Software Engineering and Project Management

INTRODUCTION

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Proposed plan

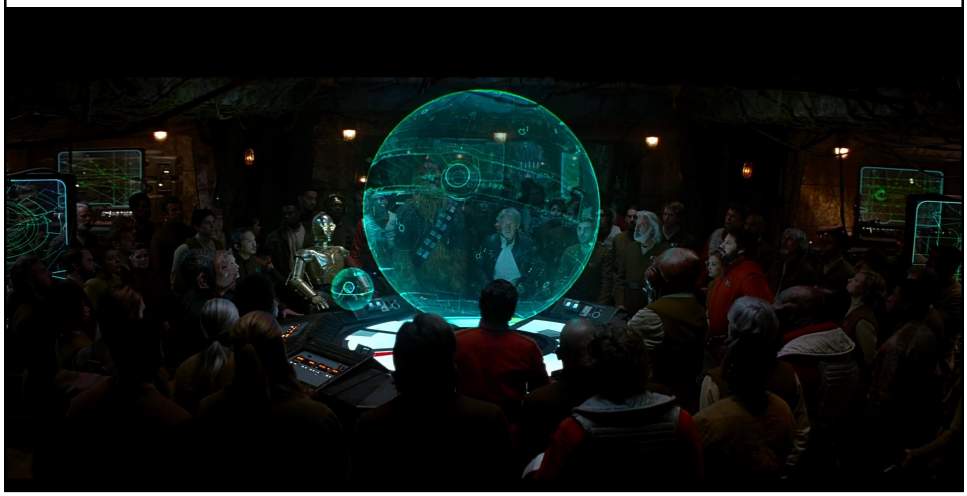
- Random story to catch students attention (for true) [10']
- Software Engineering as a process [35']
- Break [15']
- V&V of functional requirements [30']
- Discovering activity [15']

A Software Engineering Story

A long time ago in a galaxy far, far away....

Larger projects

- SEPM is about to create the ~~Death Star~~ Star Killer



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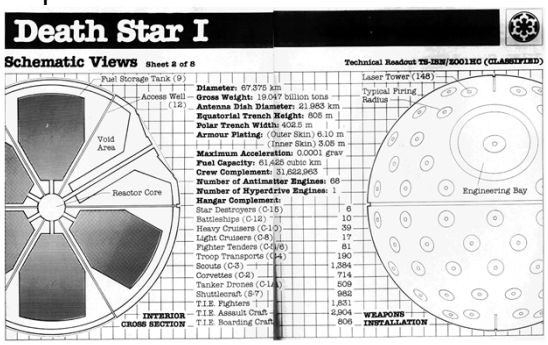
A non-formal intro to SE

- Covers aspects such as:
  - Requirements definition and specification
  - Prototypes
  - Formal specifications



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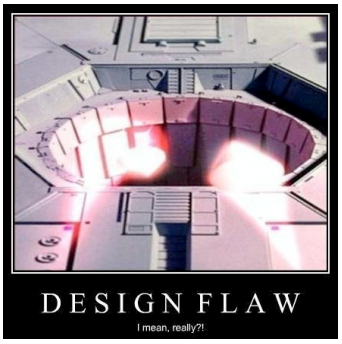
A non-formal intro to SE

- Covers aspects such as:
  - Design methods
  - Reliability and safety
  - Validation and verification
  - Quality assurance



