Vietnam National University of HCMC
International University
School of Computer Science and Engineering

Object – Oriented Analysis and Design

Software Development Life Cycle

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Outline

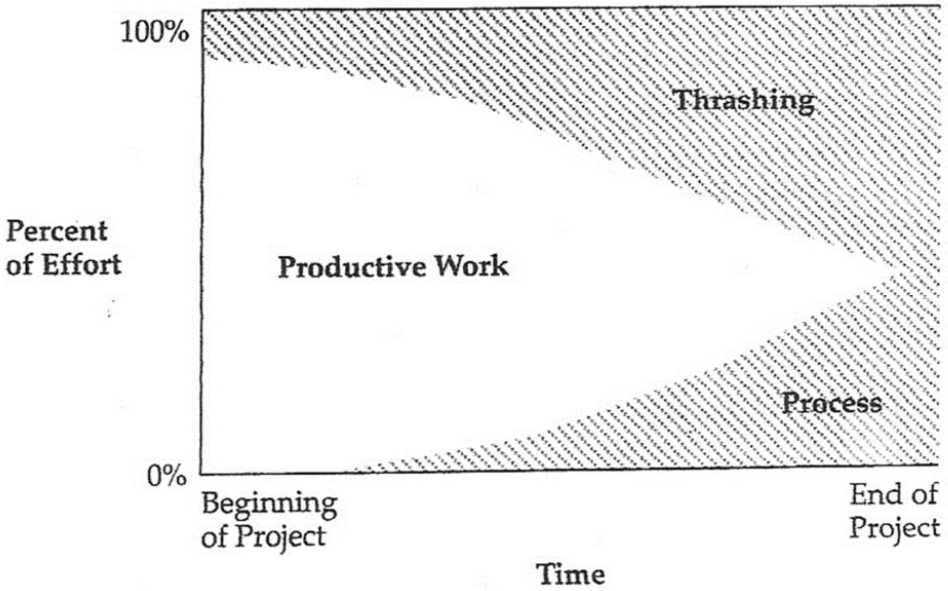
- What is a Software Development LifeCycle (SDLC)?
- Why do we need a lifecycle process?
- Lifecycle models
- Agile and Scrum Definition

What is software lifecycle?

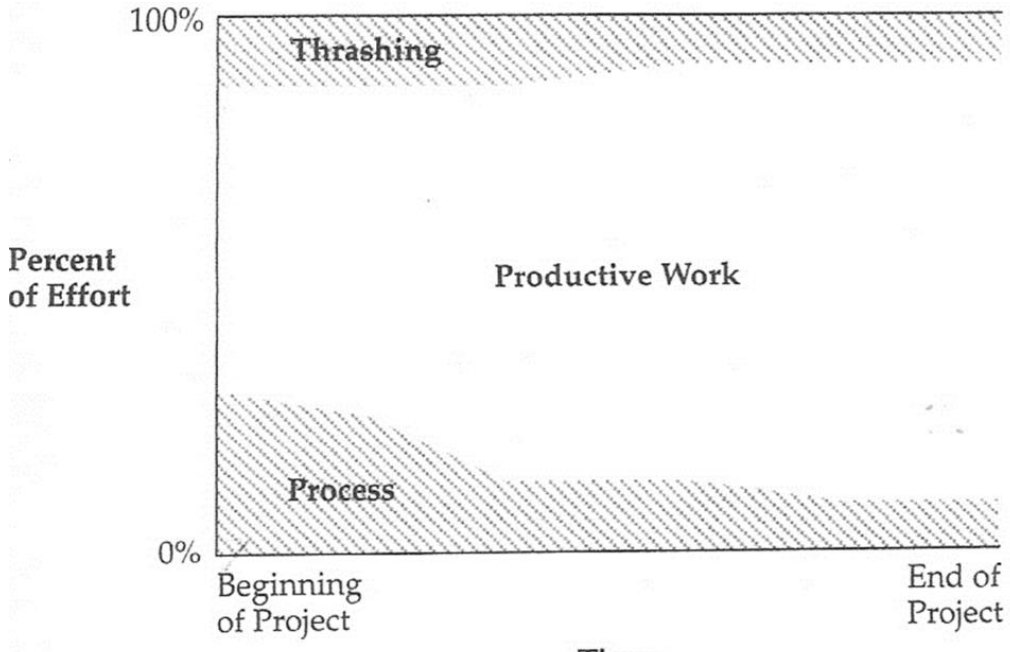
- A structured process for software development that ensures quality, efficiency, and the ability to meet customer needs.
- Emphasize the idea that it provides a roadmap for managing software projects from start to finish.

Why do we need a software lifecycle?

