Software Engineering and Project Management

INTRODUCTION

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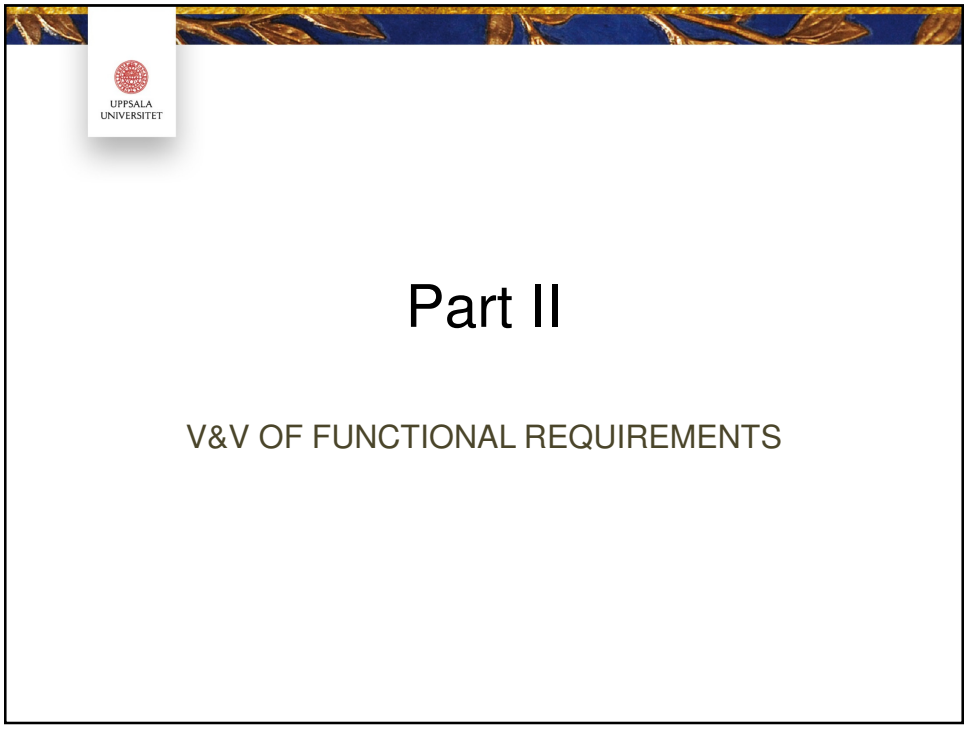
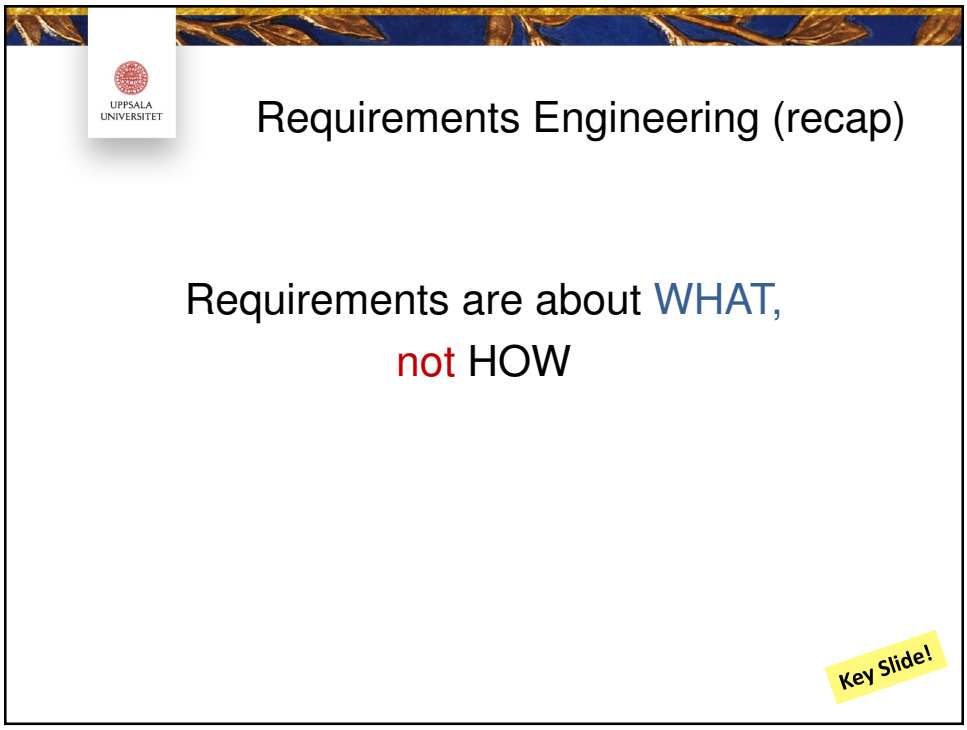
Proposed plan

- 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']



Part II

V&V OF FUNCTIONAL REQUIREMENTS



Requirements Engineering (recap)

Requirements are about WHAT,
not HOW

Key Slide!

