Data Modeling for Business Analysts

About Presenter

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- ✓ *Product Manager, Cameo Business Modeler*
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- ✓ *Chair of an annual conference Business Process Management in Practice in Lithuania*
- ✓ *Head of BPM studies at ISM Executive School*

LinkedIn

Professional Advanced — Object Management Group — UML — Certification Program

Professional Intermediate — Technical Track — Object Management Group — BPM — Certification Program

magicdraw™
Architecture Made Simple

Cameo Business Modeler™

From a Discussion in BA group at LinkedIn

"... in many cases the BA becomes the DBA but I think that is mainly because the DB becomes the skeleton that drives the entire system. In addition to learning Relational Databases I would also suggest learning Modelling tools which will give you a picture of what the relationships are and how they all fit together. There are some great modelling tools out there ... "

Alan Radau

Agenda

Data Modeling Concepts

Data Modeling Techniques

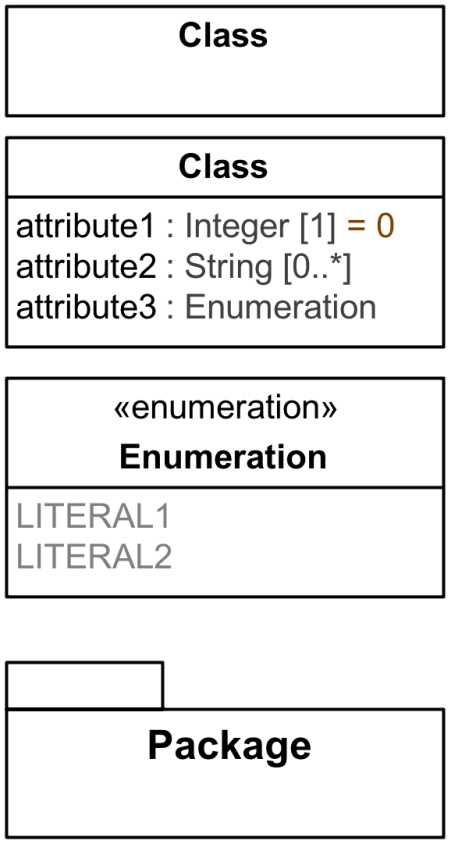
Using Data Models

UML and Data Modeling

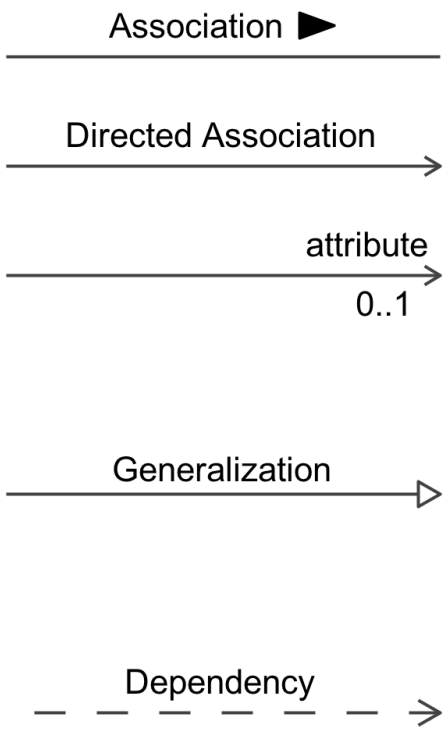
- ✓ UML is *de facto* standard for software modeling
- ✓ UML is complex: 248 metaclasses, 15 diagram types, ...
- ✓ 80% of problems can be solved with 20% of UML
- ✓ Data modeling capabilities in UML are very mature and have been widely used in practice