Project with little attention to process

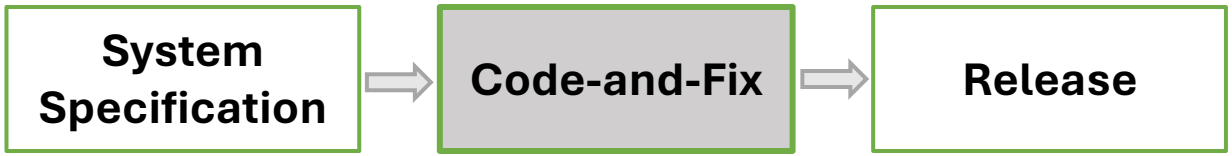


Project with early attention to process



Survival Guide: McConnell p25

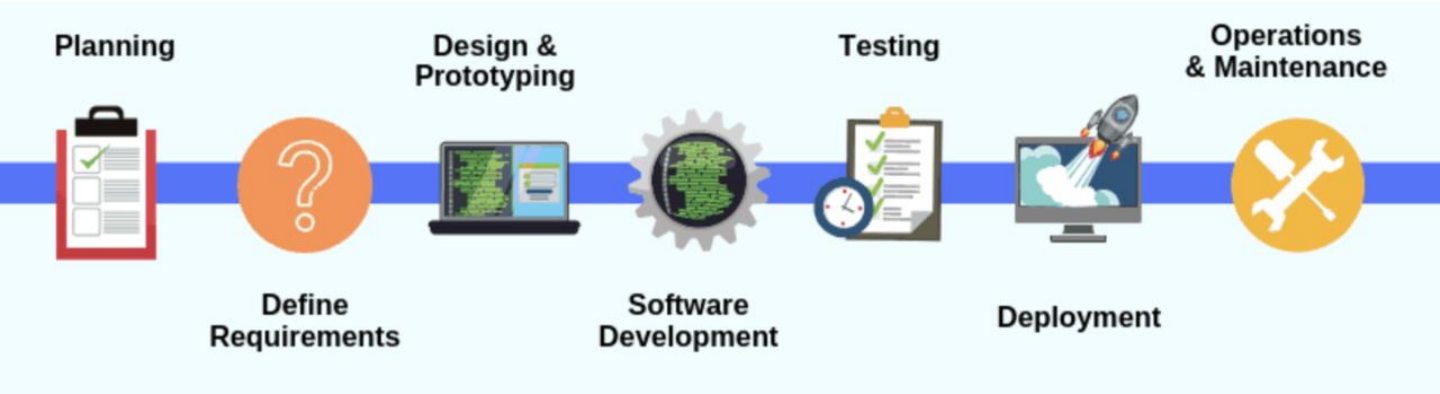
Code–and–fix model



Code-and-fix Model

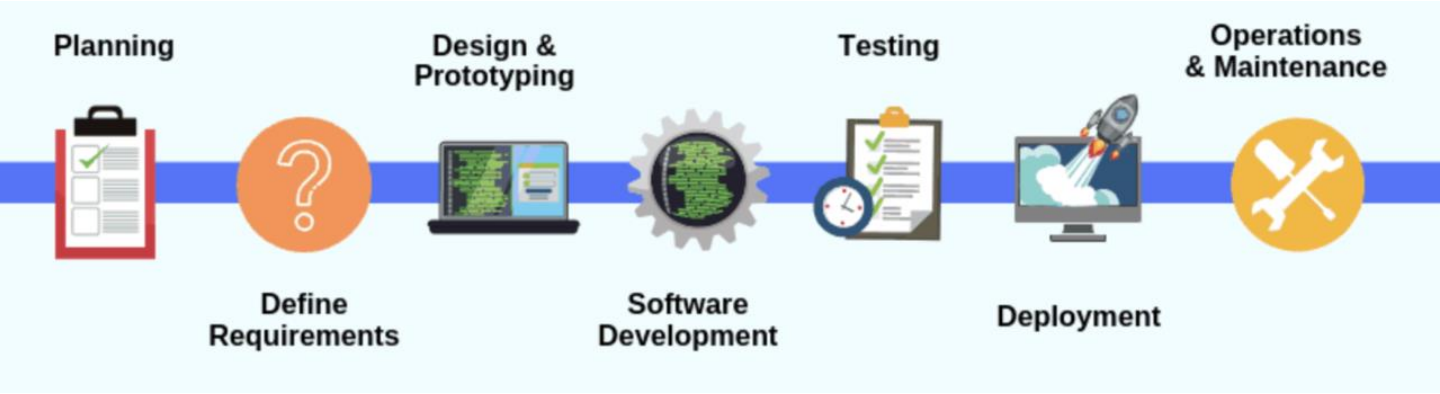
- **Code-and-fix model** is often considered an **ad-hoc** software development model.
- Why it is used?

