Software Engineering

Model Driven Engineering in Fujaba

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Last Lecture: UML

- usecase diagrams
- object diagrams
- class diagrams
- (activity diagrams)

- Announcement: http://www.fujaba.de/
  - allows MDE

Fujaba - http://www.fujaba.de

- From UML to Java And Back Again
- Fujaba is an “easy to extend UML / Story Driven Modelling and Graph Transformation platform with the ability to add plug-ins.”
  - it “combines UML class diagrams and UML behaviour diagrams (Story Diagrams) to a powerful, easy to use, yet formal system design and specification language.”
  - it “supports the generation of Java sourcecode out of the whole design which results in an executable prototype.”

Fujaba

- UML
- Story Driven Modeling
- Graph Transformation
- Class Diagrams <-> Story Diagrams
- java sourcecode -> executable prototype

Task: Verify Fujaba installation, run eDobs as shown

Scenario: Towers of Hanoi

http://en.wikipedia.org/wiki/Towers_of_hanoi

User Story 1 – Hanoi setup

- Pre: 4 discs, different sizes (1,2,3,4), empty table
- define three places on table (tower-places)
- put the four discs in the right order on the first place (radius 1 on top)
- Post: 4 discs, ordered on first tower-place

User Story 2 – Initial move

- Pre: 4 discs, ordered (4,3,2,1) on first tower-place
- Move disc with radius 1 to second tower-place
- Post: 3 discs (4,3,2) on first tower-pace, 1 disc (radius 1) on second tower-place