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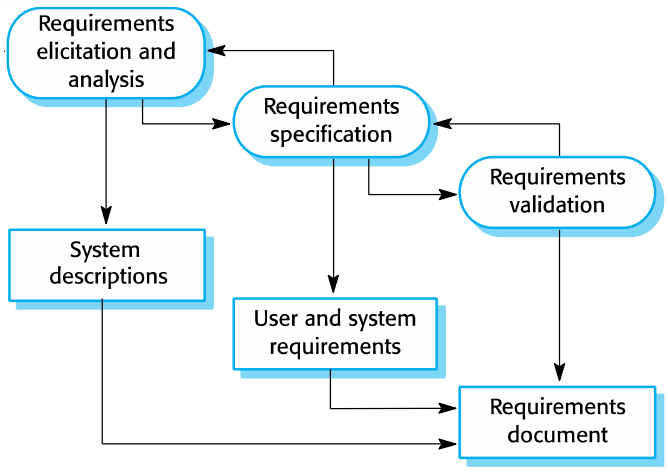
RE Process (recap)



Sommerville (10ed & 9ed): Ch2 Processes

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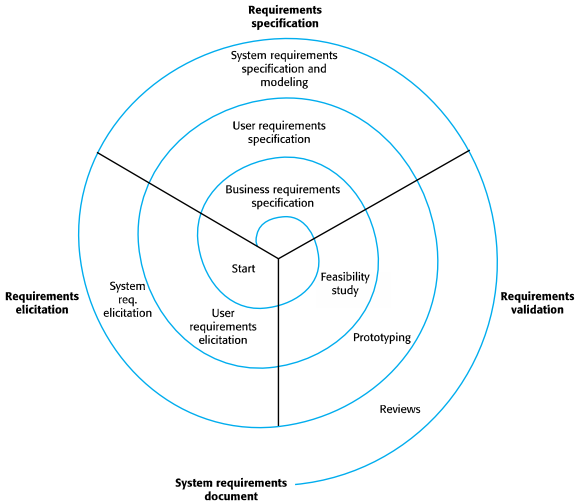
RE Process (recap)



Key Slide!

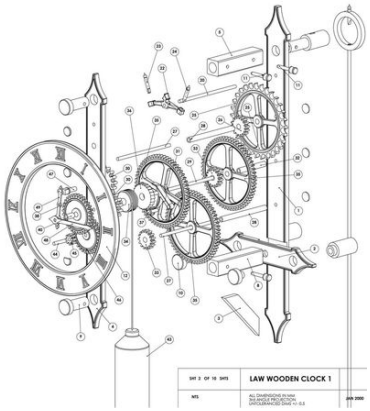
Sommerville (10ed & 9ed): Ch4 Requirements Engineering

User vs. System Requirements

Q: What is a cukoo clock?

User vs. System Requirements

User vs. System Requirements



User vs. System Requirements

- **User**
  - Abstract
  - Natural Language
  - What users want
- **System**
  - More concrete, detailed
  - Natural + Formal language
  - What system provides
  - Used as contract or product description

A Restaurant example

- **User**
  - Food should look good
  - Food should taste good
  - I want enough food
  - I want fish
- **System**
  - Chicken soup
  - Baked salmon with …
  - Chocolate mousse

A Software example

User requirements definition

1. The Mentcare system shall generate monthly management reports showing the cost of drugs prescribed by each clinic during that month.

System requirements specification

1.1 On the last working day of each month, a summary of the drugs prescribed, their cost and the prescribing clinics shall be generated.
1.2 The system shall generate the report for printing after 17.30 on the last working day of the month.
1.3 A report shall be created for each clinic and shall list the individual drug names, the total number of prescriptions, the number of doses prescribed and the total cost of the prescribed drugs.
1.4 If drugs are available in different dose units (e.g. 10mg, 20mg, etc) separate reports shall be created for each dose unit.
1.5 Access to drug cost reports shall be restricted to authorized users as listed on a management access control list.

Sommerville (10ed & 9ed): Ch4 Requirements Engineering

Functional vs. Non-functional Requirements

- **Functional**
  - what the system should do

Product behaviour

- **Non-functional**
  - constrains on the system

Process
constrains on the
development process

Key Slide!