UML Concepts for Data Modeling

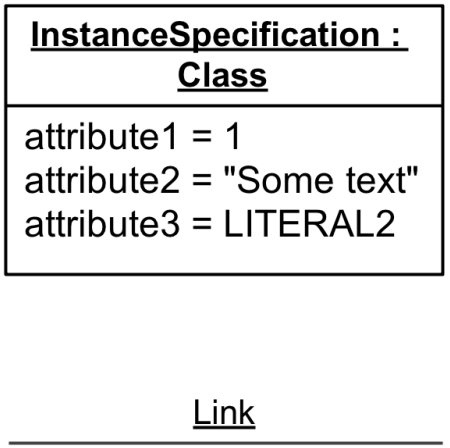
Data Structures



Data Relations



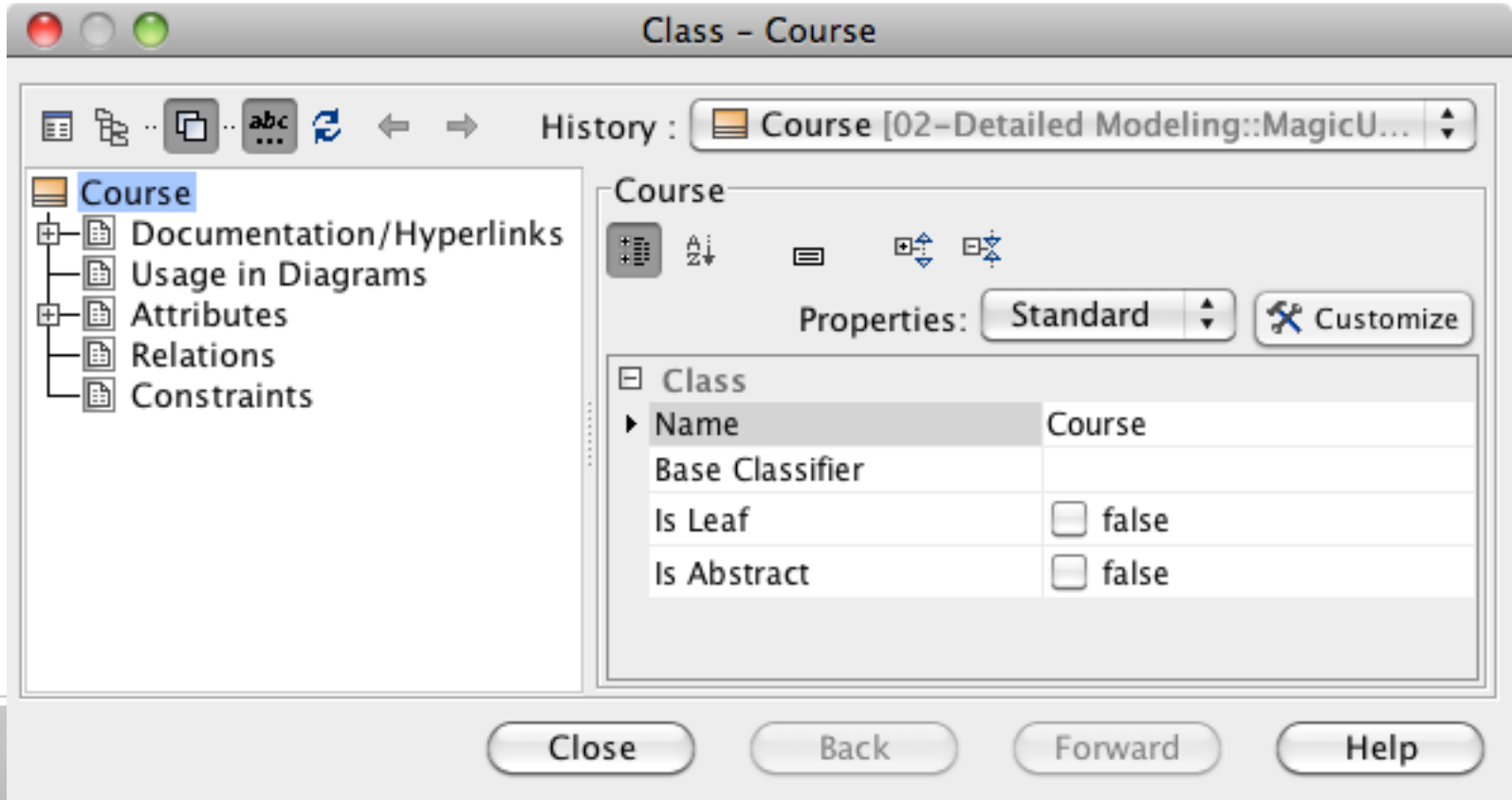
Data Samples



Class

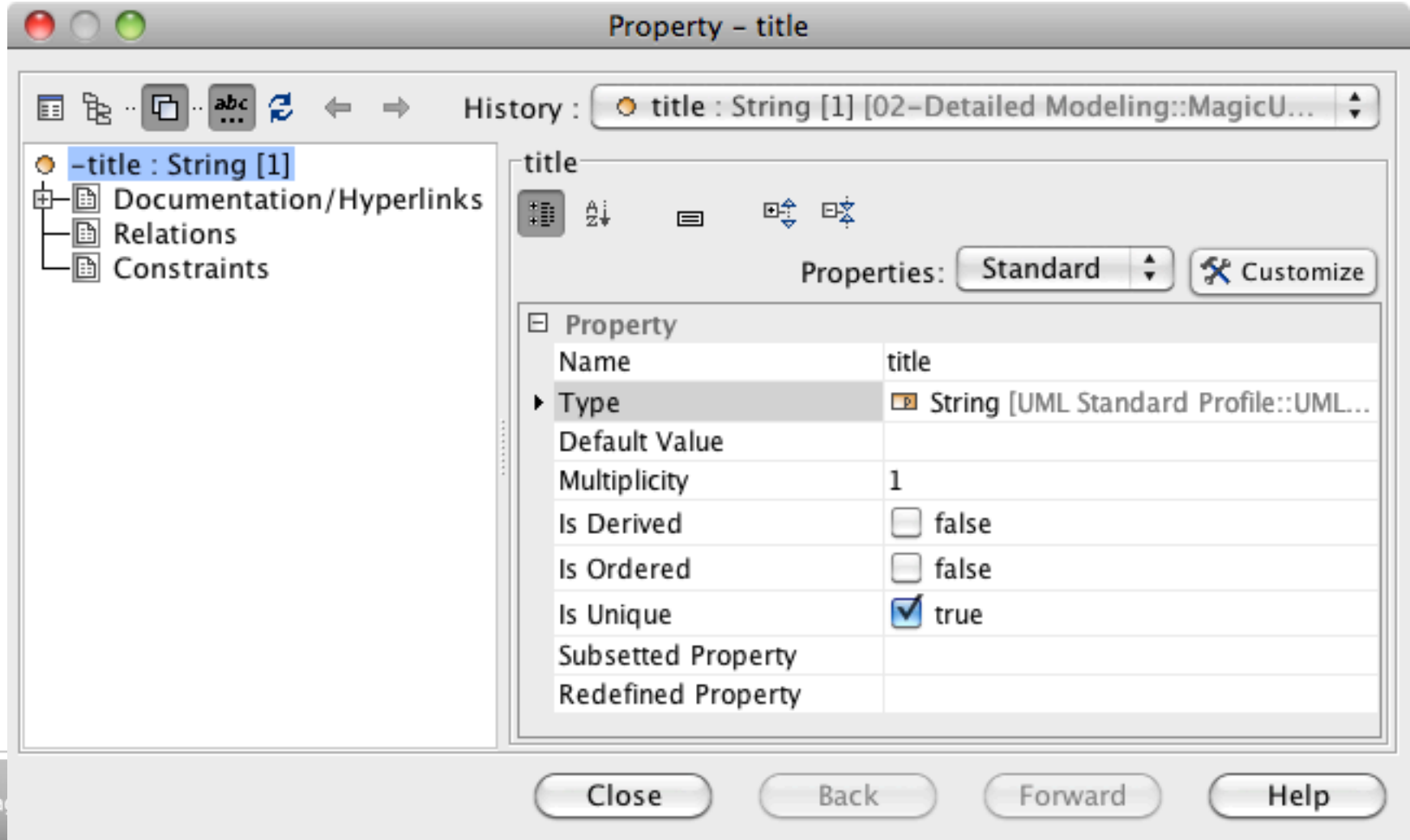
- Class provides categorization of objects according to their features*.

** In data modeling, we consider only properties - structural features.*



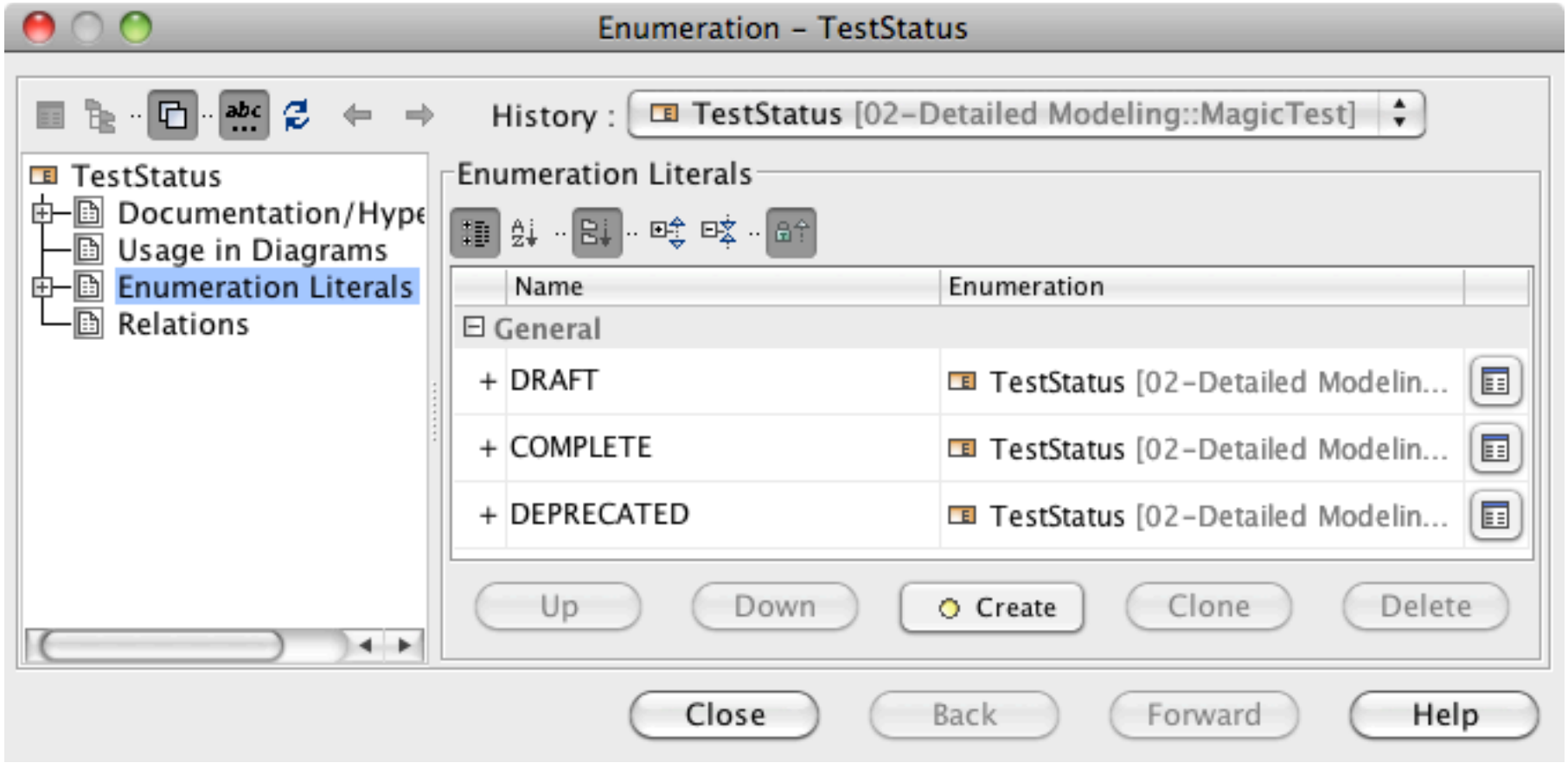
Property

- Property is a structural feature that may represent an attribute of a Class or and end of Association.