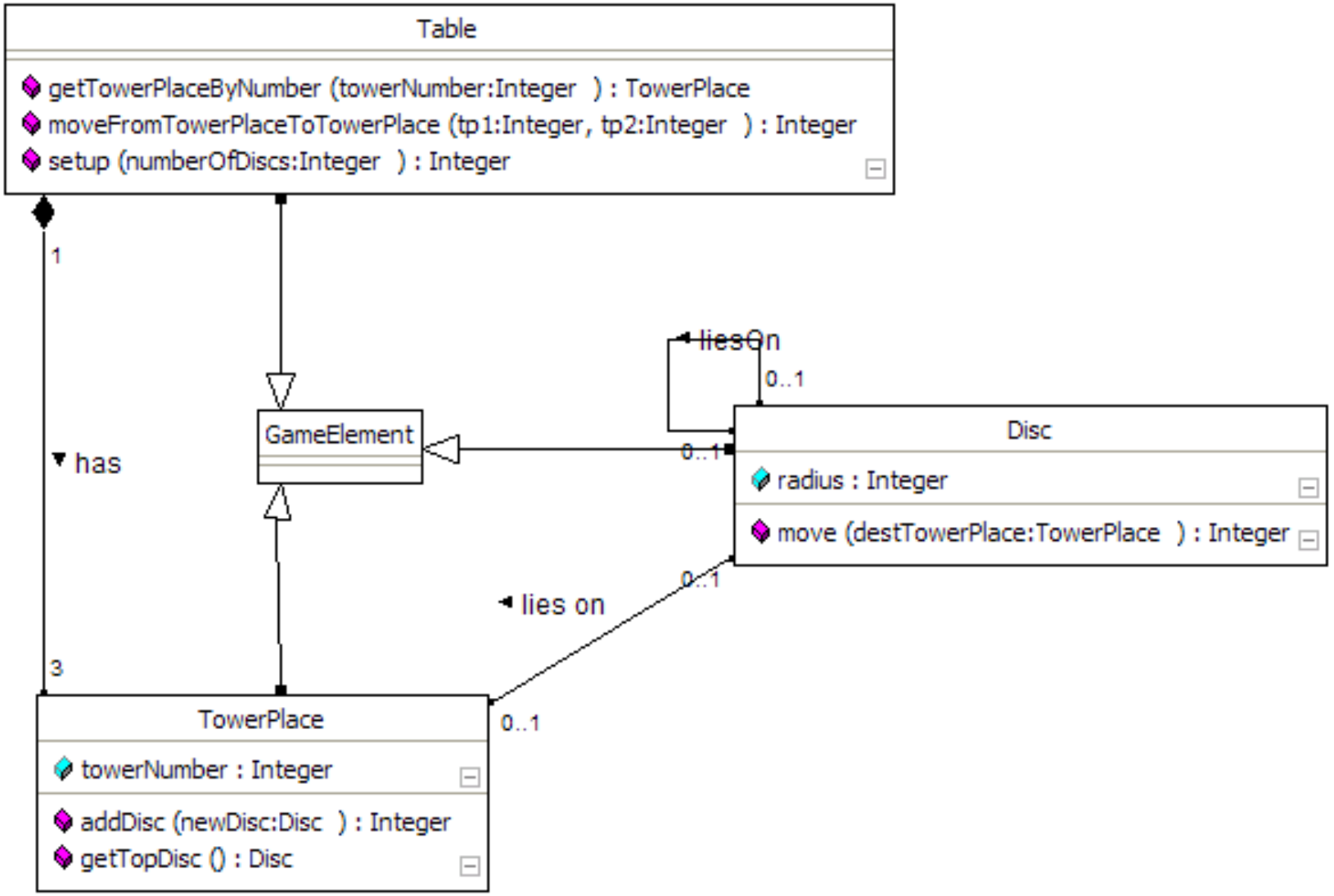
Object Diagrams for Stories

- Form teams
- Draw Object-Diagrams for pre and post cases for both user stories (on paper).
- 15 minutes each
- Present