Phases in SDLC

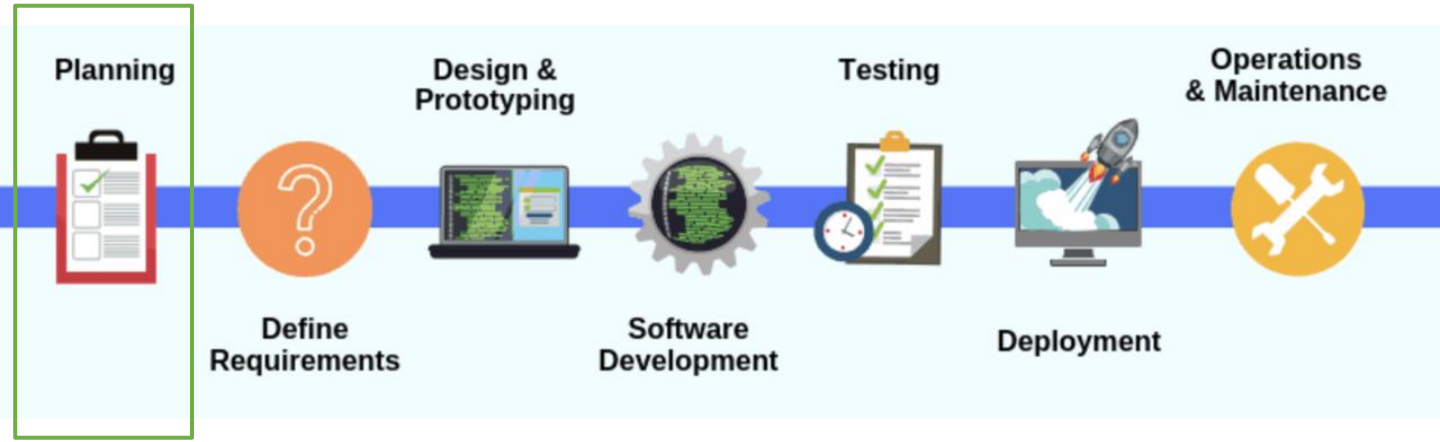


Software lifecycle

- Software lifecycle: series of steps/phases, through which software is produced
  - from conception to end-of-life
  - can take months or years to complete

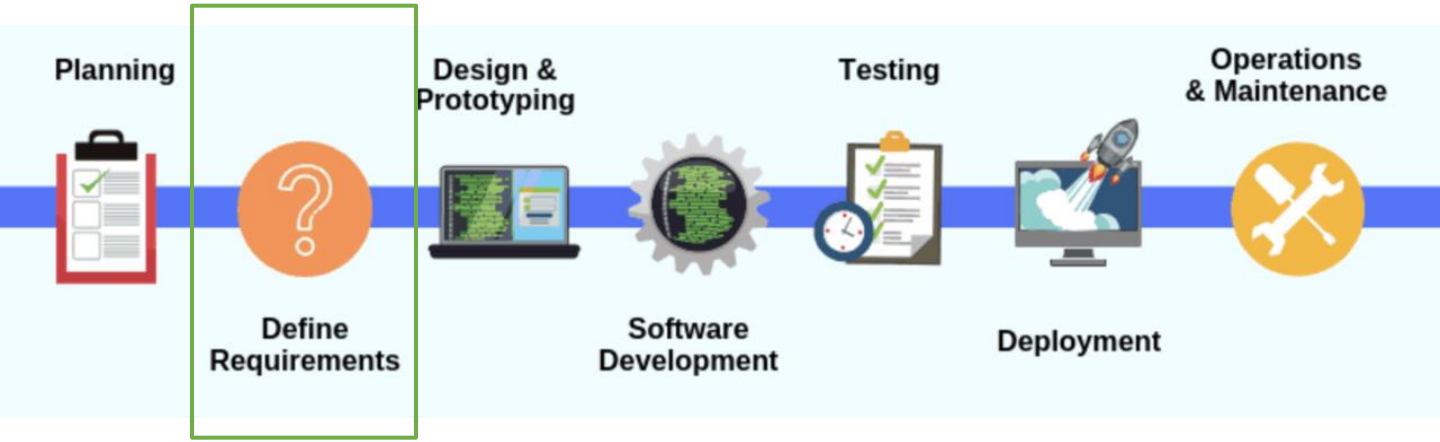


Phases in SDLC



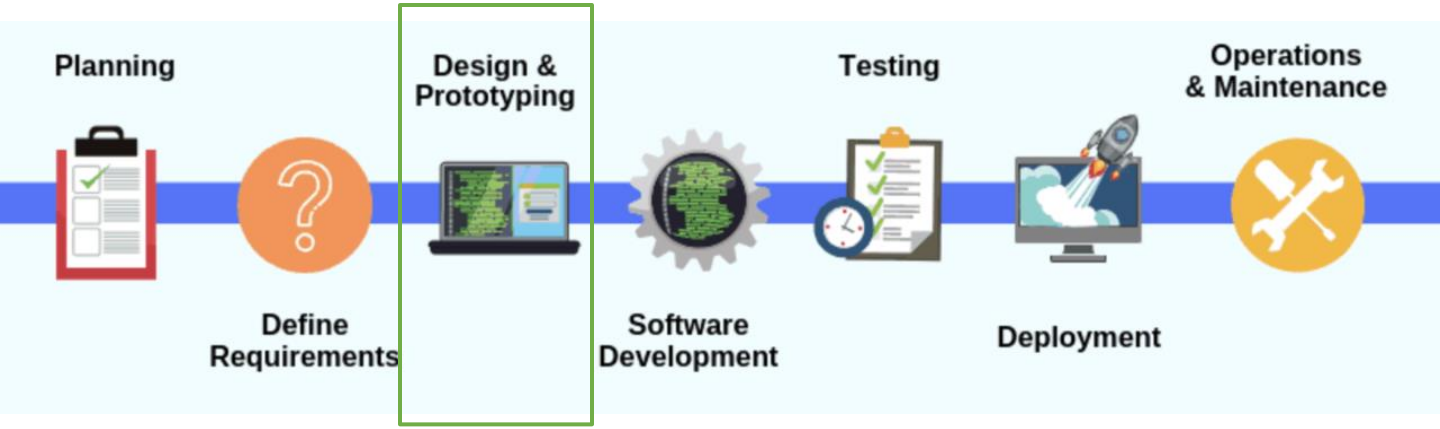
- Identify project scope, objectives, and feasibility (technical, operational, financial).
- Establish project goals, timeline, and budget.

