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Introduction to the Agile Development Process

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مهارات المستقبل

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What is a Software Process?

- To be a proficient full stack web developer you also need to develop essential non-coding skills
- A full stack web developer needs to be able to understand, communicate and code the whole web application
- Software Process: set of related activities or steps that lead to the production of a software product.

What is a Software Process?

- All software processes must include these fundamental activities:
  - Software specification
  - Software design and implementation
  - Software validation
  - Software evolution

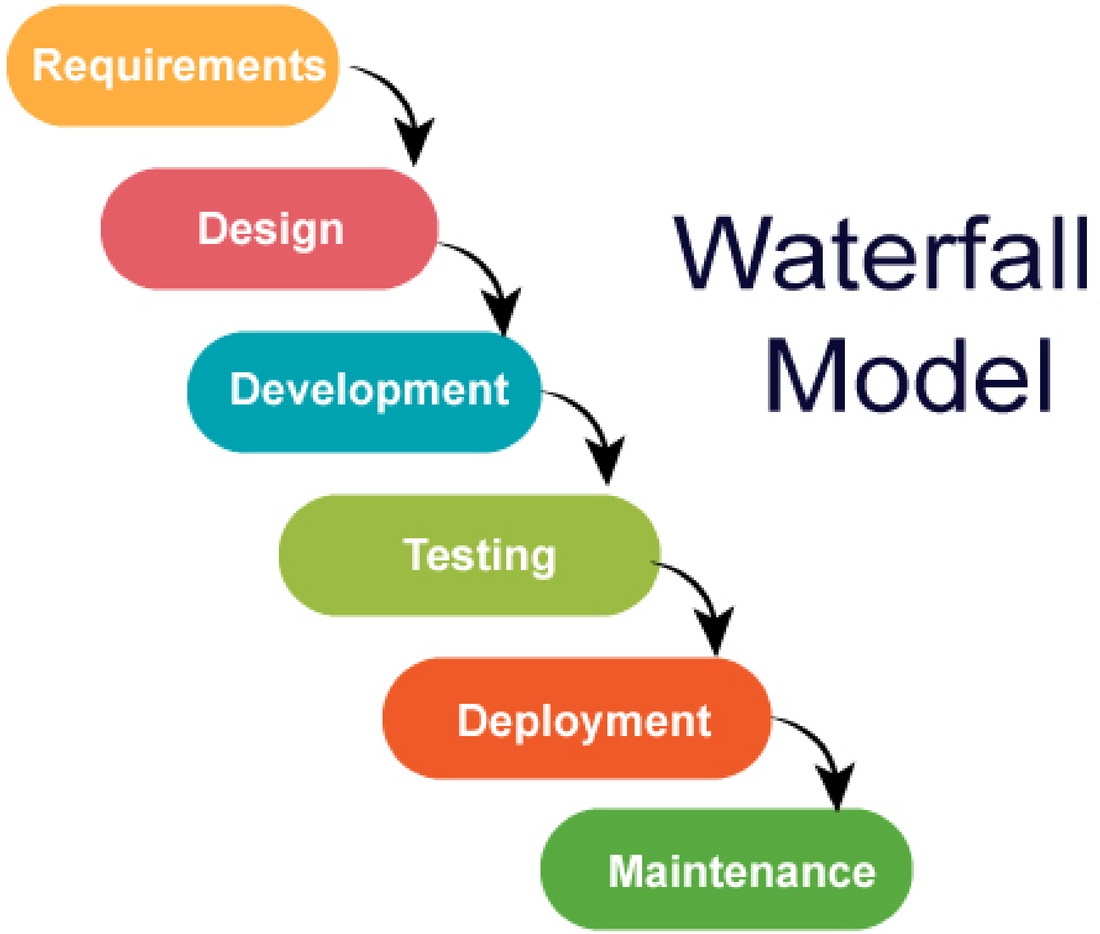
Why Should you Care about Software Processes?