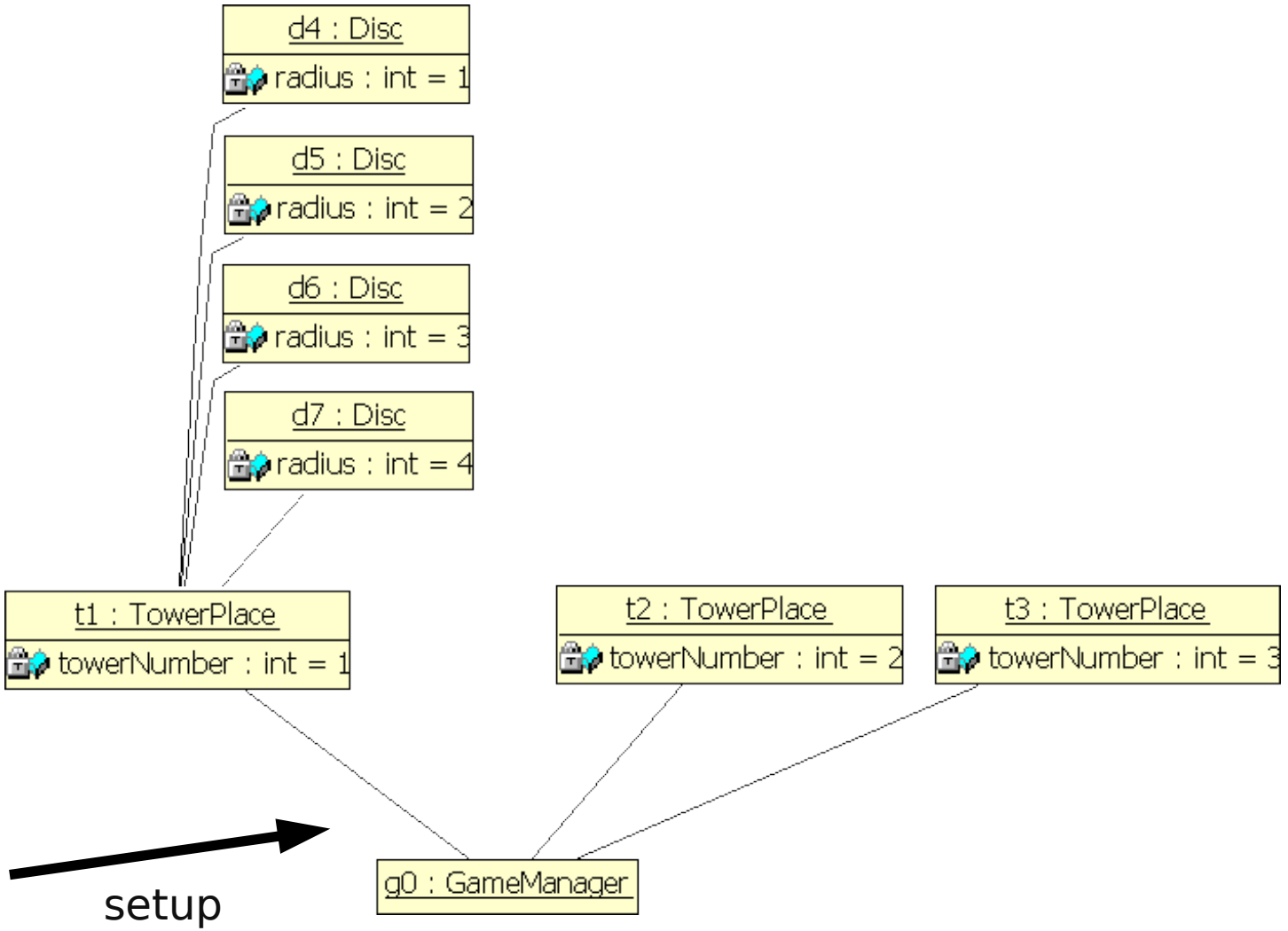
Derive the Class Diagram

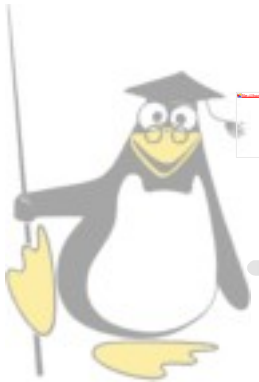
- Use Fujaba (one operator per team)
- Use classes: GameElement, Table, Disc, TowerPlace
- Methods:
  - getTowerPlaceByNumber,
  - moveFromTowerPlaceToTowerPlace,
  - setup,
  - addDisc,
  - getTopDisc,
  - move

