Introduction

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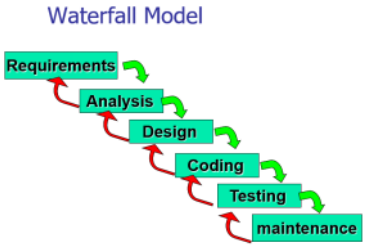
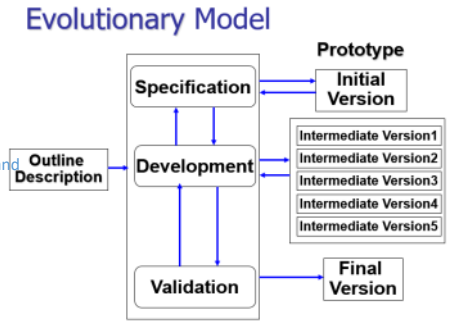
Software Process Model

- Waterfall Model
- Evolutionary model
- Spiral model
- Iterative and Incremental Process Model
- UP Model

- Waterfall Model
  - (→)
  - Requirement Analysis Design Coding Testing maintenance
  - (←)

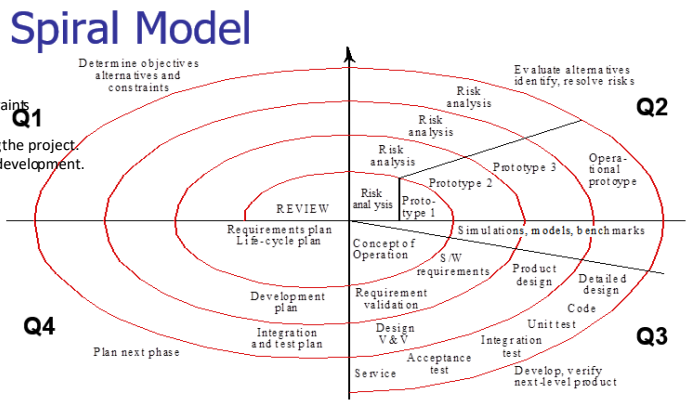


- About waterfall model:
  - The different stages are to be carried out consecutively
  - At each stage, the work done will be documented, which will form the basis for the work that is done at the next stage
  - After deployment, the system will be maintained as long as it remains in service
- Advantages：
  - It is an intuitive, sensible and general-purpose engineering approach to software engineering.
  - It emphasizes planning for an activity before carrying it out, better than just start coding without considering overall architecture of the program.
  - It recommends a top-down approach, from high level of abstraction to more details.
  - It provides a strong management tool for controlling software projects.
- Disadvantages：
  - If errors are found when working on one stage, it is reasonable to correct the problems before proceeding. However, Some earlier versions of the waterfall model restricted feedback to the previous stage in the process only.
- Evolutionary Model
  - Evolutionary model suggests that software should be developed in a more 'evolutionary' manner.
- How evolutionary model works?
  - Development starts with the production of a prototype system implementing only the core functionality of the complete system.
  - The prototype will be used to discuss with the users
  - Feedback from the users would then guide subsequent development, …
  - The prototype would evolve into a more complete system, with small increments of functionality being added at any given stage and repeated consultations with the users taking place.



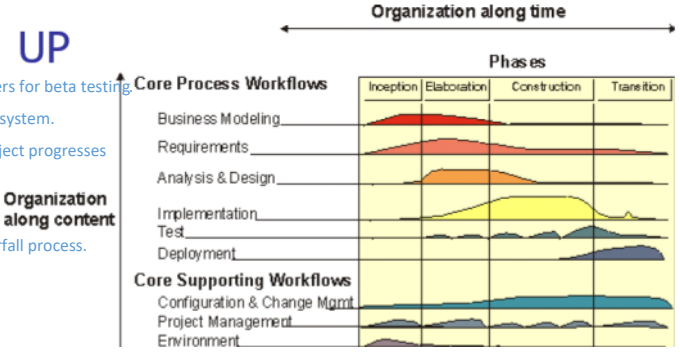
- Advantages:
  - By involving users in the development process, the problem of discovering errors late has been overcome.
  - A series of working prototypes mean that the evolving system was being tested from an early stage in a project
- Disadvantages:
  - It is very difficult to see how project managers could sensibly plan a project.
  - The model gives no guarantee that the evolutionary process will in fact ever converge on a stable system.
- Spiral Model
- The spiral model was developed in an attempt
  - to develop an explicit software process that addressed the weakness of the waterfall model
  - to reserve more of its traditional management oriented advantages than the evolutionary model

Q1: consider the objectives for the iteration, the various alternative solutions that should be considered and the constraints under which a solution must be developed.
Q2: a risk analysis is carried out. The aim of this is to ensure that each iteration focuses on the highest risks threatening the project.
Q3: construct prototypes to help evaluate possible approaches to resolving the risks, before committing to a detailed development.
Q4:a review of the work done in the iteration and plans are made for the subsequent iteration.



- Incremental development :
- develop core functionality first, to the level of getting a working system, and then
- add the remaining functionality incrementally, in a series of increments
- Iterative development:
- Software projects be managed as a series of iterations;
- Not just as a single pass through the various activities identified in the waterfall model

- UP Model
- The inception phase is primarily concerned with project planning and risk evaluation.
- The elaboration phase is concerned with defining the overall architecture of the system.
- In the construction phase, the system is built, ending with a release that can be delivered to the customers for beta testing.
- The transition phase covers the period of beta testing and terminates with the release of the completed system.
- Each activity can occur in any iteration, but the balance of activities in an iteration will change as the project progresses from inception to completion.
- Each phase terminates with a milestone to capture the points within the project lifecycle
- Each phase can contain a number of iterations; Each iteration will typically be structured as a mini-waterfall process.
- An iteration should result in an incremental improvement to the product being constructed.
- UP is:
  - Use case (requirements) driven



- An iteration should result in an incremental improvement to the product being constructed.
- UP is:
  - Use case (requirements) driven
  - Architecture centric
  - Iterative and incremental