Phases in SDLC



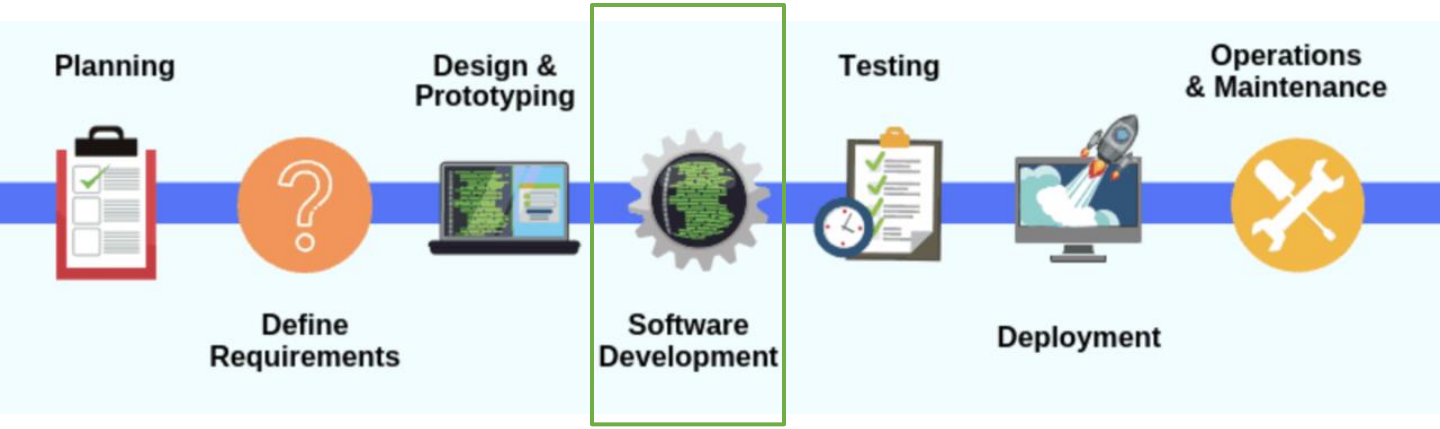
- Elicit requirements from stakeholders.
- Check if all user needs are captured.
- Output: System requirements specification (SRS).

Phases in SDLC



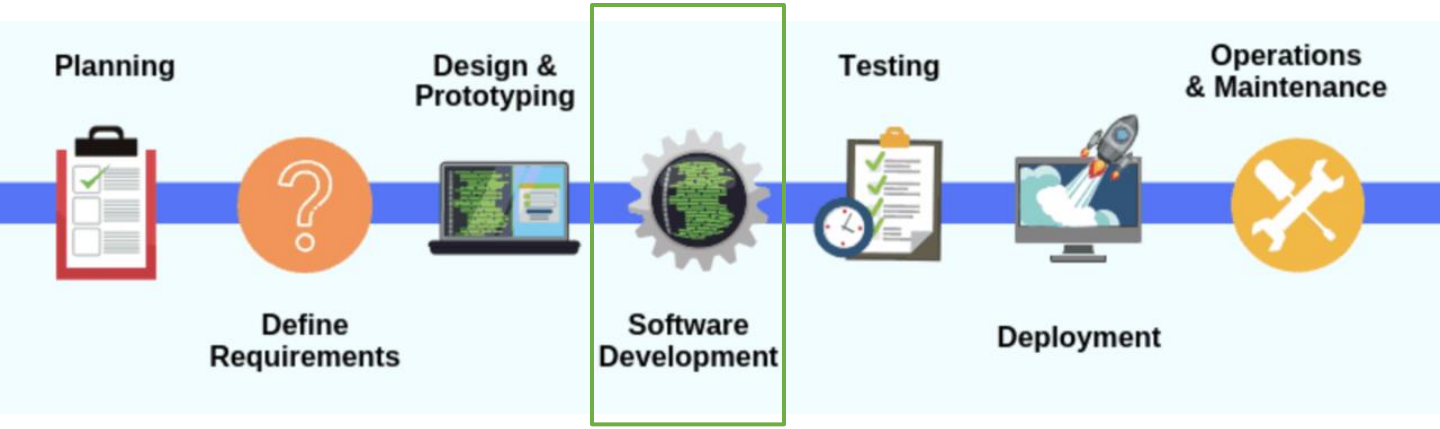
- Translate requirements into a blueprint for the system (architectural design, data design, interface design).
- Design both high-level architecture and detailed components (e.g., database schemas, UI layouts).