- It is not uncommon for software development projects to cost more and take longer to develop than initially anticipated.
- Many software systems also don’t always deliver the functionality that the users want
- The aim is to deliver systems on time, within scope and within budget

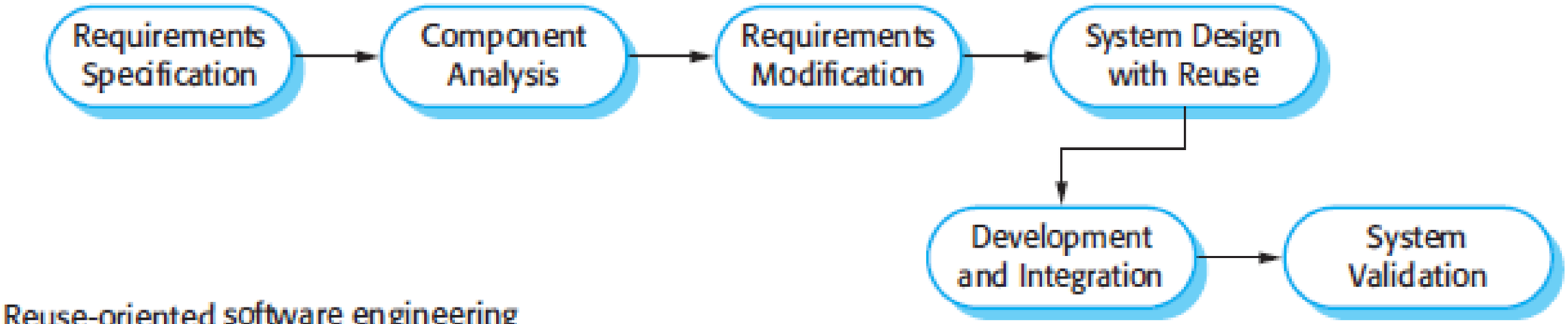
Software Process Models

- Software process model: simple representation of a software process
- Kinds of process models:
  - The waterfall model
  - Incremental development
  - Reuse-oriented software engineering
- We'll be focusing on incremental development

