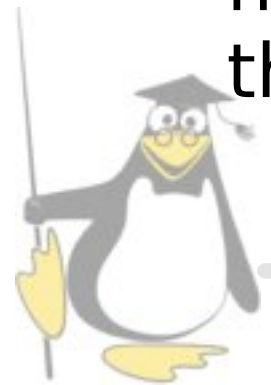
Software Engineering

Modeling

Lecture 6
2007/09/21

How To Model Software?

- use a standard
- UML
  - Unified Modeling Language
  - accepted Standard of Software Industry
  - managed by Object Management Group (OMG)
  - mainly used in OO-Design
- stay critical
  - maybe other models more accurate than one of the UML



Why Model?

- *“If you were supposed to understand it, we wouldn't call it code.”* -
  from a Federal Expresspromotion, reported by IS Survivalist Matthew Persico
- enables better communication
- shows connections, relations, context at once
- easier to see and estimate risks/costs

UML – start for yourself!

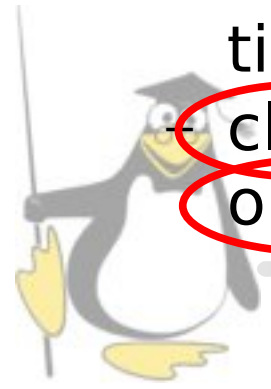
- http://www.uml.org/
- http://www.agilemodeling.com/essays/umlDiagrams.htm
- http://www.sparxsystems.com.au/UML_Tutorial.htm
- http://en.wikipedia.org/wiki/Unified_Modeling_Language

Free UML Modeler

- http://argouml.tigris.org/
- http://gaphor.sourceforge.net/
- http://pyut.sourceforge.net/
- http://www.fujaba.de/
  - allows MDA (more in my next lecture on 16th of November, Advances in Software Architecture)

UML Overview

- **Behavior diagrams**
  - behavioral features of a system or business process
  - activity, state machine, use case, and all interaction diagrams
- **Interaction diagrams**
  - subset of behavior diagrams emphasizing object interactions
  - communication, interaction overview, sequence, and timing diagrams
- **Structure diagrams**
  - depicts the elements of a specification irrespective of time
  - class, composite structure, component, deployment, object, and package diagrams



Scenario: Towers of Hanoi

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

Handout Material

- http://www.sparxsystems.com.au/resources/uml2_tutorial/uml2_usecasediagram.html
- http://www.sparxsystems.com.au/resources/uml2_tutorial/uml2_objectdiagram.html
- http://www.sparxsystems.com.au/resources/uml2_tutorial/uml2_classdiagram.html
- http://www.sparxsystems.com.au/resources/uml2_tutorial/uml2_activitydiagram.html
- http://www.sparxsystems.com.au/resources/uml2_tutorial/uml2_sequencediagram.html

Usecase + Object Diagrams

- pair up in groups of 2-3, one group 4
- read the corresponding handouts
- draw/write usecases
- create object diagram (objects first)
- one group of 4 is working at the blackboard (2writing, 2 helping)
- result will be compared to selected other groups
- total time for activity: 15-20min