Phases in a SDLC



- Developers write the actual code based on the design.
- Follow coding standards and best practices.
- **Tools**: Version control, IDEs, and development frameworks

Phases in a SDLC



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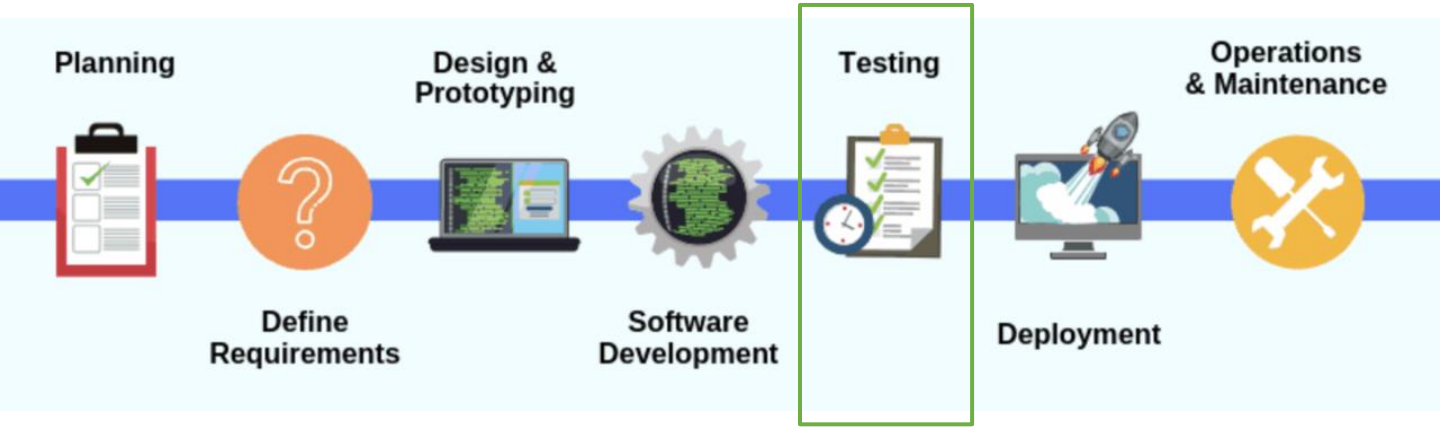
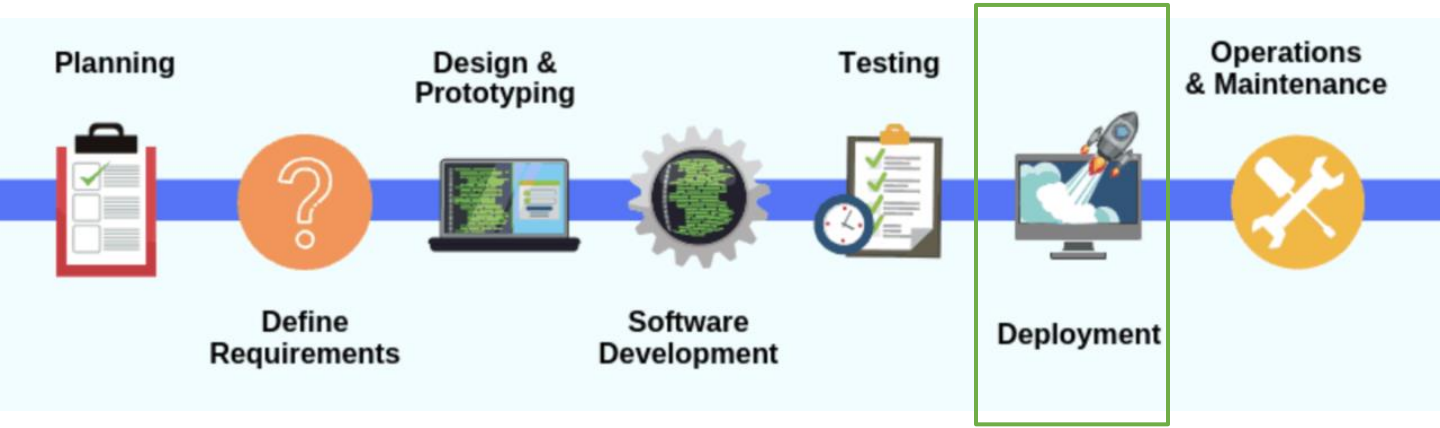


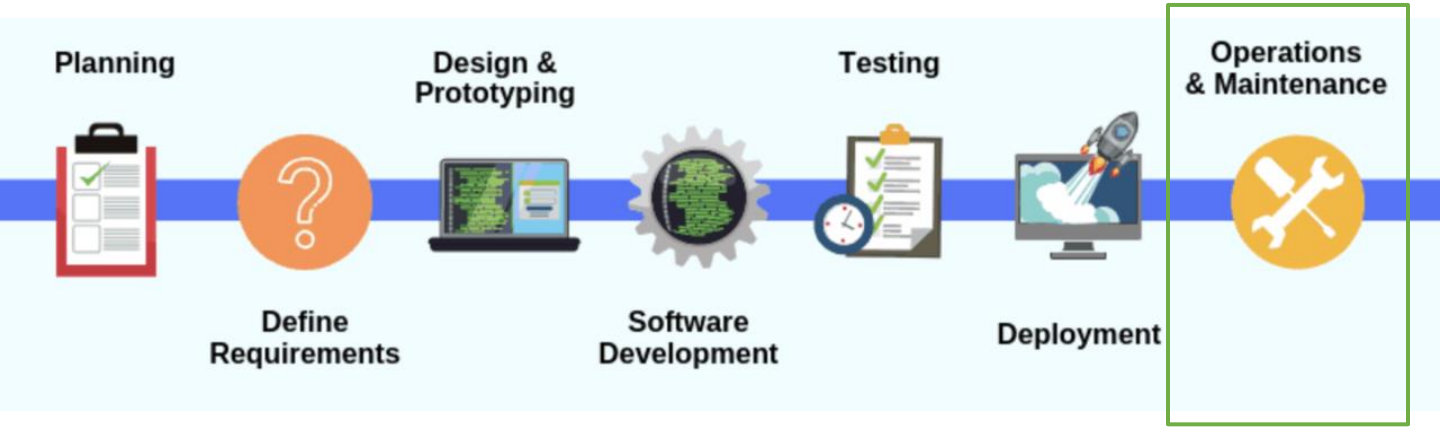
- Verify the system meets requirements and is free from bugs.
- Types of testing: Unit testing, integration testing, system testing, user acceptance testing (UAT).

