Introduction to Process and Data Modeling

Internet and Software Technology - Fall 2005
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Roadmap

• Who are you?
• Models, what & why
• Lecturers and topics
• Course format & exam
• Quick overview of the course
• A case study (Peter Carstensen)

Models what, why ...

• model = a representation of something (structure/data or behaviour/process)
• involve abstractions (depending on purpose)
• used for communication (specification) and understanding (analysis, investigation)
• for engineering, cooperation, interoperability
• by humans and programs

Software Development

• Design & analysis
• Construction
• Reconstruction
• Testing & verification
• Management
Modes of use

<table>
<thead>
<tr>
<th>Sketch, quick, informal, incomplete</th>
<th>Discussion, understanding</th>
<th>Graphical/physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blueprint, complete (to some degree)</td>
<td>Contract, specification, management</td>
<td>textual, diagrammatical CASE tool</td>
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<tr>
<td>Programming language (Model Driven Architecture)</td>
<td>Implementation</td>
<td>Executable UML trip-less CASE tool (live code)</td>
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- Mind the purpose of modeling!
- Keep it simple
- Don’t just kill trees
- When is the model correct?

The (other) lecturers:
- Design and Use of IT:
  - Yvonne Dittrich: SWD & design for change
  - Signe Ellegaard Borch, PhD: UML
  - Steen Brahe, Ind. PhD: Business Processes
- Theoretical Computer Science:
  - Jens Chr Godskesen: Formal Specification, Verification and Test

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and guests:
- Peter Carstensen (DUIT): a case study
- Lecturer from the Petri net group, (Daimi, Aarhus University)
- Kjeld Schmidt (DUIT): Workflow modelling for CSCW
- Mikkel Lauritsen, Intentia: MDA in industry
Format of course
(www.itu.dk/courses/IPDM/E2005)

- Lectures 9-12
- Exercise classes 13-16.00 (from next week) (form groups of 2-3)
- Instructor: Martin Olsen (SWU)
- Voluntary group hand-ins
- Mandatory group project in week 11
- Oral exam, January 3r

A quick tour
- Week 2: Software development
- Week 3-5: UML
- Week 6,7,10: Formal models and tools
- Week 8: XML
- Week 9: Business process models
- Week 11: Mini-project
- Week 12: Industry & Research Seminar

Software Development

UML

Note that although an iteration includes work in most disciplines, the relative effort and emphasis change over time. This example is suggestive, not literal.

A four-week iteration (for example). A mini-project that includes work in most disciplines, ending in a stable executable.

Sample UP Disciplines
- Business Modeling
- Requirements
- Design
- Implementation
- Test
- Deployment
- Configuration
- Change Management
- Project Management
- Environment

Focus of this book

UML Diagrams
- Structure Diagram
- Behavior Diagram
- Class Diagram
- Composite Structure Diagram
- Object Diagram
- Activity Diagram
- Use Case Diagram
- State Machine Diagram
- Interaction Diagram
- Communication Diagram
- Sequence Diagram
- Timing Diagram
Formal models and tools

- (Communicating) Automata
- UPPAAL tool for verification with time
- Petri net and the CPN tool

(Coloured) Petri Nets

- Coloured Petri Nets: Kurt Jensen (80'ties)

Communicating Automata and UPPALL

XML
Business Processes

- Business processes, e.g. in banks and insurance companies
- General workflows, e.g. for cooperation
- SOA & Webservice composition (BPEL4WS)

Seminar (week 12)

- Research activities at ITU on models (subjects for projects and thesis)
- MDA in industry
- Course conclusion