Chapter 2: Software processes

Your name:

Answer all questions. 1 mark per question

1. What is a software process? What are the fundamental activities that are common to all software processes?

A structured set of activities required to develop a software system.

Software specification

Software design and implementation

Software validation

Software evolution

2. What is software process model? List the 3 generic process models that are used in software engineering?

A software process model is an abstract representation of a process.

The waterfall model

Incremental development

Reuse-oriented software engineering

3. Why are iterations usually limited when the waterfall model is used?

The waterfall model is a document-driven model with documents produced at the end of each phase. Because of the cost of producing and approving documents, iterations and costly and involve significant rework. Hence they are limited.

4. What are the three benefits of incremental development, compared to the waterfall model?

(a) The cost of accommodating changes to customer requirements is reduced.

(b) It is easier to get customer feedback on development work that has been done.

(c) More rapid delivery and deployment of useful software to the customer is possible

5. What are the development stages in reuse-based development?

Component analysis

Requirements modification

System design with reuse

Development and integration

2.1. Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems:
- A system to control anti-lock braking in a car
- A virtual reality system to support software maintenance
- A university accounting system that replaces an existing system
- An interactive travel planning system that helps users plan journeys with the lowest environmental impact

Ans:

1. *Anti-lock braking system*: This is a safety-critical system so requires a lot of up-front analysis before implementation. It certainly needs a plan-driven approach to development with the requirements carefully analysed. A waterfall model is therefore the most appropriate approach to use, perhaps with formal transformations between the different development stages.

2. *Virtual reality system*: This is a system where the requirements will change and there will be an extensive user interface components. Incremental development with, perhaps, some UI prototyping is the most appropriate model. An agile process may be used.

3. *University accounting system*: This is a system whose requirements are fairly well-known and which will be used in an environment in conjunction with lots of other systems such as a research grant management system. Therefore, a reuse-based approach is likely to be appropriate for this.

4. *Interactive travel planning system*: System with a complex user interface but which must be stable and reliable. An incremental development approach is the most appropriate as the system requirements will change as real user experience with the system is gained.