**Waterfall method:**

**Process:**

It is the first formal process used for traditional engineering problems. It must be planned meticulously to get it right at the first time. It has extensive documentation and serial execution of the steps. Many projects that need safety and security, embedded projects use this approach.

**Example:**

Building of bridges, driverless cars, air craft software etc.

**Steps:**

* Requirement
* Design
* Implementation
* Verification
* Maintenance

**Advantages:**

The method that is very easy.

Phases are completed one by one.

Thorough testing is done.

**Disadvantages:**

It is very difficult to go back to the previous stage.

The cost will be high when it fails.

This method requires more labor.

The risk factors include last minute change in the requirement, test case failure etc.

It is difficult to estimate time and cost.

**Agile Manifesto related to waterfall methodology:**

Working software is the primary measure of progress.

**Rational Unified Process (RUP):**

**Process:**

It is one of the Agile methodologies with frequent iterations and continuous delivery. It creates a rapport between customers and developers. It supports changing needs and continuous improvement on every iteration.

**Best practices:**

Develop iteratively, manage requirements, use component-based structures, model software visually, verify software quality continuously, control changes

**Lifecycle phases:**

* Inception
* Elaboration
* Construction
* Transition

**Supporting disciplines:**

Business modelling

Requirements

Analysis and design

Implement

Test

Deployment

Configuration and change management

Project management

Environment

**Advantages:**

Less time for development.

Reuse of components.

Iterative solution.

Flexible development.

**Disadvantages:**

Team member needs to be expert

Difficult to maintain the changes for big projects

**Agile Manifesto with RUP:**

Highest priority is to satisfy customer with early and continuous delivery.

Welcome changing requirements.

Rapport between customers and developers.

**eXtreme Programming:**

It is one of the well-known agile method. Main goal is to provide high quality software with continuous integration and continuous delivery (CI/CD)

**12 best practices:**

* Planning game
* Small releases
* Metaphor
* Simple design
* Testing
* Refactoring
* Pair programming
* Collective ownership
* Continuous integration
* Sustainable pace
* Whole team
* Coding standards

**Advantages**:

Reduced cost.

Accept changing requirements.

Planned activities.

**Disadvantages:**

Expert team.

Complex design.

Difficult to control changes.

**Agile Manifesto with eXtreme programming:**

Highest priority is to satisfy customer with early and continuous delivery.

Welcome changing requirements.

Rapport between customers and developers.

Sustainable development