Software Process Models



Software Process Models

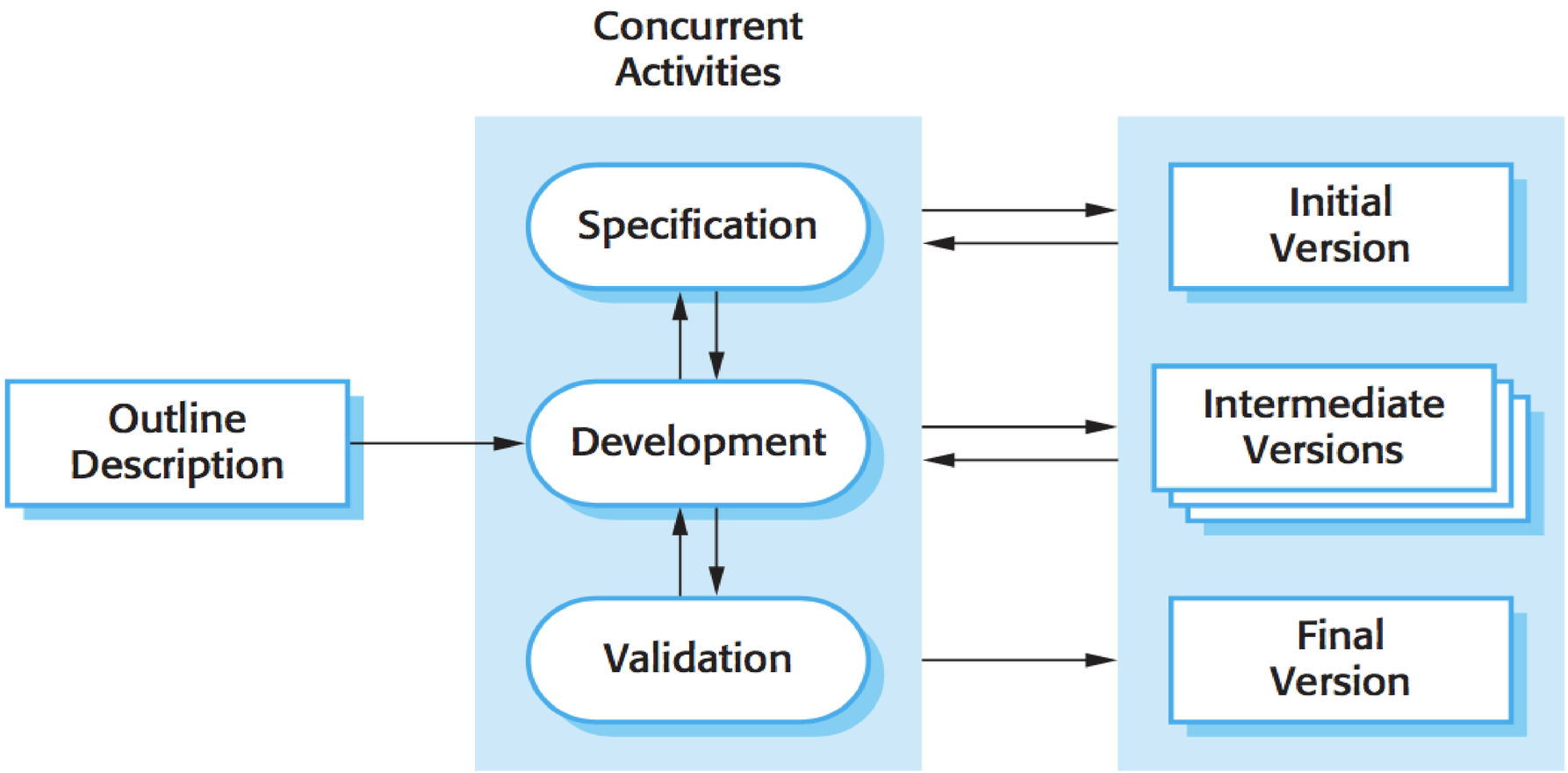


Reuse-oriented software engineering

Incremental Development

- Involves fundamental activities of specification, development and validation
- The system is developed as a series of increments, where each version adds more functionality to the previous version.
- An initial version of the system is given to the user for feedback. The system is then evolved through several versions until an adequate system is developed.

Incremental Development



Incremental Development (Sommerville 2010)

Incremental Development

Three benefits of incremental development:

1. Cheaper to change the system if the customers' requirements change.
2. Easier to get feedback from the customer regarding the work that has been done on the system.
3. Useful software is delivered and deployed more rapidly to the customer, even if all the functionality has not been included.

Incremental Development

Disadvantages of incremental development:

1. Not as likely to be as well-documented as when other approaches are used.
2. Documentation is needed to measure the progress of development.Iif the system is developed too quickly, it is not cost-effective to produce documents that reflect all versions
3. As new increments are added, the structure of the system tends to degrade and a lot of time and money will therefore be needed to improve the software.

What is Agile?

- Agile methods: incremental development methods in which changes are made in small increments
- New releases of the system are created and made available to customers every two or three weeks
- Involve customers in the development process to get rapid feedback on changing requirements
- Minimize documentation by using informal communications

What is Agile?

- Agile development refers to a number of different iterative and incremental software development methodologies:
  - Extreme Programming (XP) (best known)
  - Scrum
  - Crystal
  - Dynamic Systems
  - Development Method (DSDM)
  - Lean Development
  - Feature-Driven Development (FDD)

