Chapter 2 – Software Processes
Types of Processes
Plan-driven and agile processes

✧ Plan-driven processes are processes where all of the process activities are planned in advance and progress is measured against this plan.

✧ In agile processes, planning is incremental and it is easier to change the process to reflect changing customer requirements.

✧ In practice, most practical processes include elements of both plan-driven and agile approaches.

✧ There are no right or wrong software processes.
Software process models
Software process models

✧ The waterfall model
  ▪ Plan-driven model. Separate and distinct phases of specification and development.

✧ Incremental development
  ▪ Specification, development and validation are interleaved. May be plan-driven or agile.

✧ Integration and configuration
  ▪ The system is assembled from existing configurable components. May be plan-driven or agile.

✧ In practice, most large systems are developed using a process that incorporates elements from all of these models.
The waterfall model
Waterfall model phases

✧ There are separate identified phases in the waterfall model:
  ▪ Requirements analysis and definition
  ▪ System and software design
  ▪ Implementation and unit testing
  ▪ Integration and system testing
  ▪ Operation and maintenance

✧ The main drawback of the waterfall model is the difficulty of accommodating change after the process is underway. In principle, a phase has to be complete before moving onto the next phase.
Incremental development

Concurrent activities

- Specification
- Development
- Validation

Outlook description

Initial version
Intermediate versions
Final version
Incremental development benefits

✧ The cost of accommodating changing customer requirements is reduced.
  ▪ The amount of analysis and documentation that has to be redone is much less than is required with the waterfall model.

✧ It is easier to get customer feedback on the development work that has been done.
  ▪ Customers can comment on demonstrations of the software and see how much has been implemented.

✧ More rapid delivery and deployment of useful software to the customer is possible.
  ▪ Customers are able to use and gain value from the software earlier than is possible with a waterfall process.
Incremental development problems

✧ The process is not visible.
   ▪ Managers need regular deliverables to measure progress. If systems are developed quickly, it is not cost-effective to produce documents that reflect every version of the system.

✧ System structure tends to degrade as new increments are added.
   ▪ Unless time and money is spent on refactoring to improve the software, regular change tends to corrupt its structure. Incorporating further software changes becomes increasingly difficult and costly.
Integration and configuration

✧ Based on software reuse where systems are integrated from existing components or application systems (sometimes called COTS - Commercial-off-the-shelf) systems).

✧ Reused elements may be configured to adapt their behaviour and functionality to a user’s requirements.

✧ Reuse is now the standard approach for building many types of business system.