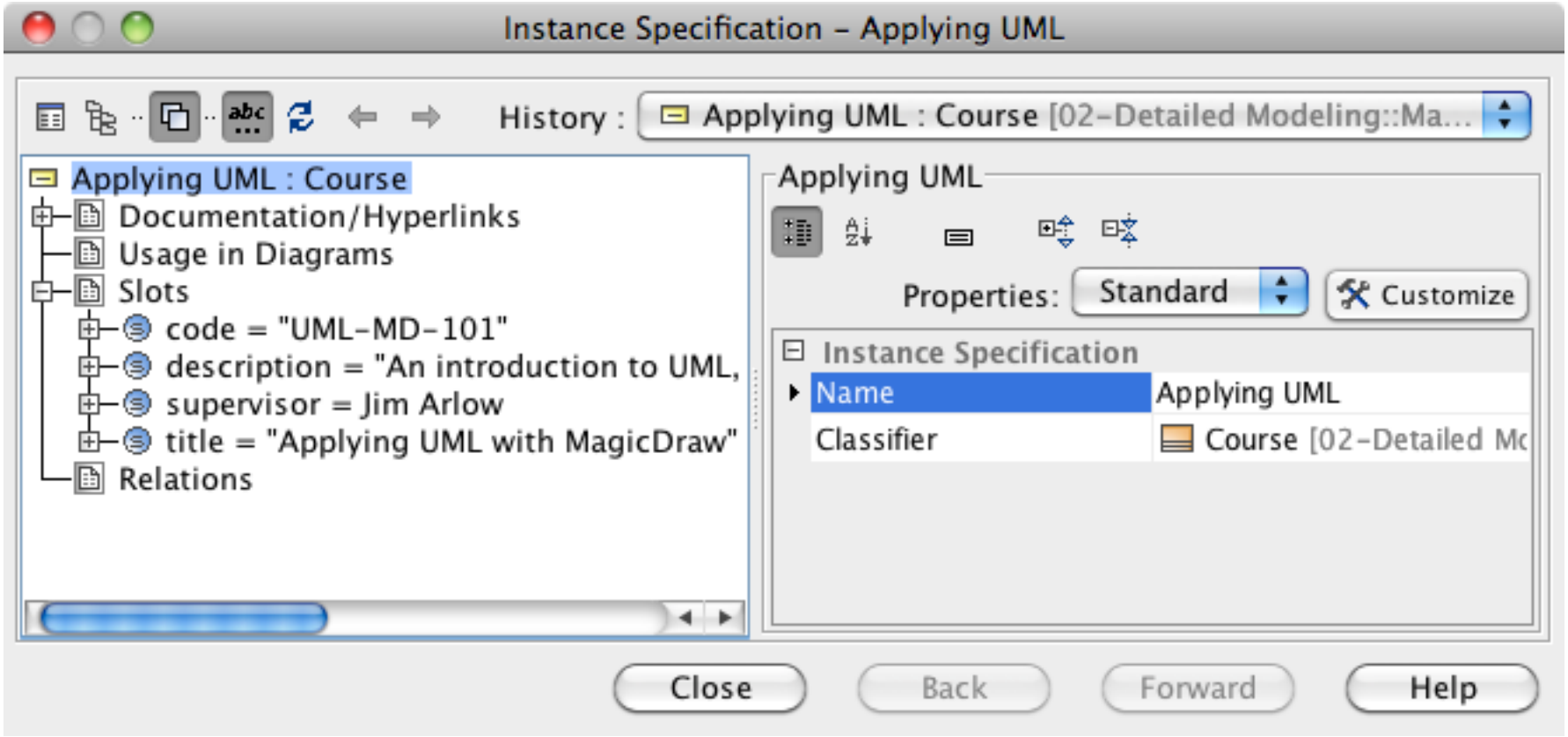
Enumeration

- Enumeration is a data type whose potential values are enumerated as literals.



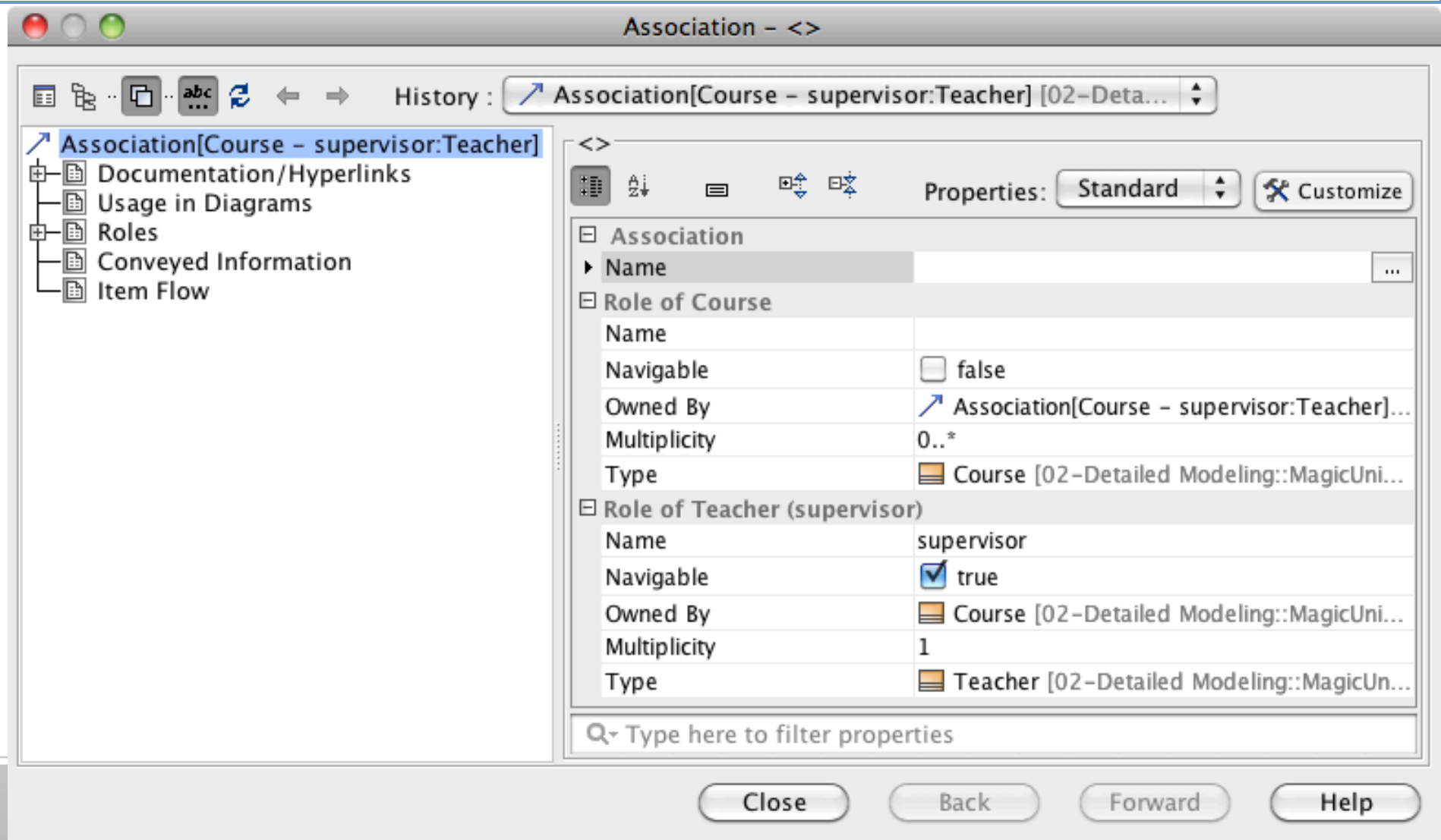
Instance Specification

- Instance Specification represents the existing object in a modeled system as a snapshot in time with slots representing concrete values for object's attributes.