Class Diagram - Hanoi

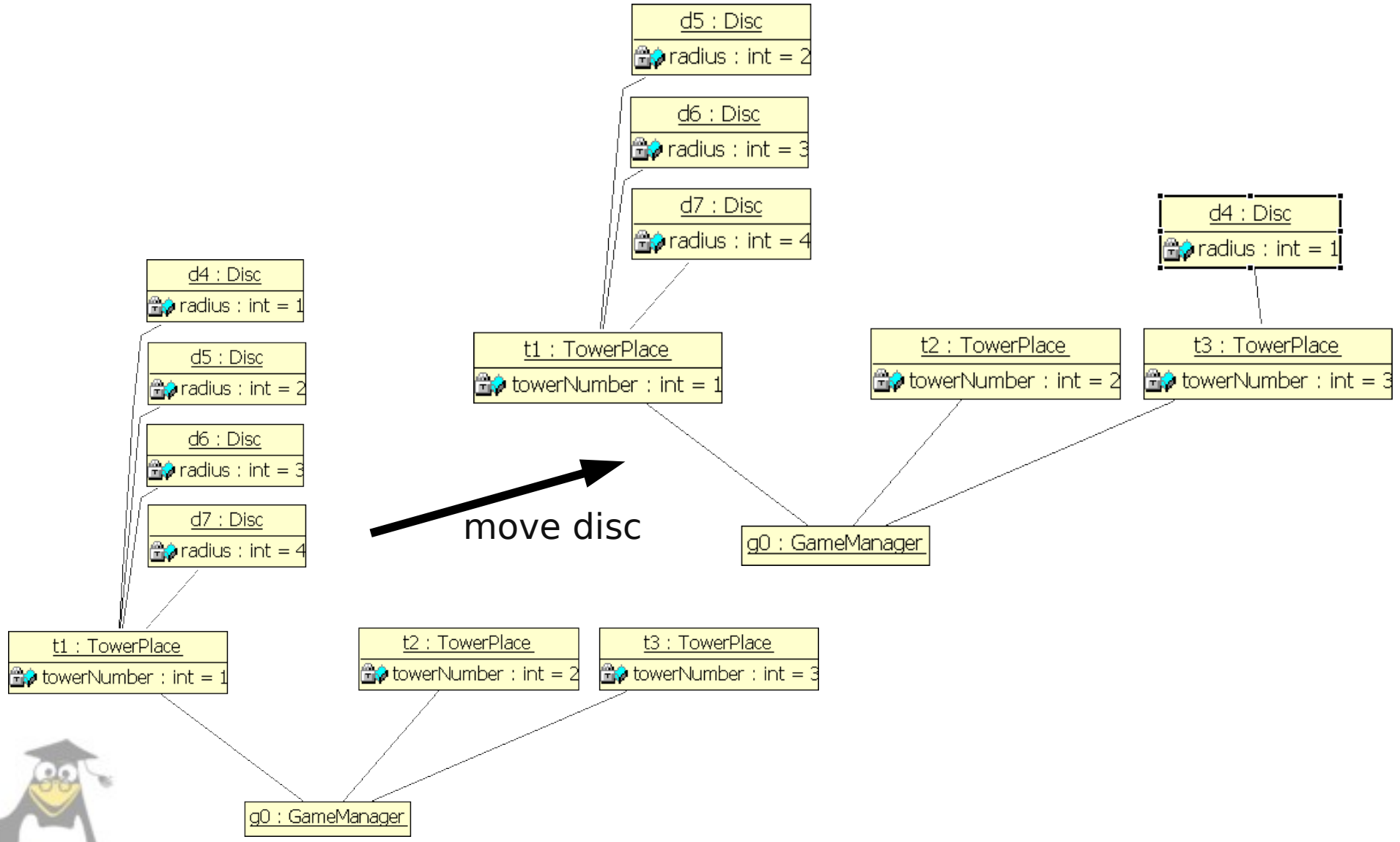


Graph Transformation





Graph Transformation



Story Driven Modeling

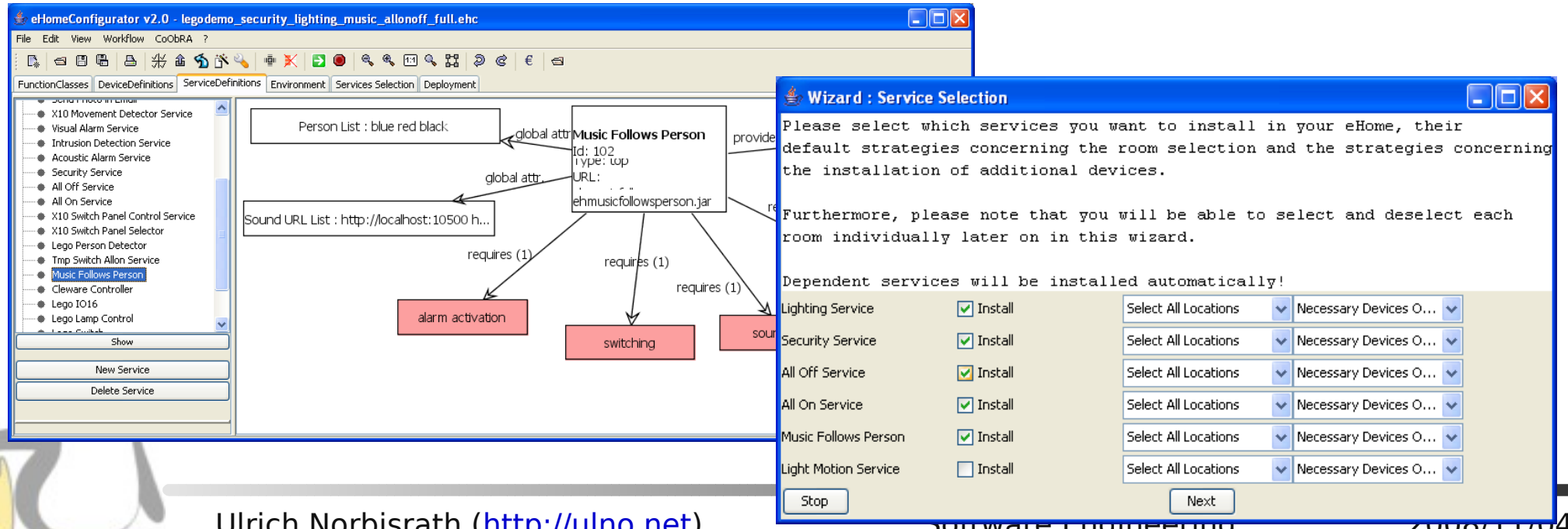
- Story diagrams
- Transitions
- Matching objects
- Loops
- eDobs