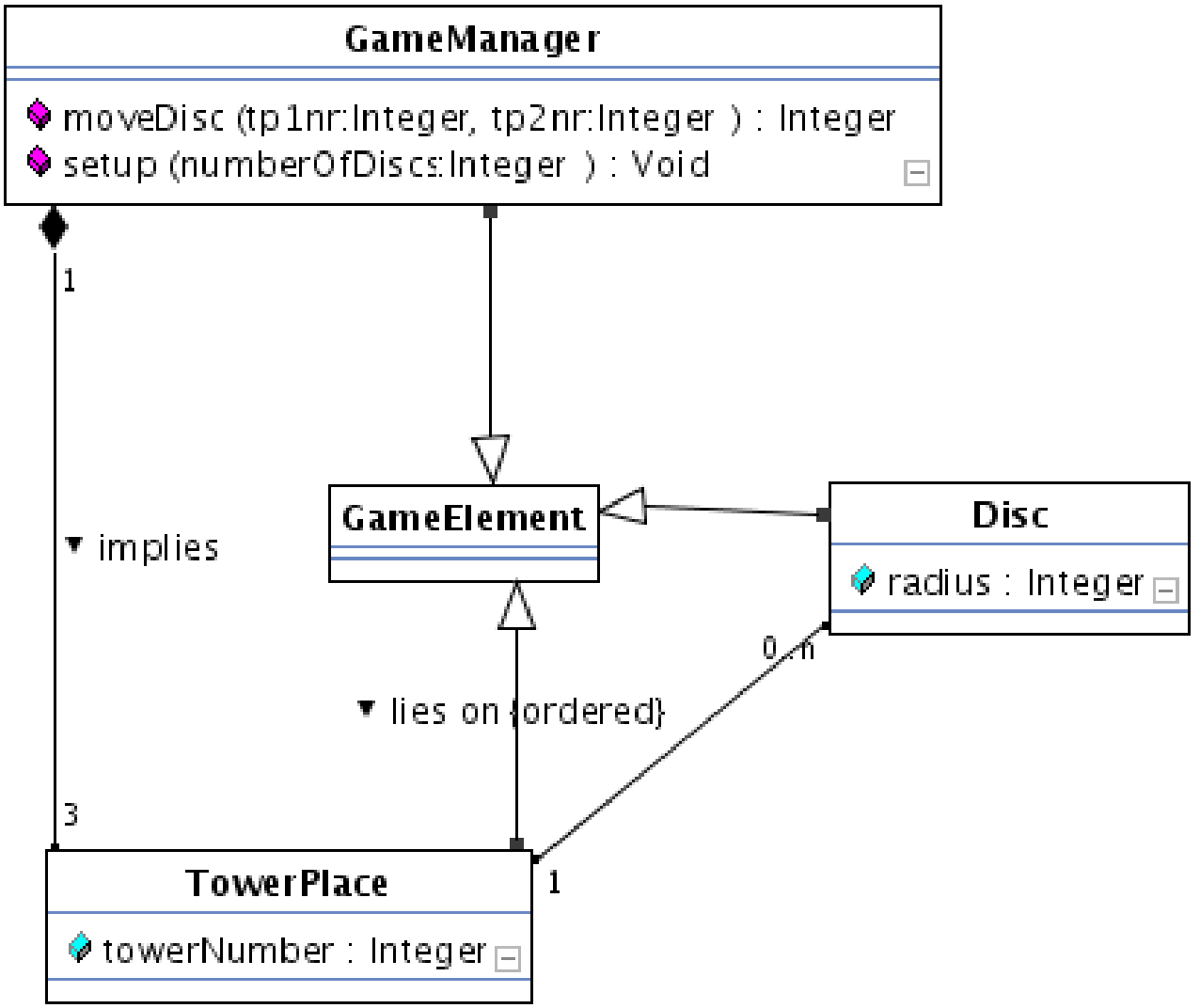
Class Diagram

- pair up in groups of 2-3, one group 4
- read the corresponding handouts
- create 2-3 object diagrams (from object diagrams)
- one group of 4 is working at the blackboard (2writing, 2 helping)
- result will be compared to selected other groups
- total time for activity: 15-20min