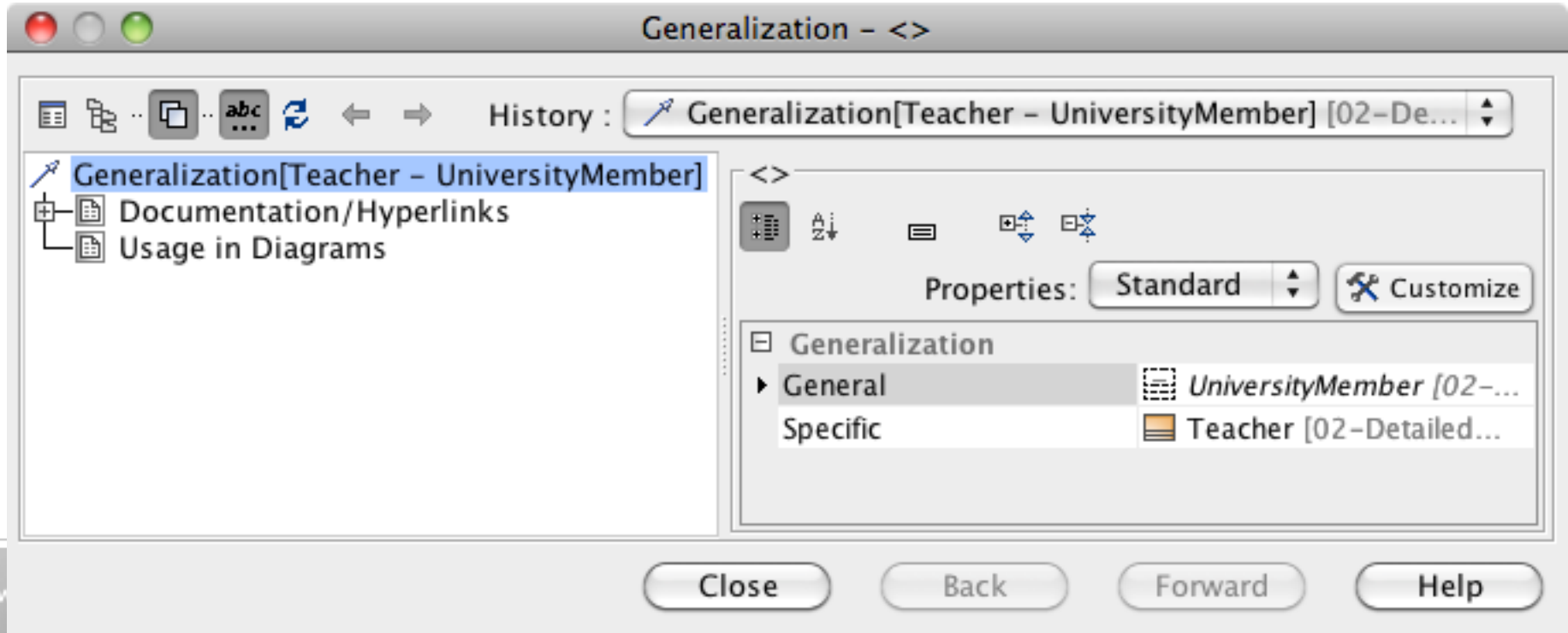
Association

- Association specifies a semantic relationship that can occur between two typed instances.



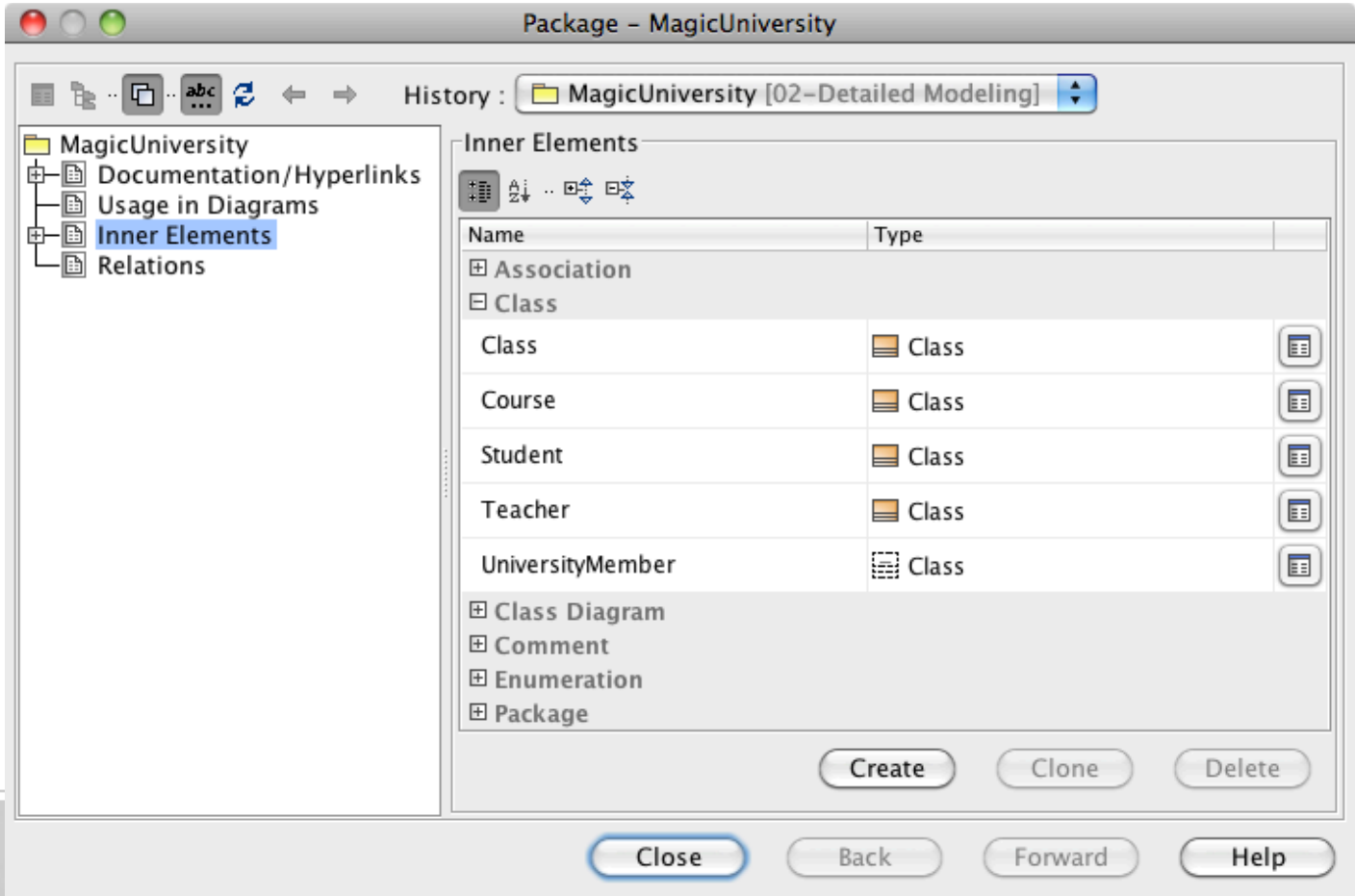
Generalization

- Generalization define generalization/specialization relationships between classes.
- *When a class is generalized, certain members of its generalizations are inherited. An instance of a class is also an (indirect) instance of each of its generalizations. Any constraints applying to instances of the generalizations also apply to instances of the class.*