Phases in a SDLC



- Release the system to the production environment.
- Discuss the different deployment strategies: pilot, phased, or full deployment.

Phases in a SDLC



- Software is updated to fix bugs, improve performance, or add new features.

SDLC Models used in Industry

RAD Model

Prototype Model

Waterfall

V-Model

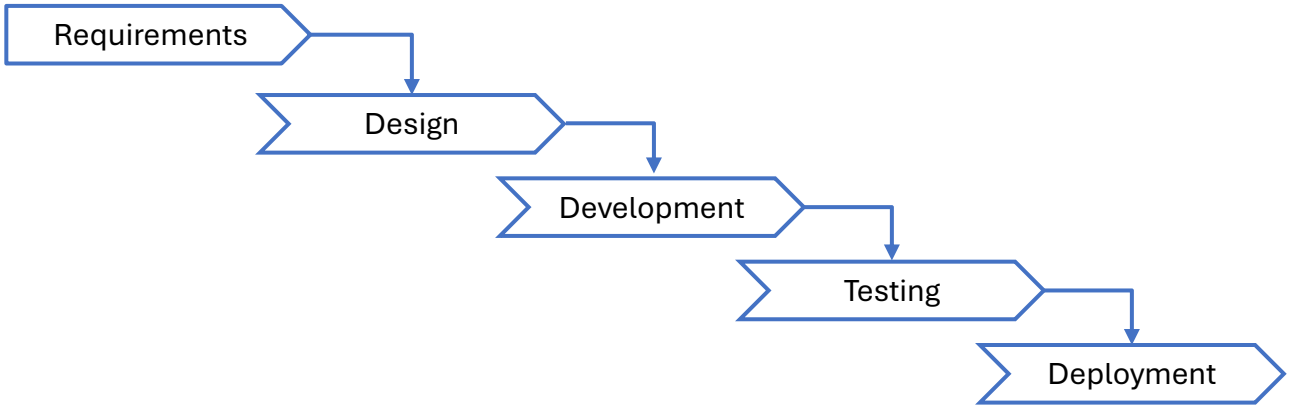
Incremental Model

Iteractive Model

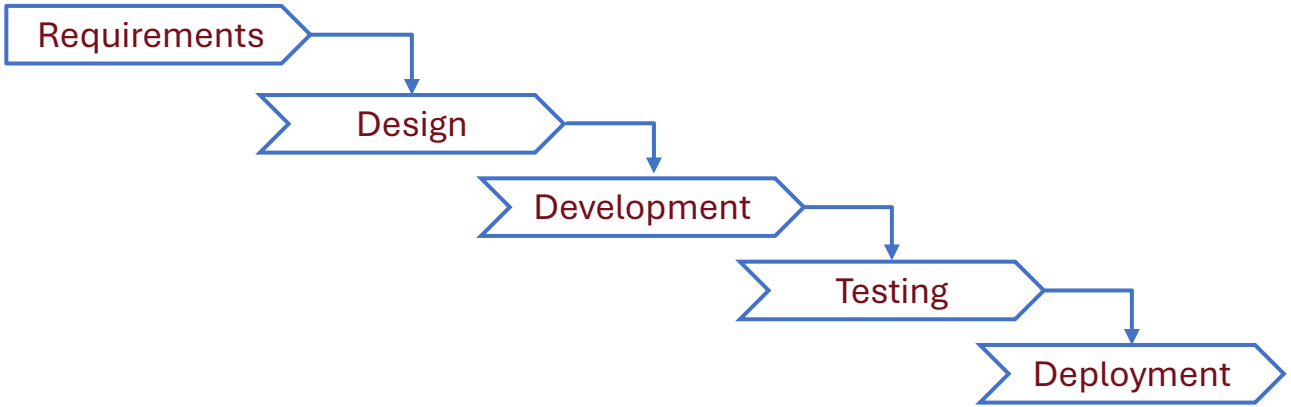
Spiral Model

Agile Model

Waterfall Model



Waterfall Model



Waterfall is a **sequential process** which is suitable for **ordered and predictable** projects

Agile Model

Agile is a framework which employs **incremental and iterative** development that are also called **sprints**.