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A non-formal intro to SE

- Covers aspects such as:
  - Maintanence and reuse
  - Project planning

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Questions

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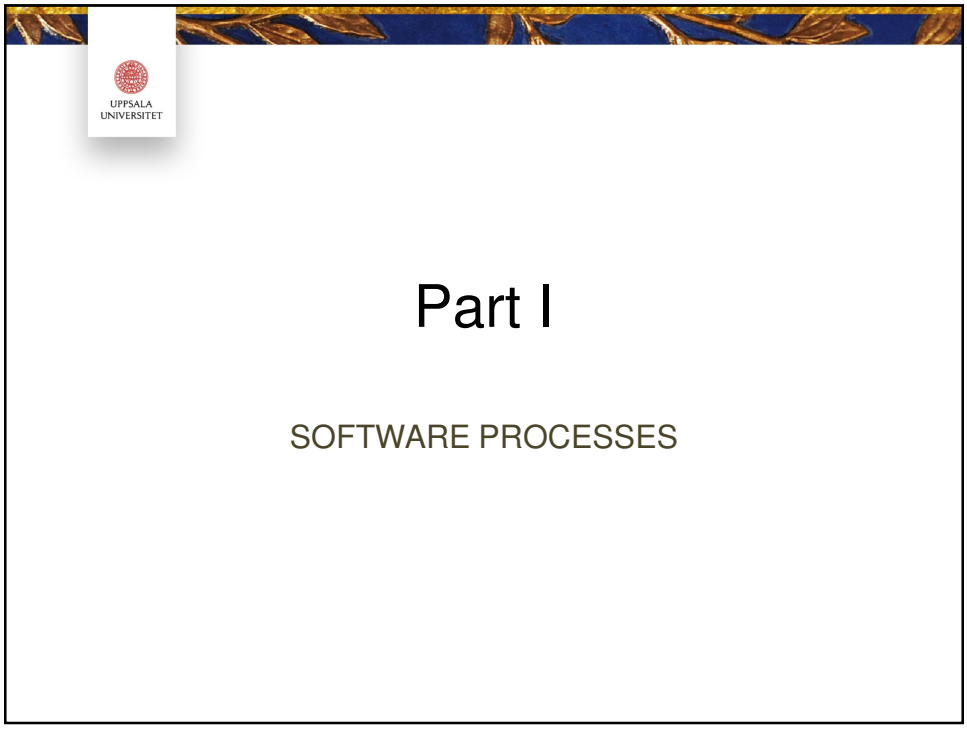
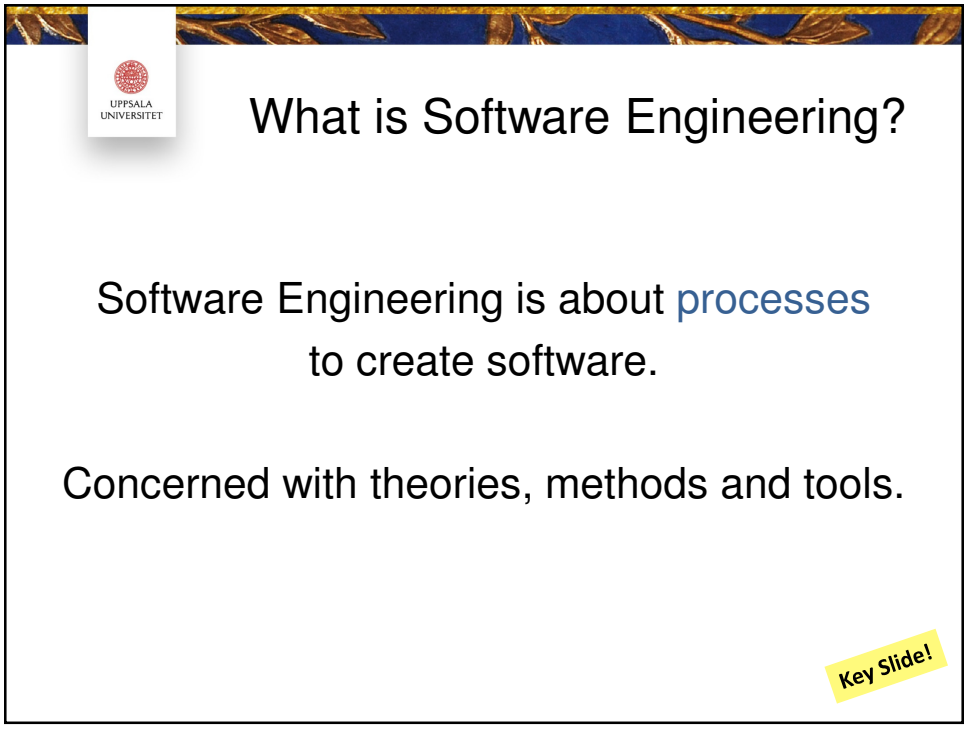


Part I

SOFTWARE PROCESSES



What is Software Engineering?