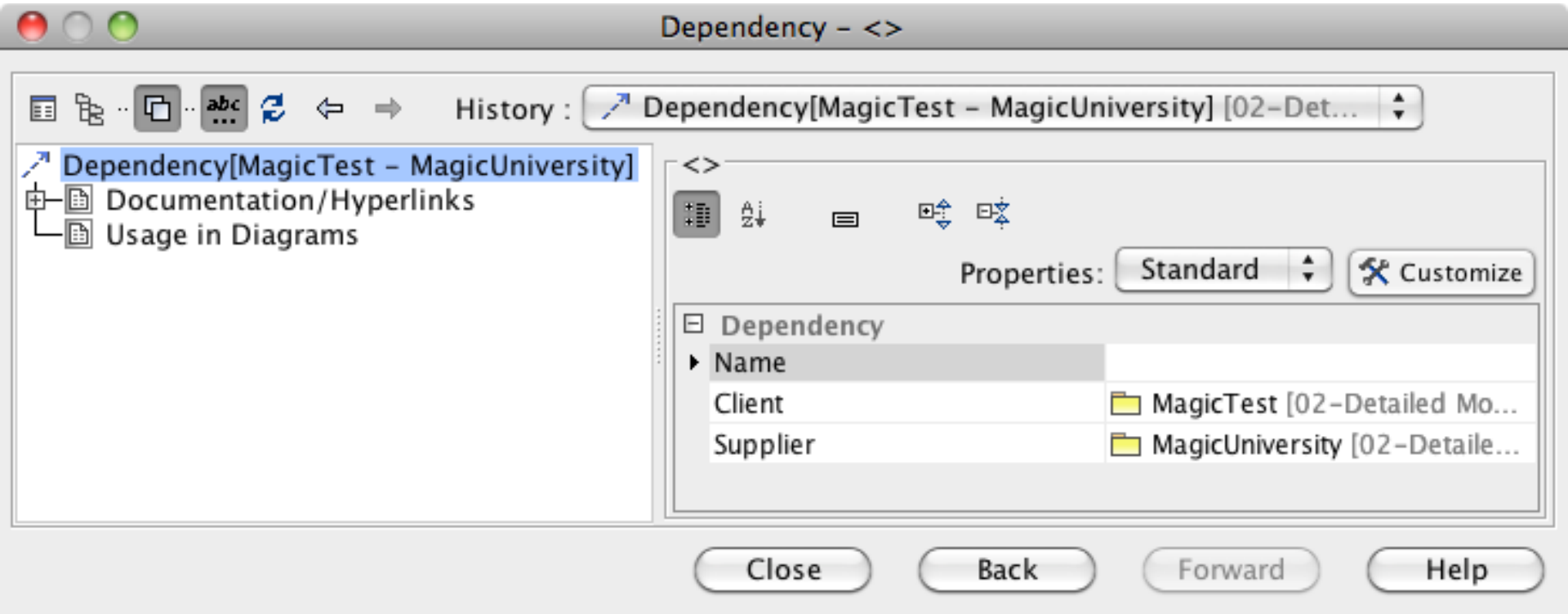
Package

- Package owns other model elements and provides a namespace for them.
- *Packages serve as a means for structuring large models, similar to folders in a file system.*



Dependency

- Dependency represents a supplier/client relationship between model elements where the modification of a supplier may impact the client model elements.



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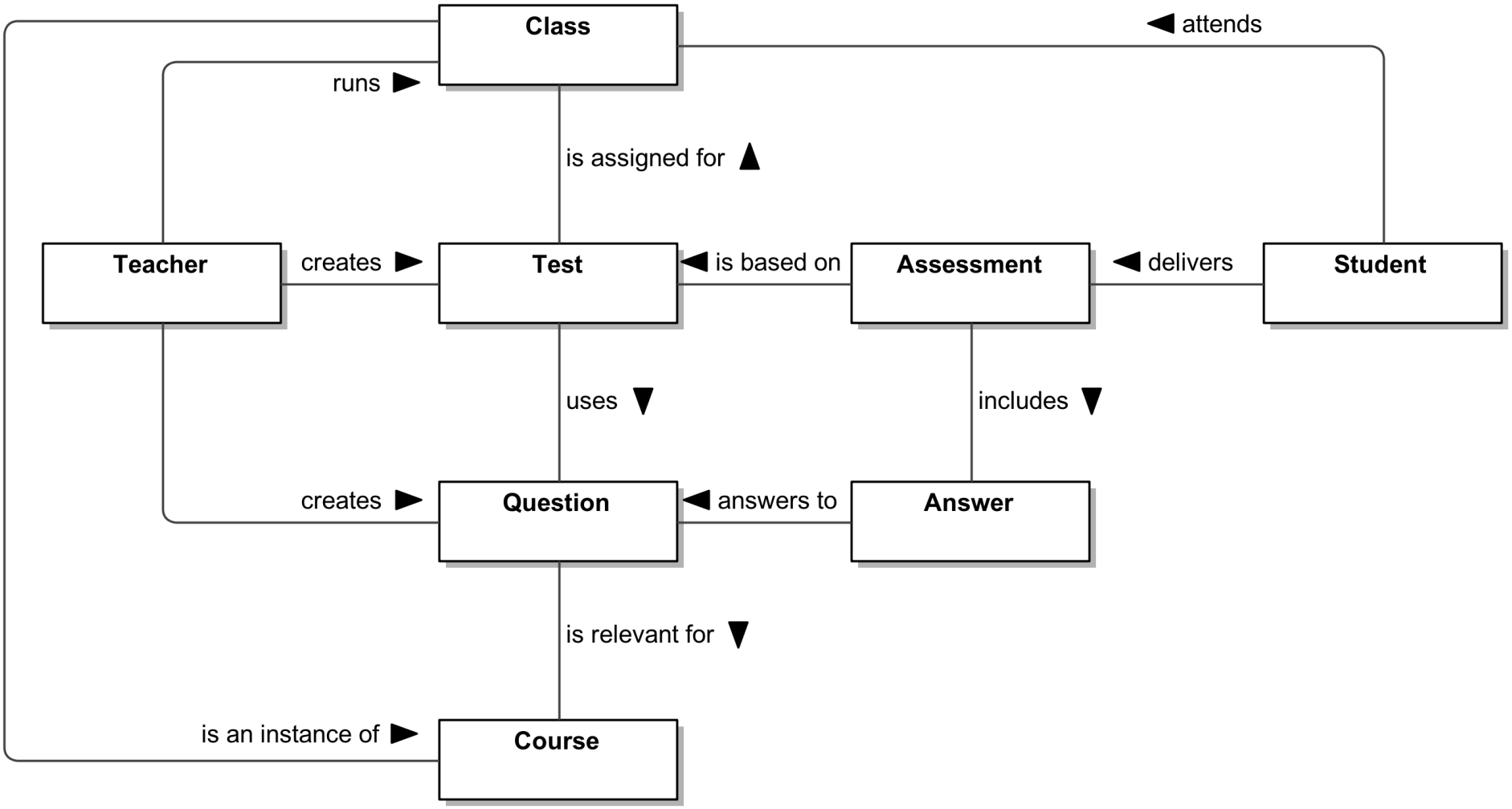
Data Modeling Techniques