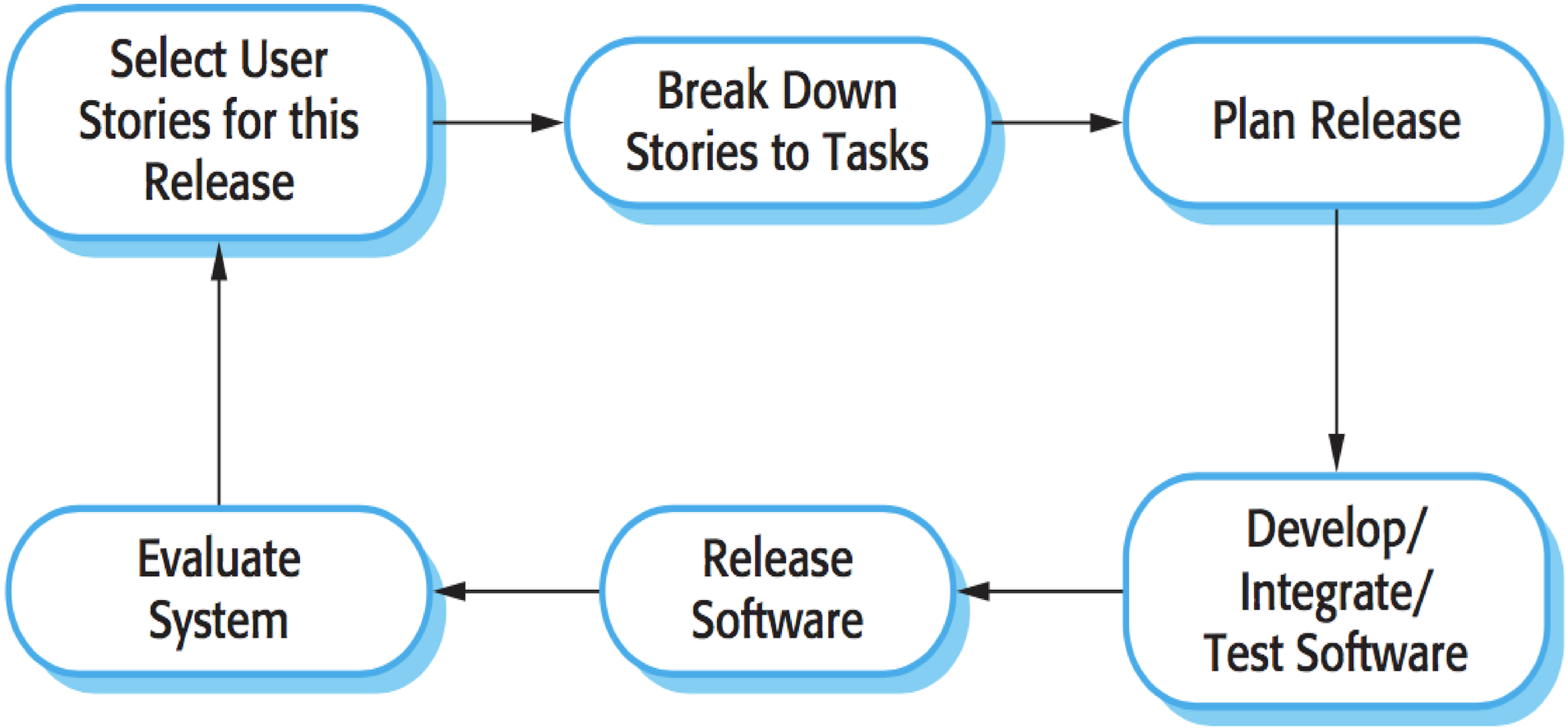
What is Agile?

- Agile methodologies were successful for some types of system development:
  - A software company is developing a small- or medium-sized product
  - Custom system development within an organization, where the customer is keen to be involved in the development process and where there are not a lot of external rules and regulations that affect the software.

Extreme Programming (XP)

- Pushes recognized good practice, such as iterative development, to “extreme” levels
- XP expresses requirements as user stories
- These are implemented directly as a series of tasks
- Tests for each task are developed by a pair of programmers before any code is written
- When new code is integrated into the system, all these tests must be executed successfully

Extreme Programming (XP)



The XP release cycle (Sommerville 2010)

Extreme Programming (XP)

XP involves practices from the Agile Manifesto:

- Incremental development
- Customer involvement
- People, not processes
- Change is embraced
- Maintaining simplicity

Extreme Programming (XP)

- Customer is part of the development team and discusses scenarios
- All team members develop a “story card”
- The team implements a scenario in a future version
- Story cards are broken down into tasks. The effort and resources needed for each task is estimated
- If new changes come to light, new story cards need to be developed and the customer decides whether these changes should have priority over new functionality

Testing in XP

The XP approach to testing reduces the chances of introducing errors that were not discovered in the current version of the system.

Key features:

- Test-first development
- Incremental test development from scenarios
- User involvement in the test development and validation
- The use of automated testing frameworks

Pair Programming

Programmers sit together at the same workstation and work to develop the software.

Advantages:

- It supports the idea of collective ownership and responsibility for the system
- It acts as a type of informal review process since each line of code is looked at by at least two people.
- It helps support refactoring