Software Engineering is about processes to create software.

Concerned with theories, methods and tools.

Key Slide!

SE is Engineering

- **Making things that work** (*practical*)
- **Use of** models, standard designs, methods, etc.
- **Constrains**
  - Time
  - Money
  - Organization
- **Managing**
  - People
  - Communication

…but not always like Engineering

- Every project is mostly new
- Software is “invisible”
- Perceived to be adaptable (*rewrite code vs. rebuild bridge*)
- Complexity
  - Lacks physical boundaries
  - Often does many things
  - Multi-language, multi-level
- Usability (*getting it right*)
- Legacy systems

…but not always like Engineering

- SE – More than just technical skills!
  - Confidentiality
  - Competence
  - IP rights
  - Computer misuse
  - ...

Process

- **Problems with processes**
  - what really happens… too messy
- **Process model**
  - abstraction, common themes
- **A "methodological" process**
  - cares of what should happen

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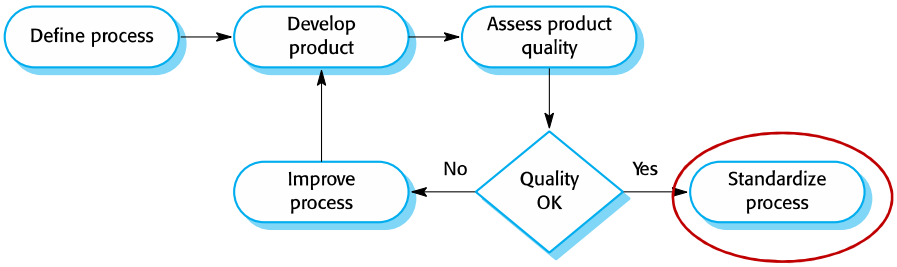
Process-based Quality



Sommerville (10ed & 9ed): Ch24 Quality management

Key Slide!

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Product Quality

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

Process (method) Quality

- **Acceptable**
  - usable, learnable, compatible
- **Dependable**
  - safe, reliable, secure
- **Efficient**
  - response time, memory use
- **Maintainable**
  - documented, structured
- **People actually follow it**
  - acceptable, usable, learnable
- **Manageable**
  - visible, robust to problems
- **It delivers**
  - efficient, in time, acceptable
- **Supportable**
  - documented, structured

Software Process Activities

- **Validation** *Testing*
- **Evolution** *Delivery, Maintenance*
- **Specification** Requirements
- **Development** *Design, Implementation*

Q: In what order should these processes be followed?

Software Process Activities

- **Specification** *define functionality and constrains*
- **Development** *design and program*
- **Validation** ensure it is what customer requires
- **Evolution** *evolve to meet changing customer & market requirements*

Key Slide!

Questions

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Part I.b

MODELS OF SOFTWARE PROCESSES

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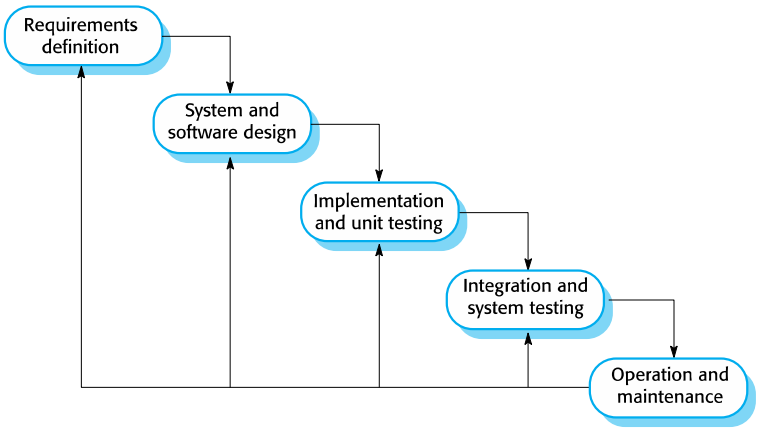
The Waterfall Model