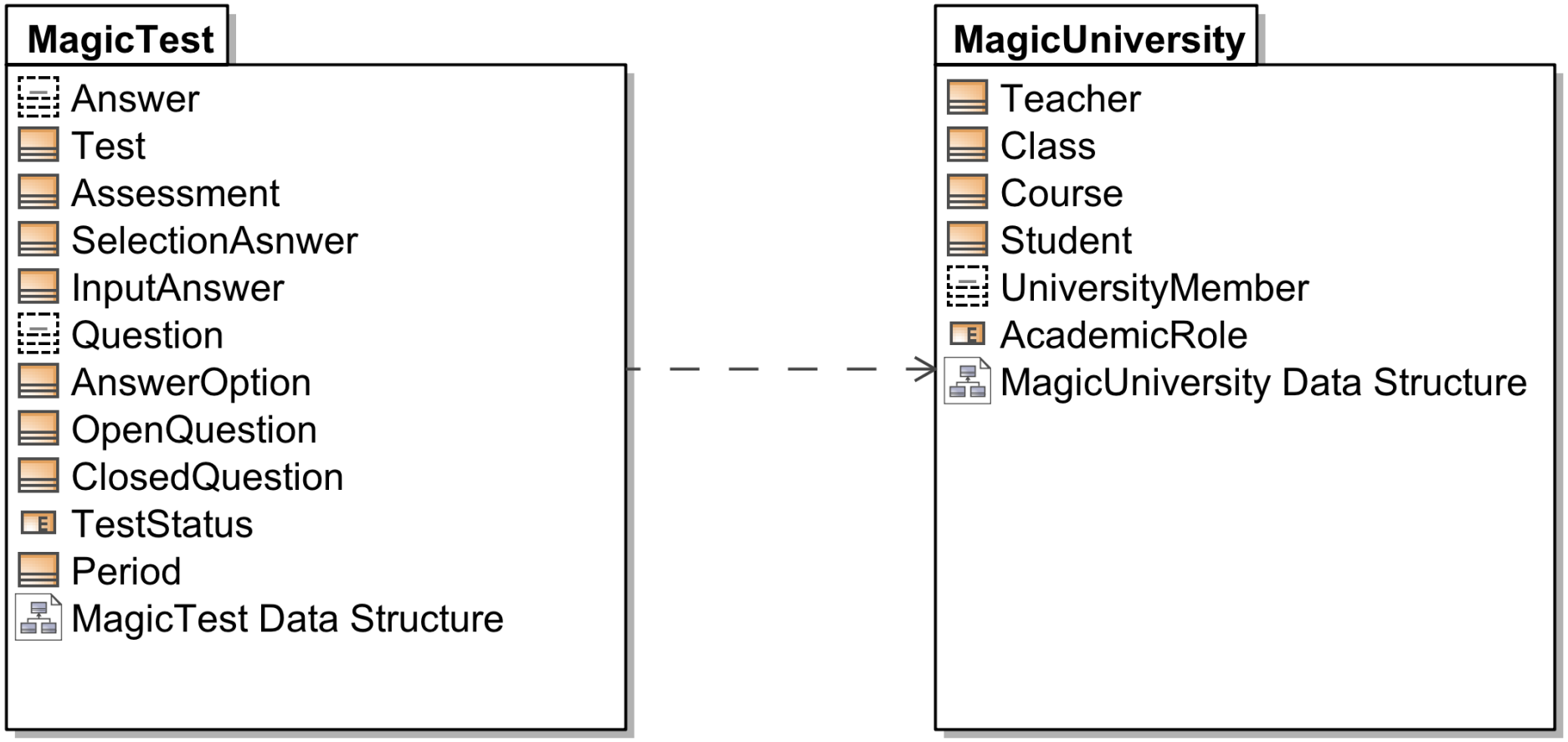
Using Data Models

Conceptual Data Modeling



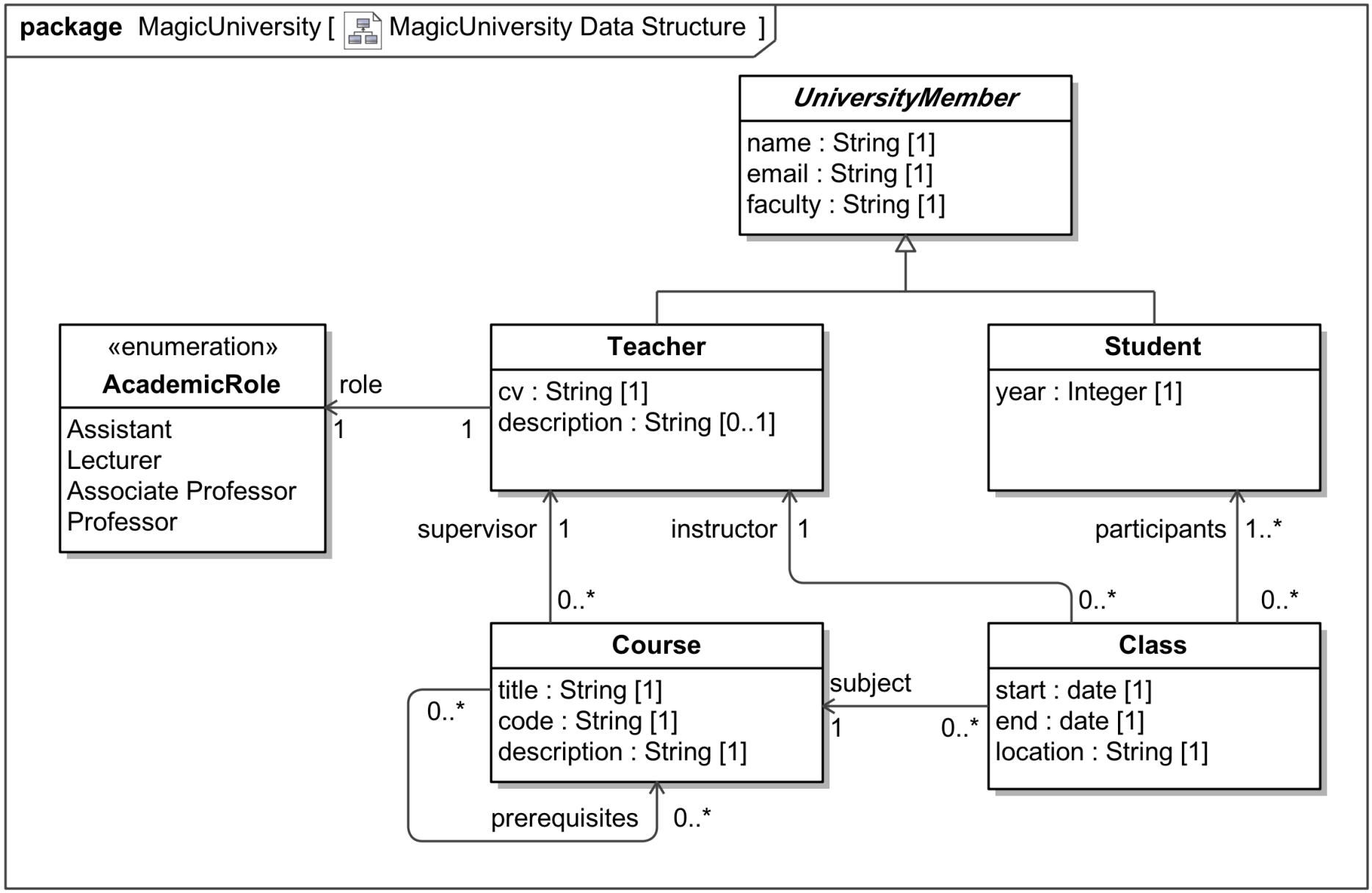
✓ Conceptual modeling focuses on defining terms and their relations, not so much on precise data properties

Detailed Data Modeling: Overview (1)