Tasks

- Model the following methods and show me how you test them in the eDobs
  - getTowerPlaceByNumber,
  - getTopDisc,
  - addDisc,
  - setup,
  - move,
  - moveFromTowerPlaceToTowerPlace
- Solutions will be available in between on http://ut.ee/~ulino/files/

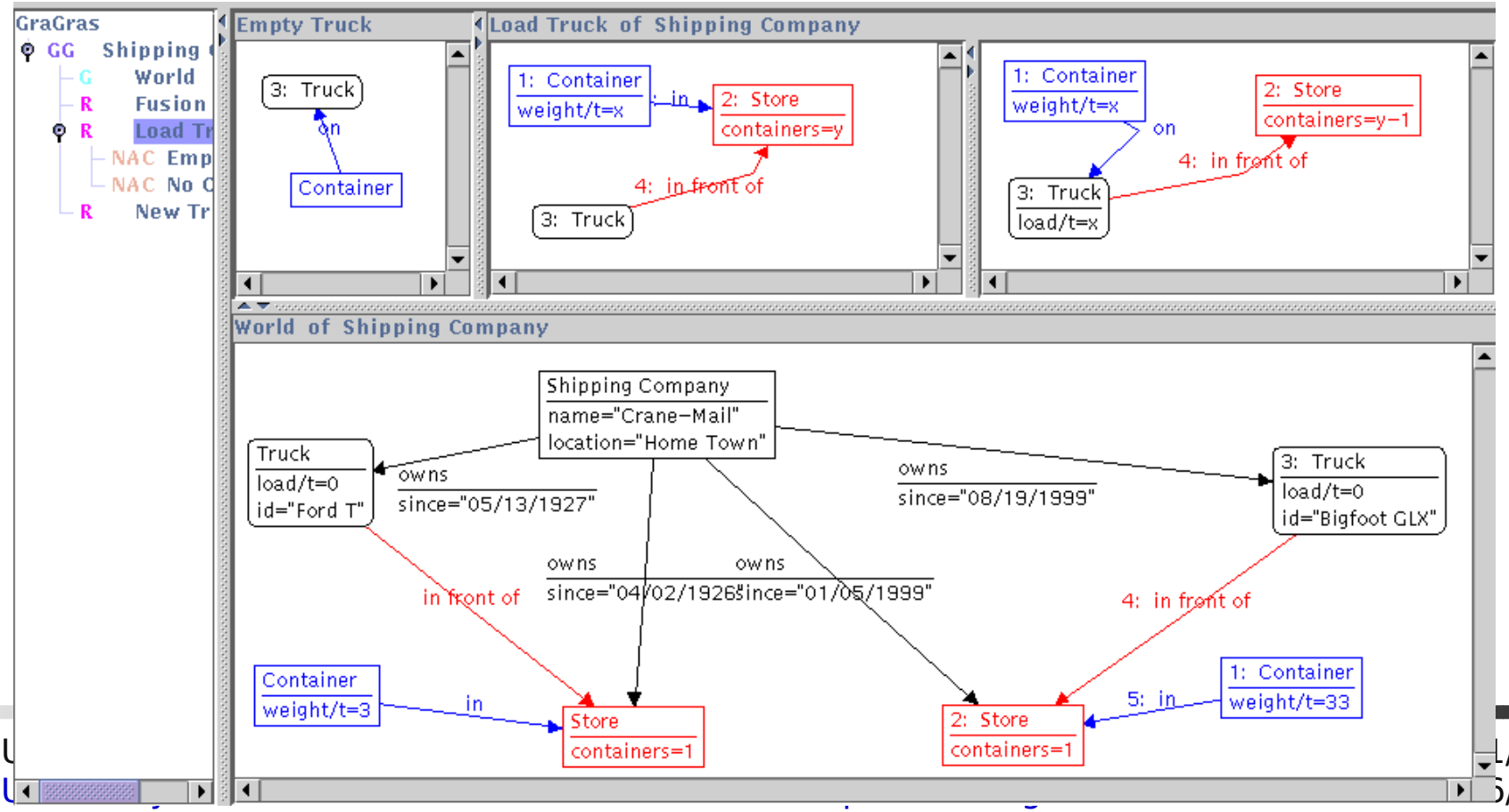
A Complex Example: eHomeConfigurator

- The class digram: eHomeModelComplete.pdf
- A story diagram: Activity_Service_install.pdf (resulting in about 1000 lines of java-code)
- Find more at: http://phd.ulno.net