Sommerville (10ed & 9ed): Ch2 Processes

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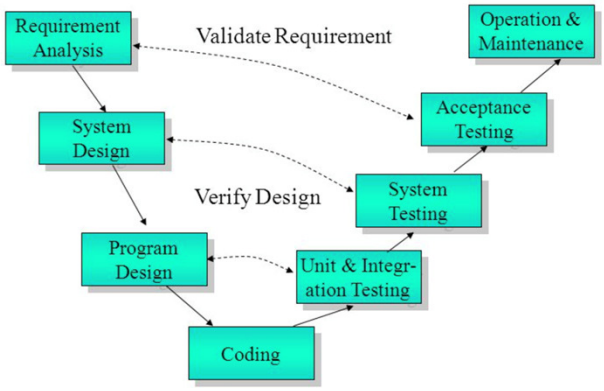
The V-Model



Sommerville (10ed & 9ed): Ch2 Processes

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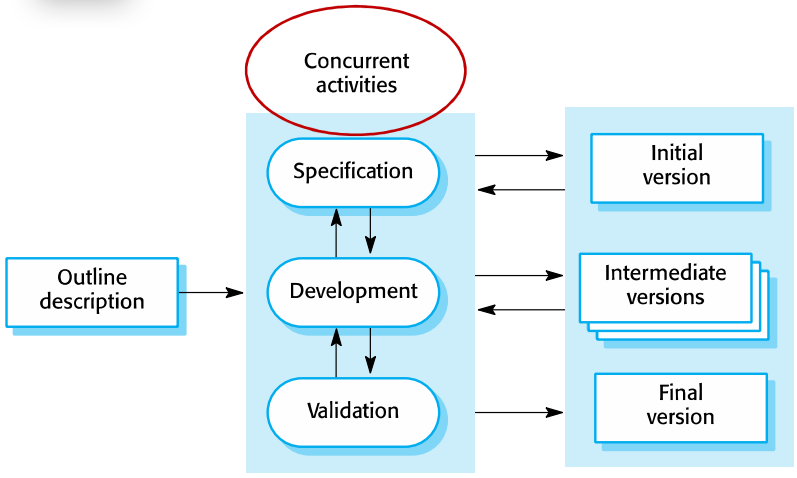
Process

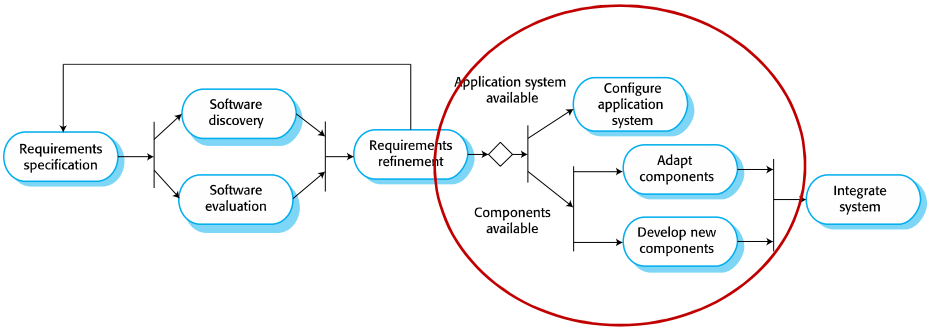
- **Validation**
  - Will the product satisfy the customer needs?
  - Are we building the right product?
- **Verification**
  - Do we satisfy the requirements?
  - Are we building the product right?

Incremental Development



Sommerville (10ed & 9ed): Ch2 Processes

Reuse-based Development



Sommerville (10ed & 9ed): Ch2 Processes

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Questions

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