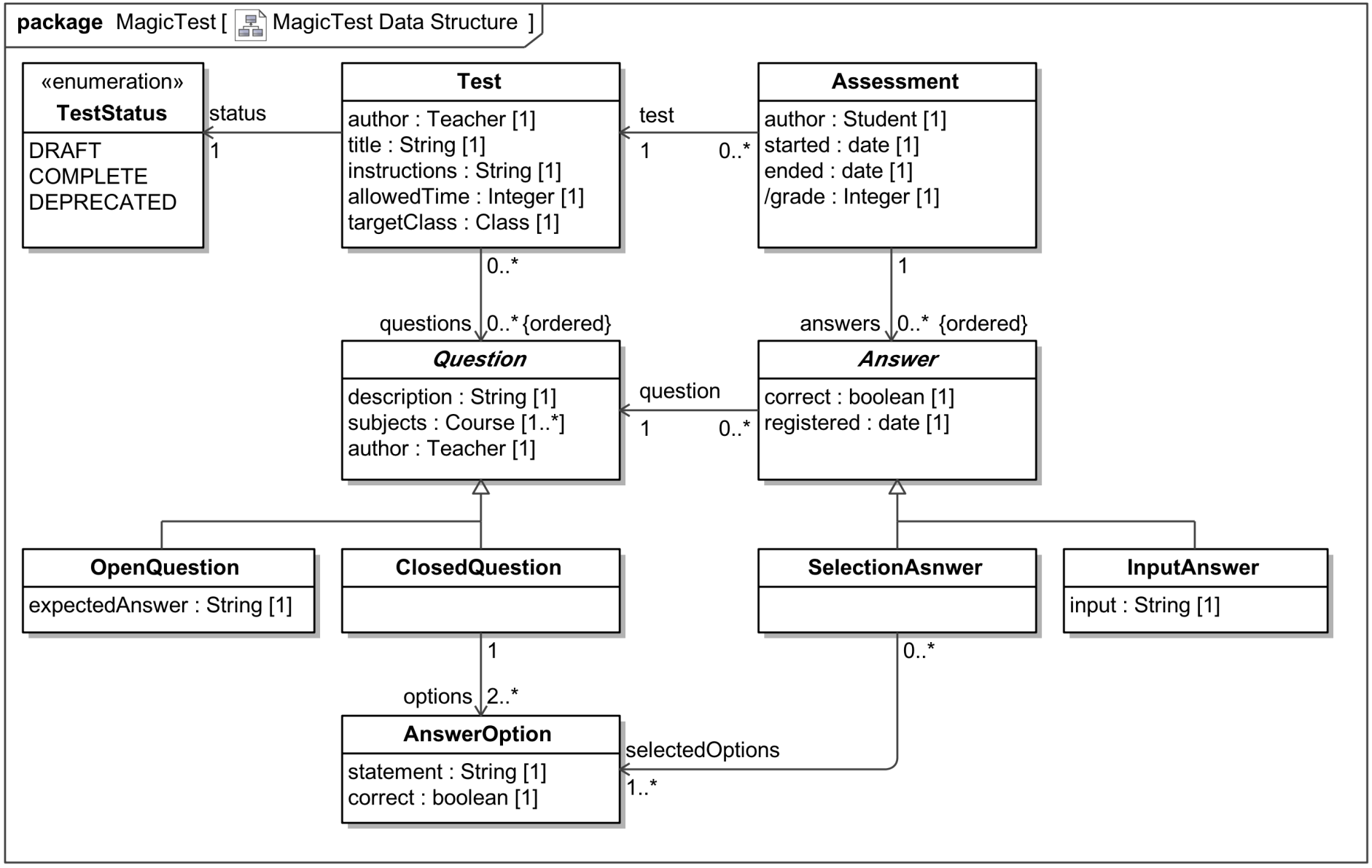


✓ This small set of UML constructs is sufficient to model data structures completely and precisely

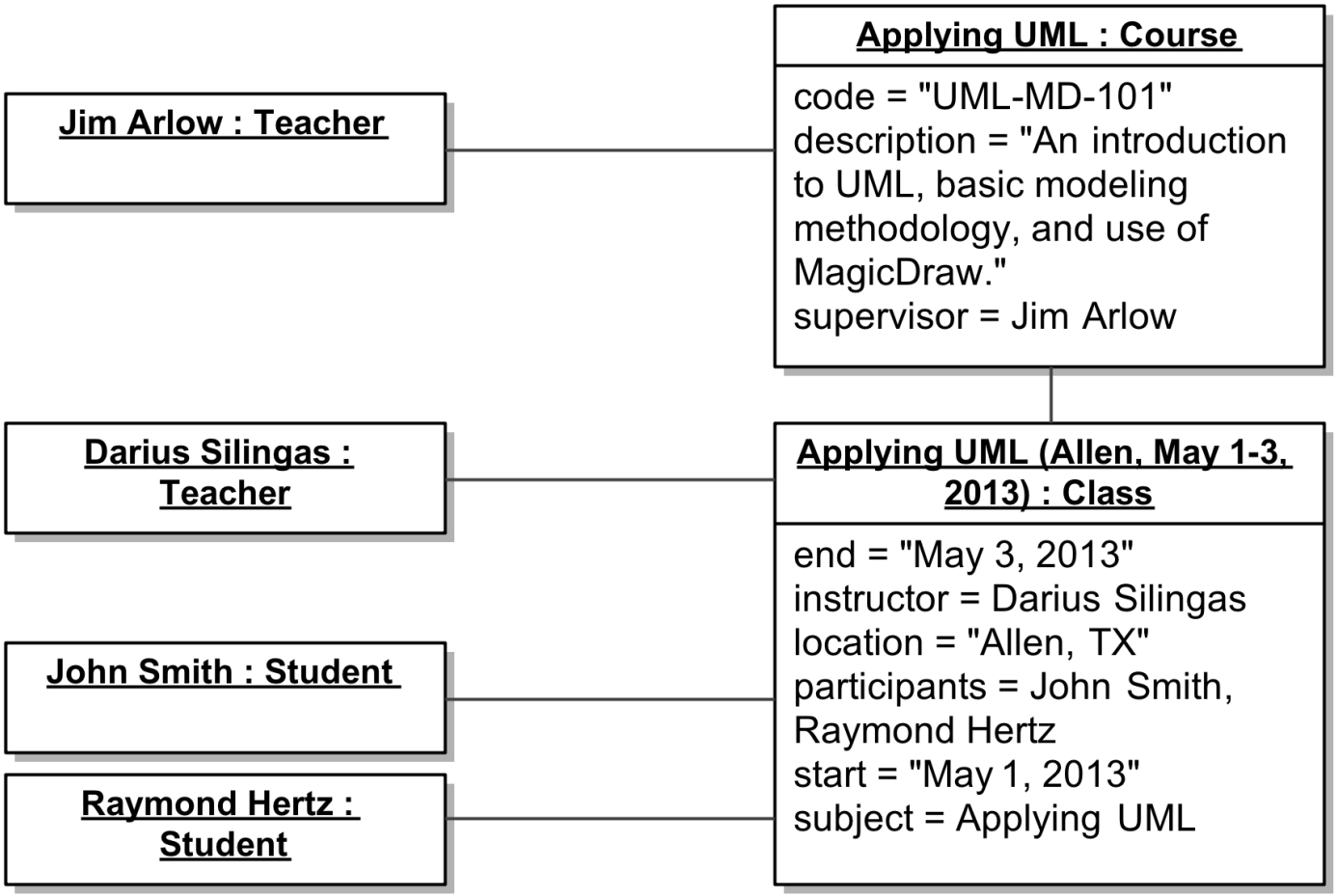
Detailed Data Modeling: MagicUniversity (2)



Detailed Data Modeling: MagicTest (3)

