Model-Driven Software Development in Technical Spaces (MOST)
- aka Software Factories -

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- Contents
- Goals

DRESDEN concept
Exzellenz aus Wissenschaft und Kultur

Relation of the Course to Modules

The course can be used for the following modules:

- Diplom Informatik: INF-BAS3, INF-VERT3
- Master Informatik: INF-BAS3, INF-VERT3
- Bachelor Medieninformatik: INF-B-540
- Master Medieninformatik: INF-BI-4, INF-BI-5
- Diplom IST: IST-B-321
- Diplom Informatik (2004): INF-04-FG-SWT
- Diplom Informatik (2004): FG 4 SE

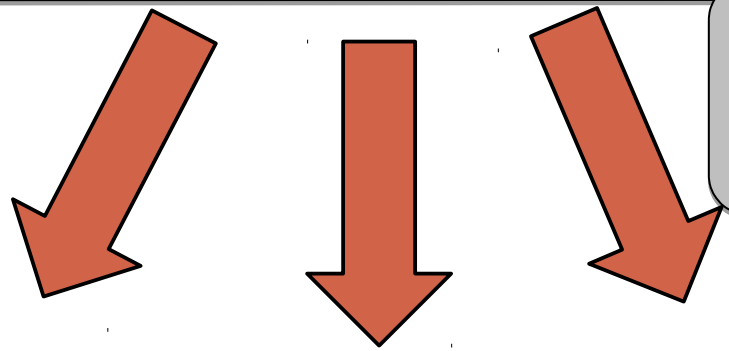
For other programs, special rules may hold; consult the manuals of your "Nebenfach".

Master‘s Courses (Hauptstudium)

Softwaretechnologie II (Bachelor)
Modellierung, Entwurfsmethoden, Produktlinien, Geschäftsmodelle (WS)

Model-Driven Software Development in Technical Spaces
How to be productive in software development (WS)

Academic Skills in Computer Science
Wie man wissenschaftlich arbeitet (WS)



Requirements Engineering und Testen (Dr. Demuth)
Wie man Qualität für Software erzielt (WS)

Software-Management
Wie man Projekte macht (SS)

Design Patterns and Frameworks
Architektur objektorientierter Systeme (WS)

Software as a Business (WS)
How to develop a business model and a startup

Ausgewählte Kapitel aus der Softwaretechnik (Dr. Götz)
Softwarearchitektur (SS)

Component-Based Software Engineering
Produktlinien mit anderen Komponentenmodellen (SS)

Future-Proof Software Systems (Dr. Furrer)
Evolvable architectures (WS)

Automotive Software Engineering (Prof. Hohlfeld)
(SS)

Central Topics of the Course

9. Modeling Islands, Modeling Villages and Technical Space Bridges are important for heterogeneous software development

Transformation Bridge Adapter Bridge

8. Process Engineering and Method Engineering

7. Megamodels (with model mappings) for Quality Management

MDA OSM HYPS Vitruv ROSI

6. Alternative Metapyramids of Technical Spaces

5. Metamodel composition

4. Generic Tools in a Technical Space (Reducible metamodels, Querying, Abstract Interpretation, logics for analysis and consistency, TRS, GRS, Port GRS for transformation)

3. Metamodel-based environments

EMFText eMOFlon

2. Technical Spaces do have the same components and tools, language mappings, model algebrae, model composition systems

1. Metamodels structure data, models and programs
Decidable metamodels, Tool Metamodels
Tool Construction and -Generation in a TS

EMOF MOF EMOF CROM Melanie

0. Applications of MDSD: Design tools of complex systems
Design tools for CPS

MDSD and Software Factories

- MDSD is the engineering of applications with several related models (inclusively code), based on systematic engineering of metamodels (languages) in technical spaces.
- How are models related
  - Model cover by matching rules
  - Model mappings
- How are the languages related?
  - By mapping
  - By role fattening

Engineering of Technical Spaces, Megamodels, and Software Factories

- Engineering of Technical Spaces and Megamodels is one of the most important topics of the future of software and systems development
- Dresden has modern technologies and tools
  - Role-based languages
  - Invasive composition
  - Metacomposition tools (Reuseware)
  - Round-Trip Engineering and Role-based tools

Outline

Teil I: Grundlagen

- 1. Modeling
- 2. MDSD Applications
- 3. Tools and Materials Pattern Language (TAM)
  - Roles and collaborations
- 4. Metamodeling (EMOF, MOF)
  - The Technical Space House
- 5. Bridging the TS Grammarware and EMOF with EMFText
- 6. Tool architecture
  - Repositories
  - Role modeling and the Role-Object Pattern
- 7 Megamodels

- Part II Technical spaces
- 20. Grammarware
  - Parser generators
  - Text algebrae
- 21 Treeware
  - Query
- 22 Deep Analysis in Treeware
  - Abstract interpretation
- 23 Link-Treeware
  - XML, JSON, Xcerpt
- 24 Flat Analysis in Graph- and Modelware
  - Semmle .QL, TGreQL
- 25 Deep Analysis in Graphware
  - Reachability
- 26 Graph and Model Transformations
- 28. MOFLON as example

Outline Part III-VI – Architecture of Software Factories

Part III: Architecture and Composition of Tools to Applications

- 30. Architecture
  - Tool integration
  - Exchange formats
  - Bridges between technical spaces
  - Composition of stream-based tools
- 31. Role-based composition of languages for the composition of materials
  - And tools
- 32. Stream-Based integration
- 33. MetaCASE tools (MetaEdit+)
- 34. MOFLON

- Part IV: 1-TS Software Factories
  - 40. Requirements and Test Management in ReDeCT
  - 41. Model-Driven Architecture
  - 42. Documentation
- Part V: Synchronization and Round-Trip Engineering
  - 40. Round-Trip Engineering
  - 41. Triple Graph Grammars
  - 42. Orthographic Software Modeling
- Part VI: Multi-TS Software Factories
  - 60. The MOST factory
  - 61. Conclusion

Literature - Books

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