Functional Requirements

- Data operations, presentation…
- Domain requirements: *"everyone knows that…"*

- **Complete**
  - All desidered funcionality is covered

- **Consistent**
  - They do not contradict each other

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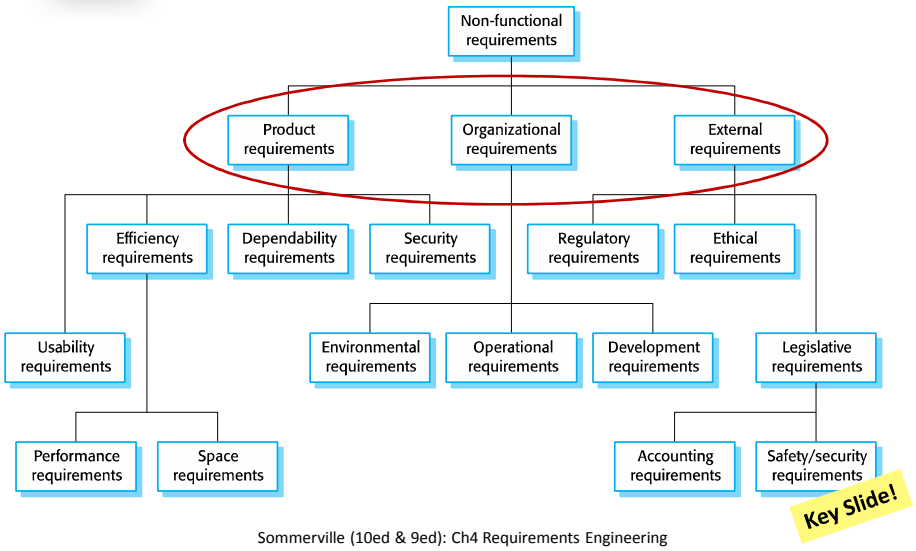
Non-functional Requirements



Key Slide!

Sommerville (10ed & 9ed): Ch4 Requirements Engineering

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Metrics for Non-functional Requirements

Property	Measure
Speed	Processed transactions/second User/event response time Screen refresh time
Size	Mbytes Number of ROM chips
Ease of use	Training time Number of help frames
Reliability	Mean time to failure Probability of unavailability Rate of failure occurrence Availability
Robustness	Time to restart after failure Percentage of events causing failure Probability of data corruption on failure
Portability	Percentage of target dependent statements Number of target systems

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Questions

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Part II.b

VERIFICATION, VALIDATION, INSPECTION

Requirements checklist (Verification)

- **Understandable** *(properly explained)*
- **Valid** *(is this required, rationale)*
- **Verifiable** *(test cases included)*
- **Realistic** *(feasibility, prototype)*
- **Complete** *(all cases covered, exceptions)*
- **Consistent**
- **Traceable**

Key Slide!

Requirements checklist (Verification)

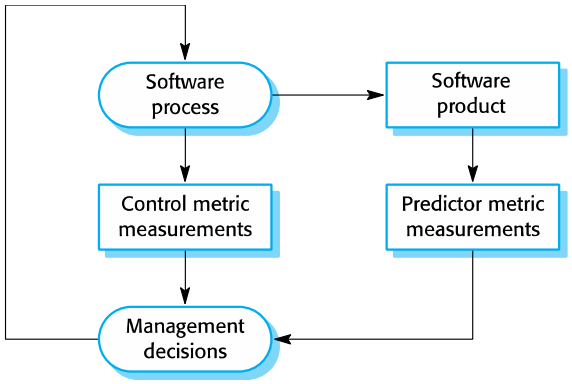
- **Valid**
  - *Real users*
- **Realistic**
  - *On time / Under budget / Current tech*
- **Complete**
  - *Is all functionality captured? / Are all cases covered?*
- **Consistent**
  - *Internal to requirements*
- **Verifiable**
  - *Can requirements be tested?*

How do we get the requirements right? (Validation)

- **User review of**
  - *Requirements*
  - *Models*
  - *Prototype*
  - *Test cases*
- **Comparison with similar systems**

Key Slide!

Measurement Feedback



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

Measurement Process

- **Choose measurements**
  - *Goal → Question → Metric (GQM)*
- **Select components**
- **Measure**
- **Identify anomalous values**
  - *Compare to normal product / company values*
- **Analyze anomalous components**

Process measurement

- **Resources required**
  - *Time*
  - *Money*
- **Occurrence of events**
  - *Failed system builds*
  - *Missed deadlines*
  - *Missing process documents*

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Questions

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Part II.c

CHECK ACTIVITY

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Example 1

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Example 2

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Questions

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