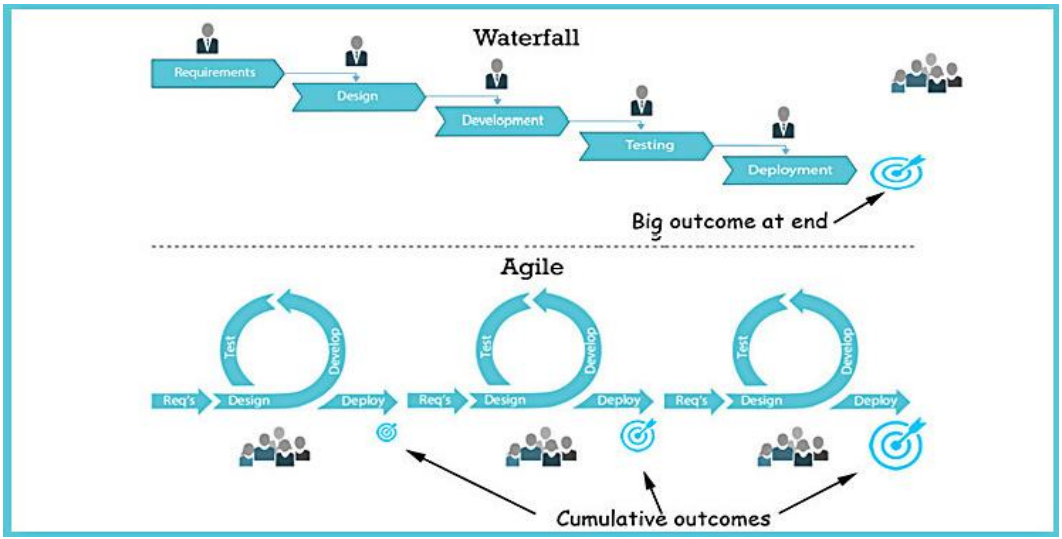


Image source: http://craigread.cloud/agile-and-waterfall-methods-can-both-be-valid/

Agile Principles

1. Our highest priority is to satisfy the customer through the early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity–the art of maximizing the amount of work not done–is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Agile Model

Goal of the **Agile Manifesto:**

flexible, adaptive, and responsive

to changes.

Scrum

- Why is it called Scrum?

It is inspired by a scrum in the sport of rugby. In rugby, the team comes together in what they call a scrum to work together to move the ball forward. In this context, Scrum is where the team comes together to move the product forward.

> **Scrum is a lightweight framework that helps people, teams and organizations generate value through adaptive solutions for complex problems *(The 2020 Scrum Guide)***

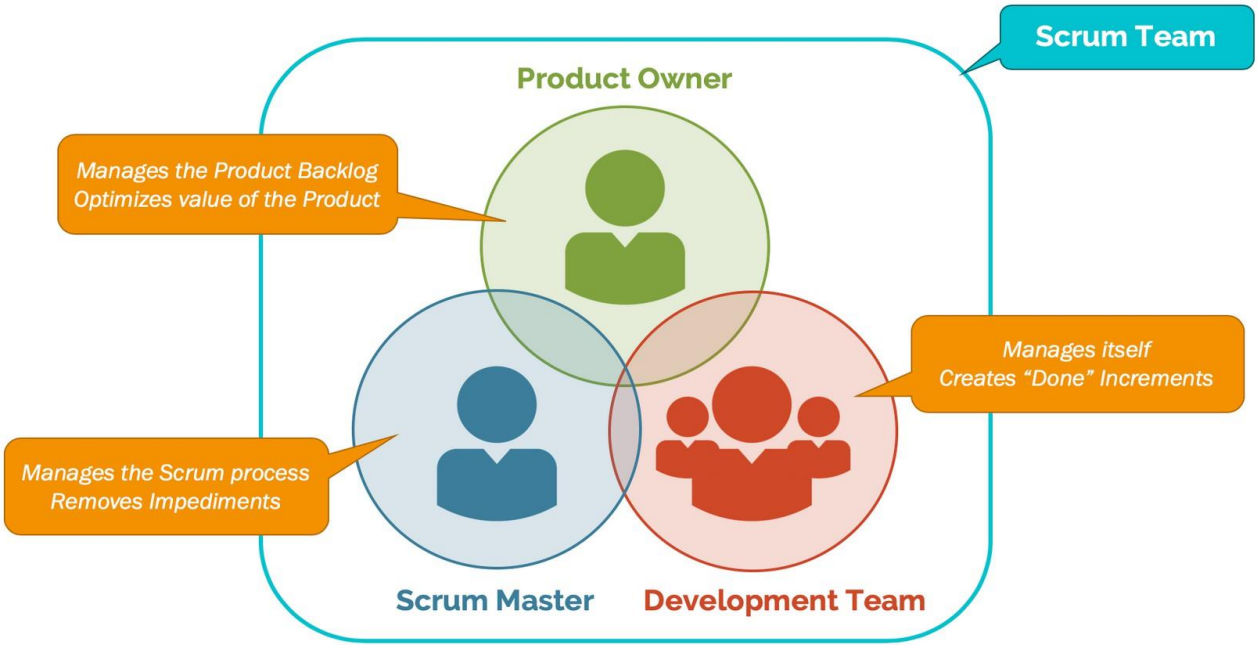
Basically, think of Scrum as a way to get work done as a team in small pieces at a time, with continuous experimentation and feedback loops along the way to learn and improve as you go.

