



Chapter 3 – Agile Software Development

Topics covered



- ✧ Agile methods
- ✧ Agile development techniques
- ✧ Agile project management
- ✧ Scaling agile methods

Rapid software development



- ✧ **Rapid development and delivery** is now often the most important requirement for software systems
 - Businesses operate in a **fast-changing** requirement and it is **practically impossible** to produce a set of **stable software requirements**
 - Software must **evolve quickly** to reflect changing business needs.
- ✧ Plan-driven development **is essential for some types of system** but does not meet these business needs.
- ✧ Agile development methods emerged in the late 1990s whose aim was to **radically reduce the delivery time** for working software systems

Agile development

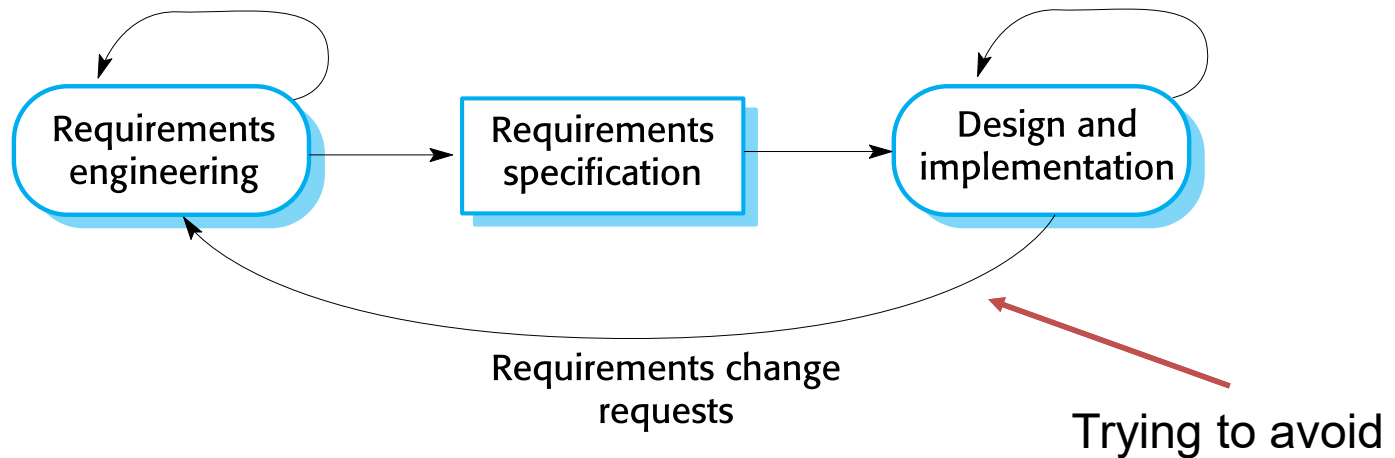


- ✧ Program specification, design and implementation are **inter-leaved**
- ✧ The system is developed as a **series of versions** or increments with **stakeholders involved** in **version specification and evaluation**
- ✧ **Frequent delivery** of new versions for evaluation
- ✧ Extensive tool support (e.g. automated testing tools) used to support development.
- ✧ Minimal documentation – **focus on working code**

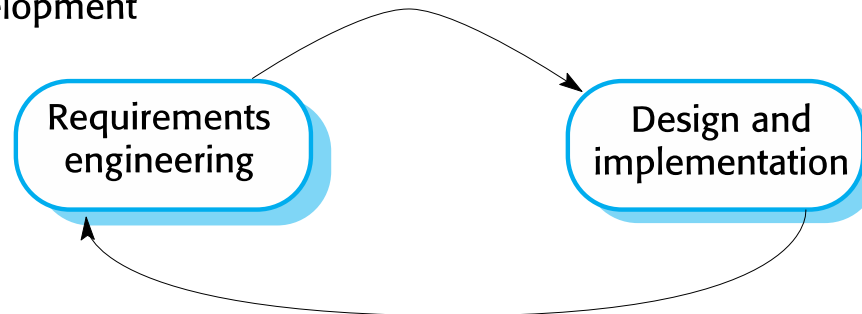
Plan-driven and agile development



Plan-based development



Agile development



Plan-driven and agile development



✧ Plan-driven development

- A plan-driven approach to software engineering is based around **separate development stages** with the **outputs to be produced at each of these stages planned in advance**.
- Not necessarily waterfall model – **plan-driven, incremental development is possible**
- **Iteration occurs within activities.**

✧ Agile development

- **Specification, design, implementation and testing are interleaved** and the outputs from the development process are decided through a process of negotiation **during the software development process**.



Agile methods

Agile methods



- ✧ Dissatisfaction with the overheads involved in software design methods of the 1980s and 1990s led to the creation of agile methods. These methods:
 - Focus on the **code rather than the design**
 - Are based on an **iterative** approach to software development
 - Are intended to **deliver working software quickly** and **evolve this quickly** to meet changing requirements.
- ✧ The aim of agile methods is to **reduce overheads** in the software process (e.g. by limiting documentation) and to **be able to respond quickly to changing requirements** without excessive rework.

Agile manifesto



- ✧ *We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:*
 - *Individuals and interactions over processes and tools*
 - *Working software over comprehensive documentation*
 - *Customer collaboration over contract negotiation*
 - *Responding to change over following a plan*

- ✧ *That is, while there is value in the items on the right, we value the items on the left more.*

The principles of agile methods



Principle	Description
Customer involvement	Customers should be closely involved throughout the development process. Their role is to provide and prioritize new system requirements and to evaluate the iterations of the system.
Incremental delivery	The software is developed in increments with the customer specifying the requirements to be included in each increment.
People not process	The skills of the development team should be recognized and exploited. Team members should be left to develop their own ways of working without prescriptive processes.
Embrace change	Expect the system requirements to change and so design the system to accommodate these changes.
Maintain simplicity	Focus on simplicity in both the software being developed and in the development process . Wherever possible, actively work to eliminate complexity from the system.

Agile method applicability



- ✧ Product development where a software company is developing a **small or medium-sized** product for sale.
 - Virtually all software products and apps are now developed using an agile approach
- ✧ Custom system development within an organization, where there is a **clear commitment from the customer to become involved** in the development process and where there are **few external rules and regulations** that affect the software.