:

- Requires skilled team
- Difficult to estimate cost/time

Best Use Case:

- Projects with frequently changing requirements

Why Agile over Waterfall

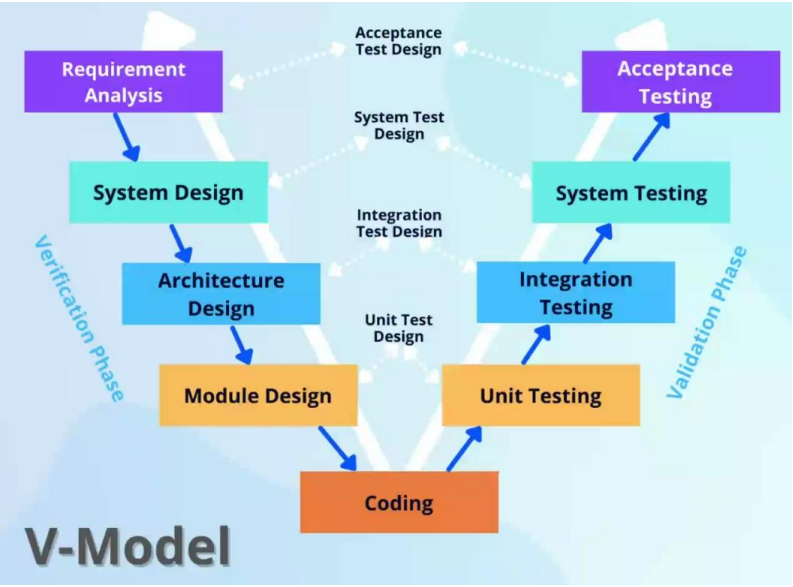
Agile is preferred over Waterfall because it allows changes at any stage of development, while Waterfall does not. In the Waterfall model, once a phase is completed, you cannot go back and modify requirements, making it rigid and unsuitable for projects where needs evolve. Agile is flexible, supports continuous feedback, delivers work in small iterations, and adapts quickly to new requirements. This makes Agile faster, more efficient, and more suitable for modern software development.

Why Agile is Most Used

1. Faster releases
2. Handles requirement changes easily
3. Continuous customer feedback
4. Early detection of issues
5. Perfect for modern web & mobile apps

3. V-Model

In the V-Model, each development phase has a matching testing phase (Verification & Validation).



Advantages:

• Early defect detection

• High reliability

Disadvantages:

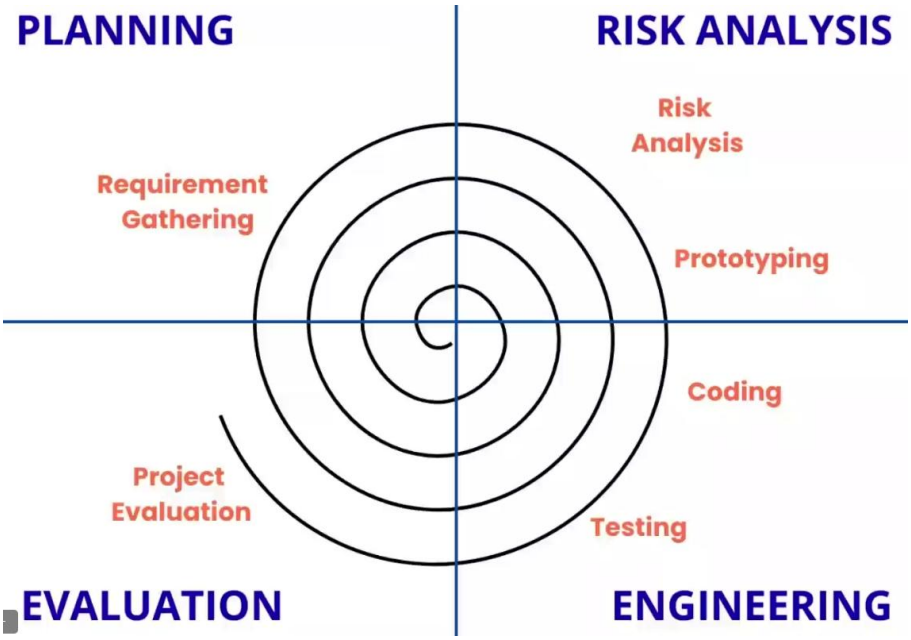
• Very rigid

Best Use Case:

• Safety-critical systems like healthcare/banking

4. Spiral Model

The Spiral Model combines iterative development with strong risk analysis. Each cycle contains:



1. Planning
2. Risk Analysis
3. Development
4. Evaluation

Advantages:

• Excellent for large, high-risk projects

Disadvantages:

• Expensive
• Requires skilled experts