The 2020 Scrum Guide: https://scrumguides.org/scrum-guide.html

Scrum

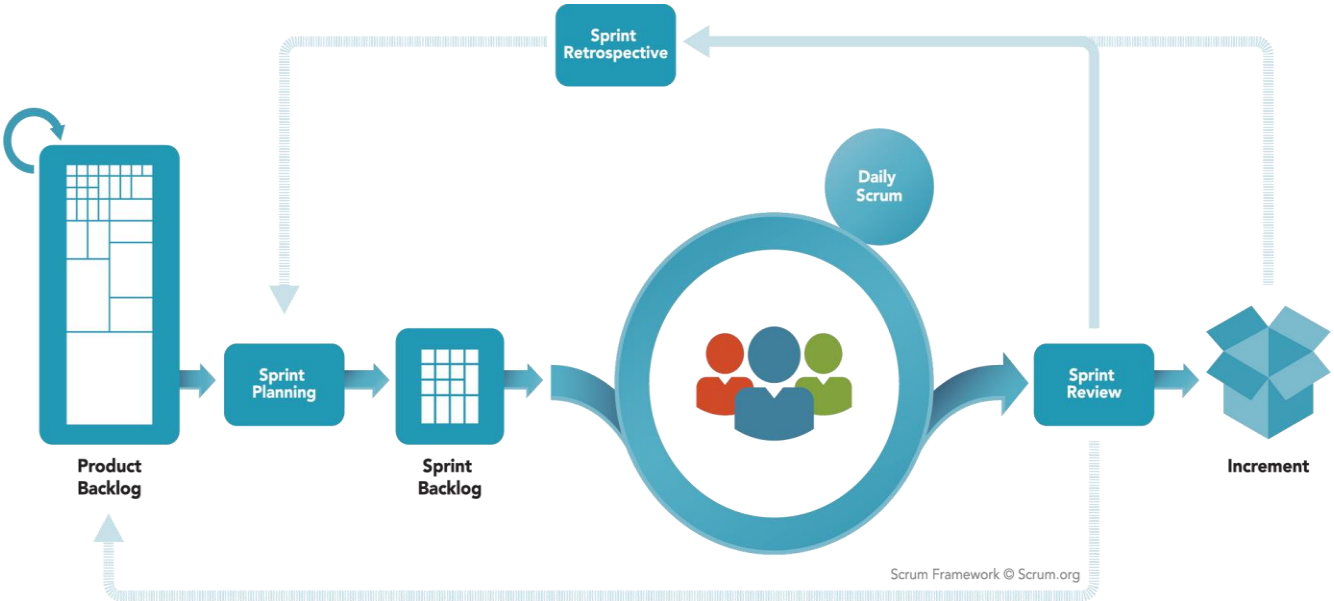
Potentially Shippable Product (PSP)

Scrum Team



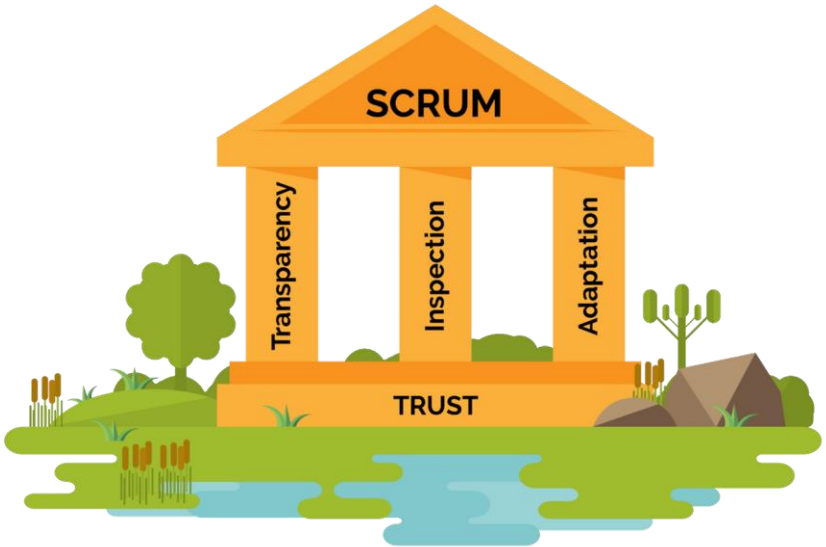
Source: https://www.scrum.org/resources/blog/how-do-3-scrum-roles-promote-self-organization

Scrum Events & Artifacts



Source: https://www.scrum.org/resources/what-is-scrum

Scrum Theory and Values



COURAGE
Scrum Team members have courage to do the right thing and work on tough problems

FOCUS
Everyone focuses on the work of the Sprint and the goals of the Scrum Team

COMMITMENT
People personally commit to achieving the goals of the Scrum Team

RESPECT
Scrum Team members respect each other to be capable, independent people

OPENNESS
The Scrum Team and its stakeholders agree to be open about all the work and the challenges with performing the work

Credit: ABN AMRO Bank N.V.

Source: https://www.scrum.org/resources/what-is-scrum

Project Management with Jira

- Project Roadmap
- Enable Backlog and Sprints features
- Manage backlog and Sprint Backlog
- Track team's work by reporting features

Conclusion

- Phases in a software lifecycle
- Software lifecycle Models
- Waterfall vs Agile
- Scrum definition
- Tool for Project management