Evolving FRaMED
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Complex Practical Course

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Evolving FRaMED

Outline

Looking Back

Task

Next Steps
First Role Modelling Editor (FRaMED)

- Development of an Eclipse-based diagram editor
  - Graphical specification of role models
    *aka. Compartment Role Object Models (CROM)*
  - Generate coherent Models
  - Enable the usage of common concepts and notations

Prerequisites

- Knowledge about Eclipse plugin development, meta modelling with Ecore, and GEF diagram framework
- Basic understanding of the concept of roles and compartments
- Insight into the established Ecore Metamodel
Looking Back
Syntax of Object Role Model[1]

Entities
- Classes
  - Class
    - fields
    - methods()
- Role Types
  - RoleType
    - fields
    - methods()
- Context Types
  - ContextType
    - fields
    - methods()
    - rolemodel

Constraints
- Role Implication[2]

Constraint Groups
- Role Groups
  - RoleGroup (n..m)

Relations
- Relationship
  - A
    - multi
  - B
    - multi

Formal relations
- Inheritance
  - ClassA
  - ClassB

Fulfilment (fills-Relation)
- RoleType
  - Class

Relationship Constraints [3]
- Role Equivalence
- Role Invariants [4]
  - irrefflexive, acyclic, total,
  - singleton

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Looking Back

Update Graphical Syntax

**Entities**

- **Data Types**
  - *DataType*
    - fields
    - method(s)
  - *Natural Type*
    - fields
    - method(s)

- **Static Relations**
  - *Data Type Inheritance*
    - *DataType* → *SubData*

- **Dynamic Relations**
  - *Participation (participates-Relation)*

<table>
<thead>
<tr>
<th>Compartment Types</th>
<th>Role Types</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>CompType</em></td>
<td><em>RoleType</em></td>
</tr>
<tr>
<td><em>RoleType1</em></td>
<td><em>CardA</em></td>
</tr>
<tr>
<td>...</td>
<td><em>CardB</em></td>
</tr>
<tr>
<td><em>RoleTypeN</em></td>
<td><em>B</em></td>
</tr>
</tbody>
</table>

**Constraint Atomes**

- **Role Types**
  - *RoleType*
    - *B1*
    - *B2*
    - *B3*
    - ...
    - *Bn*

- **Role Groups**
  - *RoleGroup (n..m)*
    - *RoleGroup (AND)*
      - *B1*
      - ...
      - *Bn*
    - *RoleGroup (OR)*
      - *B1*
      - ...
      - *Bn*

**Constraints**

- **Role Implication** [3]
  - *A* → *B*

- **Role Prohibition** [3]
  - *A* → ¬*B*

- **Relationship Constraints** [4]
  - *A* → *B*
    - Irreflexive, acyclic, total, ...

- **Relationship Implication** [5]
  - *A* → *B*
    - *B* → *C*
Looking Back
Usage Scenario

Bank
- name: String
  - login(id: int, credentials: String): Customer
  - executeTransactions()
CROM (Meta)model (Version 1.0)

Looking Back

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Looking Back

New CROM (Meta)model (Version 2.0)
Looking Back
Role of the CROM (Meta)model

Models based on a common Metamodel

- Conceptual Model
- Database Schema (RSQL)
- Formal Model

Graphical Notation (FRaMED\textsuperscript{1})

created from

Textual Syntax (TRoML\textsuperscript{2})

represents

abstracts to

CROM\textsuperscript{3} Metamodel

1) https://github.com/Eden-06/TRoML
2) https://github.com/leondart/FRaMED
3) https://github.com/Eden-06/CROM
Resolve the Software Evolution Problem

- Keep stable FRaMED_{\text{beta}} version intact (branch out)
- Develop FRaMED_{\text{evl}} on the current branch
- Refactor and Include the new metamodel
Evolving First Role Modelling Editor (FRaMED)

- Evolution of FRaMED towards a new release
  - Incorporate the new \textit{CROM Metamodel} \(^2\)
  - Respect the consistancy of \textit{CROM Models}
- Establish a new version of FRaMED \(^1\)
  - Including UnitTests, Documentation, Examples

Prerequisites

- Knowledge about Eclipse plugin development, meta modelling with Ecore, and GEF diagram framework
- Understanding of the \textit{CROM Metamodel} \(^1\)

1) https://github.com/leondart/FRaMED
2) https://github.com/Eden-06/CROM
1. **Neue Meta-Modell-Version einpflegen**
   a) Abhängigkeiten zwischen FRaMED und CROM identifizieren
      i) Um welche Infos muss CROM erweitert werden?
      ii) Welcher Teil der grafischen Oberfläche sollte modellunabhängig sein?
   b) Abhängigkeiten reduzieren

2. **Bugfixing** *(Siehe Github Issue Tracker)*

3. **Refactorings**
   a) MVC - Pattern konsequent umsetzen
   b) Weitergabe von Modellelemente statt Strings

4. **Dokumentation**
   a) Architekturdokumentation
   b) Dokumentation der Abhängigkeiten

5. **Tests** *(UnitTests)*
Next Steps

- Get a GitHub Account
- Download CROM\textsuperscript{1} from GitHub
- Download FRaMED\textsuperscript{2} from github.com
- Get used to work with GEF / Ecore Development Tools
- Investigate the structure and behavior of FRaMED
- Define necessary extensions to the metamodel

1) https://github.com/Eden-06/CROM
2) https://github.com/leondart/FRaMED
[1] Explizite Rollenbindung mit Story-Boards  
T. Kühn  
*Großer Beleg, TU-Dresden* (2011)

[2] Role model based framework design and integration  
D. Riehle and T. Gross  

S. Balzer, T. Gross, and P. Eugster  

[4] ORM 2  
T. A. Halpin  
*OTM Workshops, vol. 3762 of Lecture Notes in Computer Science* (2005)
“I’m beginning to wonder if our Terms of Reference may be a little too broad..?”
Cartoon by Nick D Kim strange-matter.net. Used by permission.