Software Engineering

Spring term 2013

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Welcome!

- Software Engineering is about
  processes
  to create software.
- This is a small (5 cr) course:
  - we study several processes, but
  - we do not execute any of them.

About the course

- Literature: Sommerville, 9th ed.
  Buy and start reading - today!
- http://www.it.uu.se/edu/course/homepage/pvt/vt13
  - schedule, detailed reading instructions
    - lectures
    - guest lectures
    - seminar
  - examination

About the examination

- written exam (4 cr)
  - notes and selected parts of the book
  - grades U, 3, 4, 5
- assignment (1 cr)
  1. Select a SE article
  2. Hand in a summary + own opinion
  3. Give feedback to another student

  For details see the course homepage

Verbal skills (reading, writing) essential!

About the book

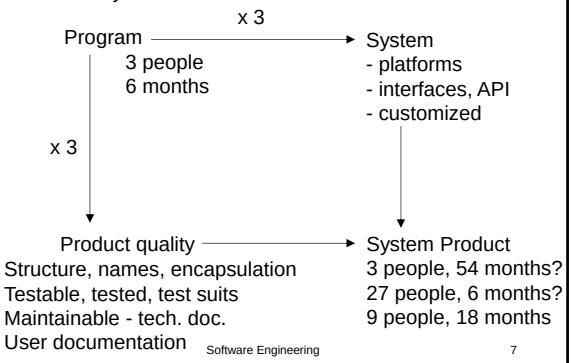
Part 1: Introduction to SE - mostly covered
Part 2: Dependability and Security
- mostly covered
Part 3: Advanced SE - mostly *not* covered
Part 4: Management - mostly covered

This course is about *large* projects:

- 10 - 40 - … - 1000 people
- 3 - 12 - … - 100 months

Why do projects get large?

In a garage in
Silicon Valley:



Structure, names, encapsulation
Testable, tested, test suits
Maintainable - tech. doc.
User documentation

SE is Engineering

- Making things that work - practical
- Use of models, standard designs, methods, tools
- Constraints: time, money, organisation
- Managing people, communication

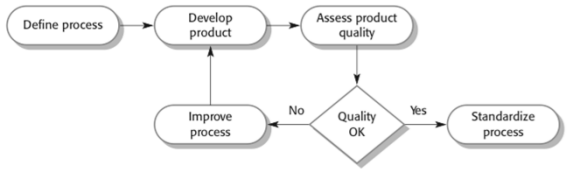
...but not always like Engineering

- Every project is mostly new
- Software is ”invisible”,
- perceived to be adaptable
  (rewrite code vs. rebuild a bridge)
- lacks physical boundaries - gets complex
- Usability - ”getting it right”
- Legacy systems

Process

- Process
  - what really happens … too messy
- Process model
  - abstraction, common themes
- Method (or: Process)
  - what *should* happen
  Every company has one! (ADM, PROPS)

Figure 24.3 Process-based quality



Product Quality

- Acceptable: usable, learnable, compatible
- Efficient: response time, memory use
- Dependable: safe, reliable, secure
- Maintainable: documented, structured

[Fig. 1.2, 24.2]

Process (method) Quality

- People actually follow it:
  - acceptable, usable, learnable
- It delivers:
  - efficient, in time, acceptable product quality
- Manageable
  - visible, robust to problems
- Supportable
  - documented, structured

The ingredients

Requirements

Design

Implementation

Testing

Operation, Maintenance

Some related courses

Requirements

Design

Implementation

Testing

Operation, Maintenance

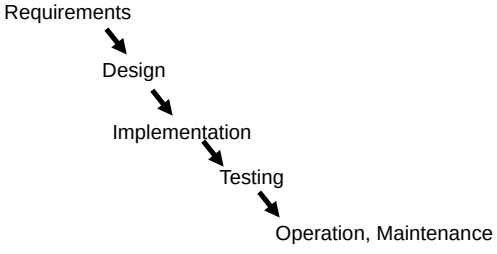
User-centered systems design
Distributed systems
OO Design
Database design
Compiler design
Algorithms and datastructures

Test method.

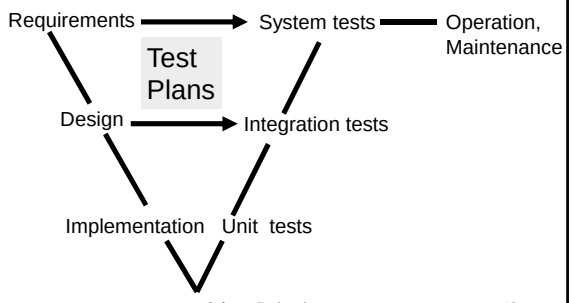
Large Scale Progr.

PROJECTS

The waterfall model



The V-model



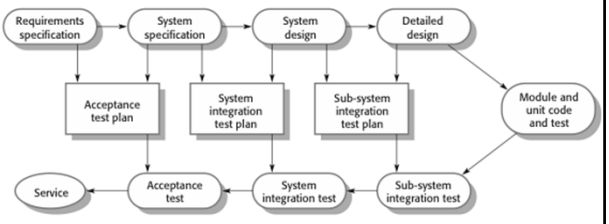
Validation

- Will the product satisfy the customer needs?
- Are we building the right product?

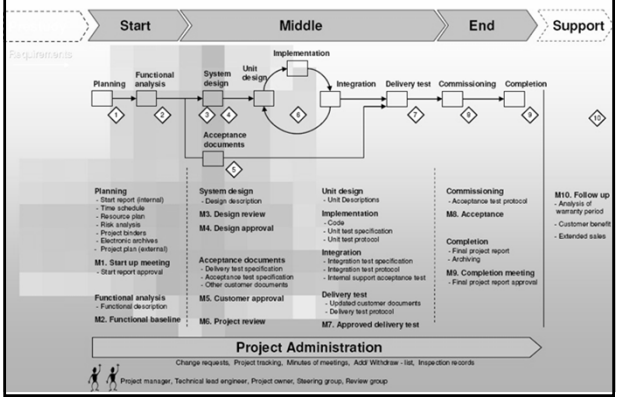
Verification

- Do we satisfy the requirements?
- Are we building the product right?

The V-model (Sommerville)



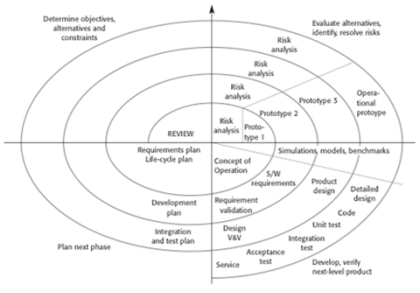
Prevas project model (detailed)



Outline of the course

- The V-model as a roadmap
- Dependable systems
- Project management
- Ethics

Figure 2.11 Boehm's spiral model of the software process



Project start

Commercial Off The Shelf

- Custom made → Generic (COTS)

trend

- Extremely customizable systems (ERP systems, like SAP)

Enterprise Resource Planning

Project start

- Custom made
  - feasibility study
  - requirements definition
  - requirements specification
  - contract
- Generic (COTS)
  - market analysis
  - technical developments
  - requirements definition
  - requirements specification
  - product description

Feasibility study

Many IT-projects that fail, should not have started

- One System to integrate them all ...
- Organisation that is the problem, not IT
- Political action (we need to do something …)
- We can make it work …

Describe the *environment* with the new IT-system
Ethnographical study [4.5.5]