**1. Waterfall Model**

**Explanation:** A linear and sequential approach where each phase must be completed before the next begins.

**Steps:**

1. Requirements Analysis
2. System Design
3. Implementation
4. Integration and Testing
5. Deployment
6. Maintenance

**Characteristics:**

* Simple and easy to understand
* Well-defined stages
* Limited flexibility for changes

**2. Agile Model**

**Explanation:** An iterative and incremental model focused on collaboration, customer feedback, and small, rapid releases.

**Steps:**

1. Planning
2. Design
3. Development
4. Testing
5. Review
6. Deployment
7. Repeat (in sprints)

**Characteristics:**

* Highly adaptive to change
* Emphasizes customer involvement
* Prioritizes working software over comprehensive documentation

**3. Spiral Model**

**Explanation:** Combines iterative development with the systematic aspects of the waterfall model, emphasizing risk assessment.

**Steps:**

1. Identify objectives
2. Risk assessment and reduction
3. Development and testing
4. Review and plan the next iteration

**Characteristics:**

* Focus on risk management
* Flexible and adaptive
* Can be costly due to continuous risk analysis

**4. V-Model (Validation and Verification Model)**

**Explanation:** An extension of the waterfall model that emphasizes verification and validation.

**Steps:**

1. Requirements Analysis
2. System Design
3. Architectural Design
4. Module Design
5. Implementation
6. Unit Testing
7. Integration Testing
8. System Testing
9. Acceptance Testing

**Characteristics:**

* Clear correspondence between development and testing phases
* Early detection of defects
* Suitable for projects with well-defined requirements

**5. Incremental Model**

**Explanation:** Development is broken into smaller, manageable increments that build upon each other.

**Steps:**

1. Requirements analysis
2. Increment development (for each increment):
   * Design
   * Implementation
   * Testing
3. Integration of increments

**Characteristics:**

* Allows for partial implementation of the system
* Flexibility to change requirements
* Each increment adds functional features

**6. RAD Model (Rapid Application Development)**

**Explanation:** Focuses on rapid prototyping and quick feedback from users.

**Steps:**

1. Requirements planning
2. User design (prototyping)
3. Construction
4. Cutover (implementation)

**Characteristics:**

* Emphasizes user feedback and iterative design
* Quick delivery of components
* Less emphasis on planning and more on active user involvement

**7. DevOps Model**

**Explanation:** Combines development and operations to improve collaboration and efficiency.

**Steps:**

1. Planning
2. Development
3. Continuous integration
4. Continuous testing
5. Deployment
6. Monitoring
7. Feedback and iterations

**Characteristics:**

* Emphasizes automation and monitoring
* Enhances collaboration between teams
* Fast delivery of high-quality software

**8. Feature-Driven Development (FDD)**

**Explanation:** An iterative and incremental approach that focuses on features as the primary unit of progress.

**Steps:**

1. Develop an overall model
2. Build a feature list
3. Plan by feature
4. Design by feature
5. Build by feature

**Characteristics:**

* Client-centric
* Emphasizes working features
* Scalable for large projects

**9. Scrum**

**Explanation:** An agile framework that structures development in cycles called sprints, usually lasting 2-4 weeks.

**Steps:**

1. Sprint planning
2. Daily stand-ups (scrum meetings)
3. Sprint execution (development and testing)
4. Sprint review
5. Sprint retrospective

**Characteristics:**

* Roles defined (Scrum Master, Product Owner, Development Team)
* Emphasizes teamwork and accountability
* Continuous improvement through retrospectives

**10. Lean Software Development**

**Explanation:** Inspired by lean manufacturing principles, it focuses on optimizing efficiency and minimizing waste.

**Steps:**

1. Identify value
2. Map the value stream
3. Create flow
4. Establish pull
5. Seek perfection

**Characteristics:**

* Prioritizes customer value and efficient processes
* Continuous improvement
* Eliminates waste in development processes