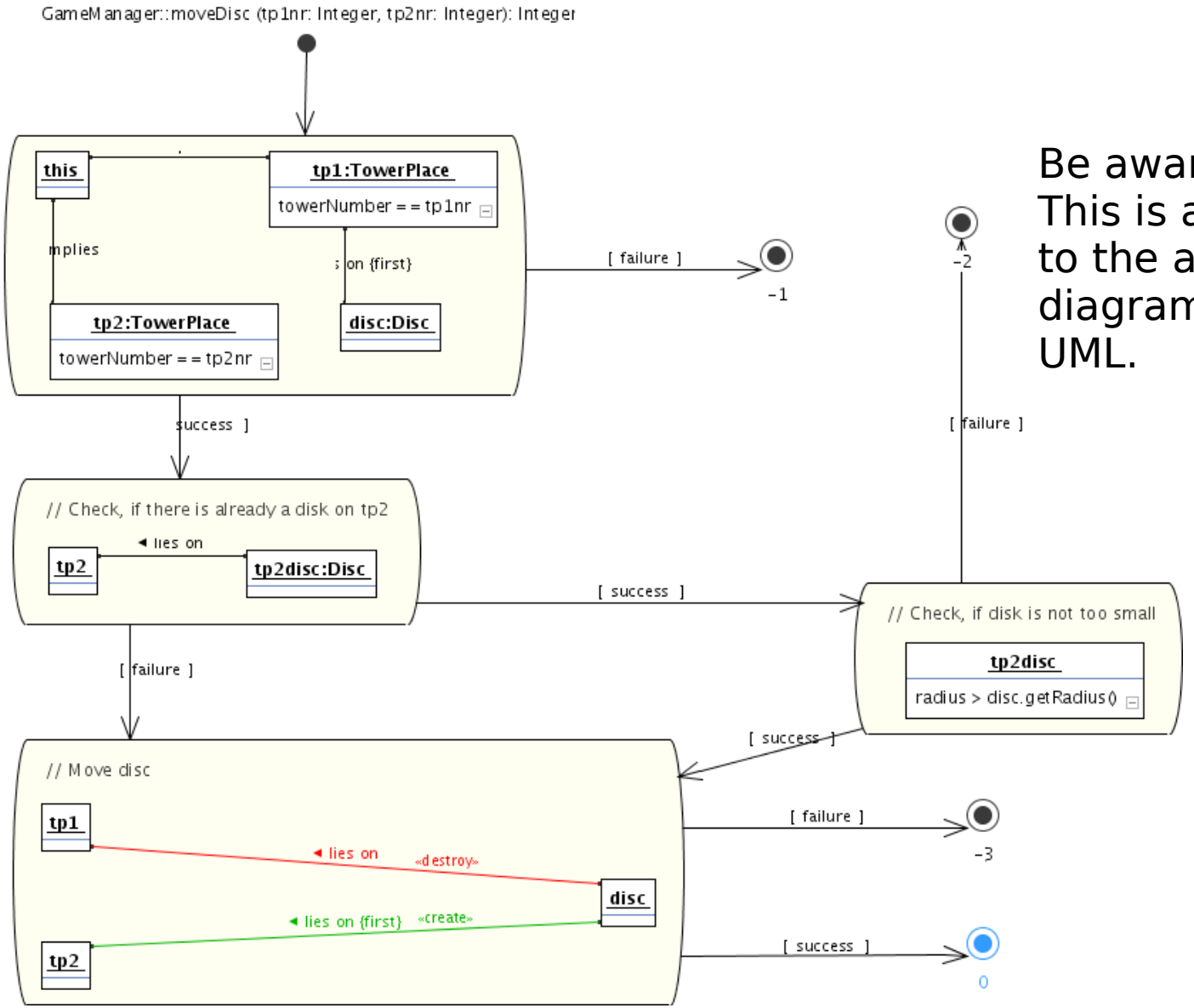
Activity and Sequence Diagram

- analog to previous slides
  - dependent on remaining time

Examples


GameManager
moveDisc (tp1nr:Integer, tp2nr:Integer) : Integer
setup (numberOfDiscs:Integer) : Void
1
implies
3
GameElement
Disc
radius : Integer
0..n
lies on {ordered}
TowerPlace
towerNumber : Integer
1

Examples



Be aware!
This is an extension to the activity diagram defined in UML.