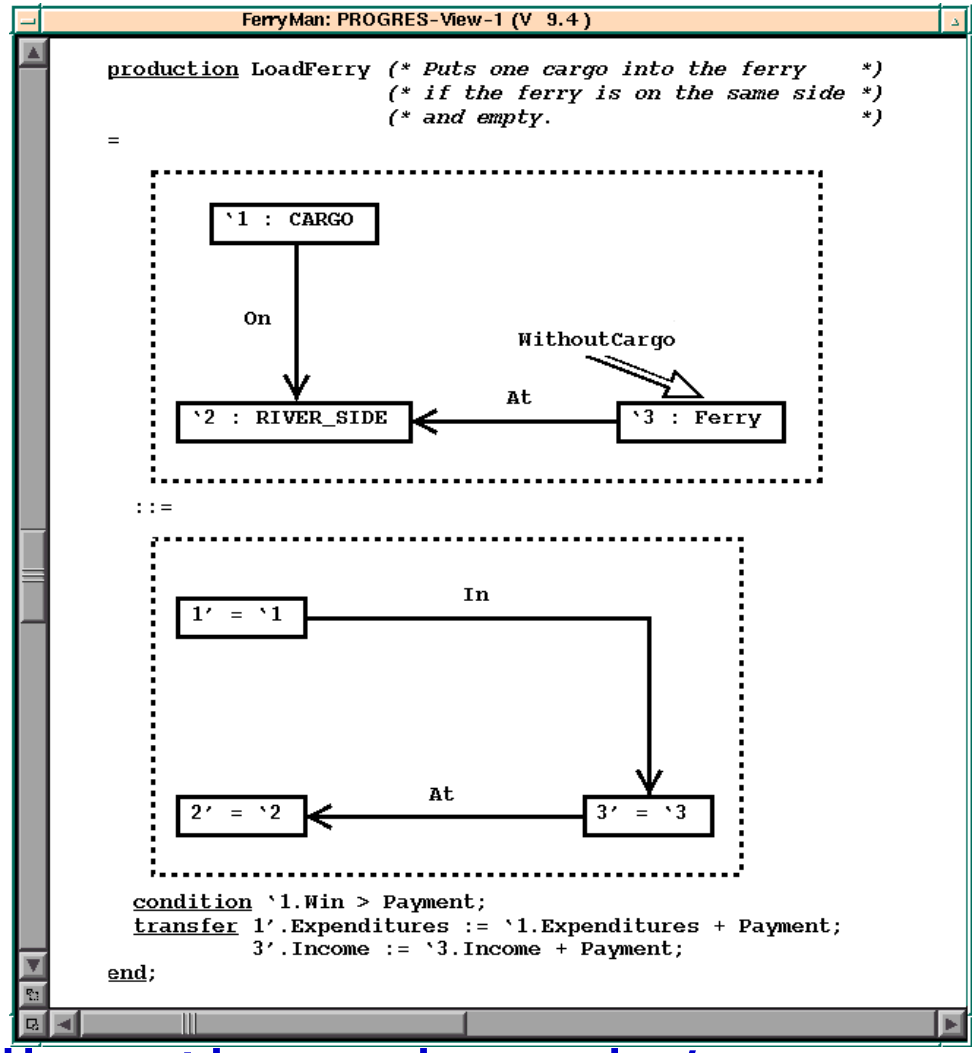
Other Graph Transformation Based Systems

- AGG:
  The Attributed Graph Grammar System
  http://tfs.cs.tu-berlin.de/agg



Other Graph Transformation Based Systems

- Progres:
  An integrated environment and very high level language for PROgrammed Graph REwriting Systems



http://www-i3.informatik.rwth-aachen.de/progres

Lessons Learned

- Objects First Design
- Story Driven Modeling
- Visual Programming Language