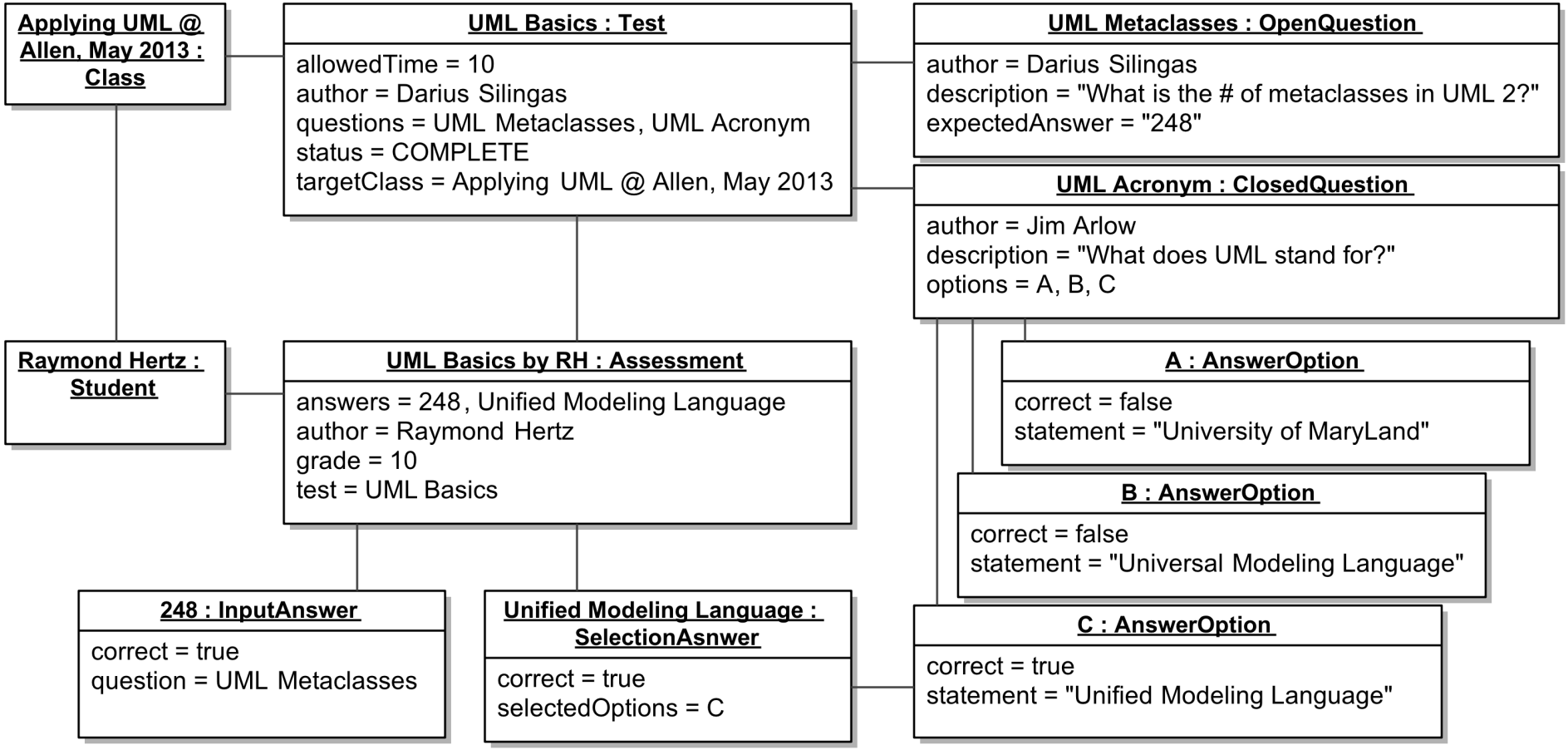


Testing Data Models with Data Examples (1)



- ✓ Modeling representative data examples validates data structure design and prepares initial data set up for testing

Testing Data Models with Data Examples (2)



Data Model Validation: Correctness and Completeness

Data modeling is an error-prone process

A data model can be either
incorrect (*it breaks some modeling rules*) or
incomplete (*it lacks some required information*)

Rules defined in UML specification are automated in MagicDraw

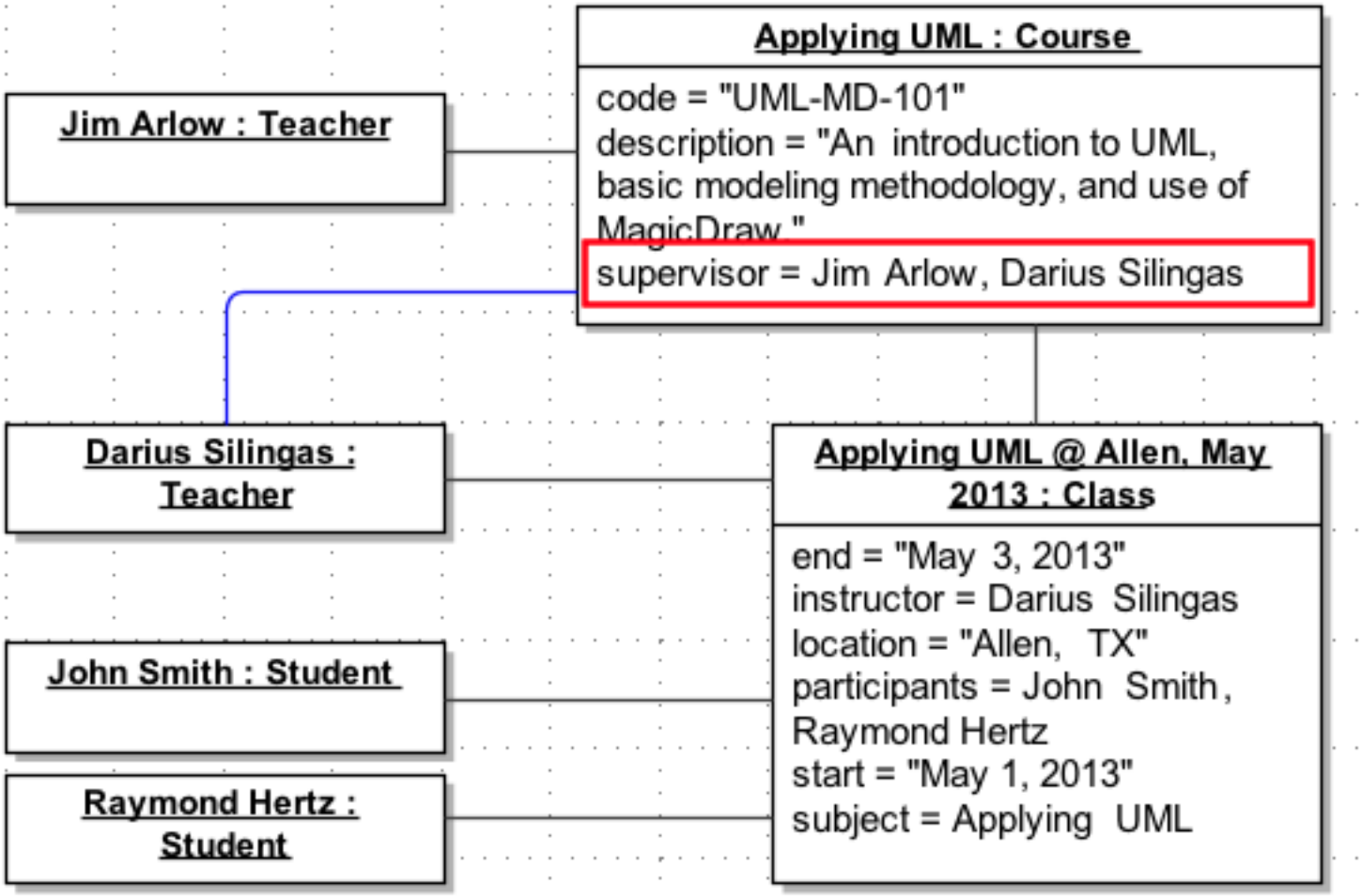
However, a specific modeling method typically implies additional rules

- Restriction to single generalization for classes
- Compulsory role names on navigable association ends
- Each class must be documented with owned comment

MagicDraw enables validating model based on custom validation rules

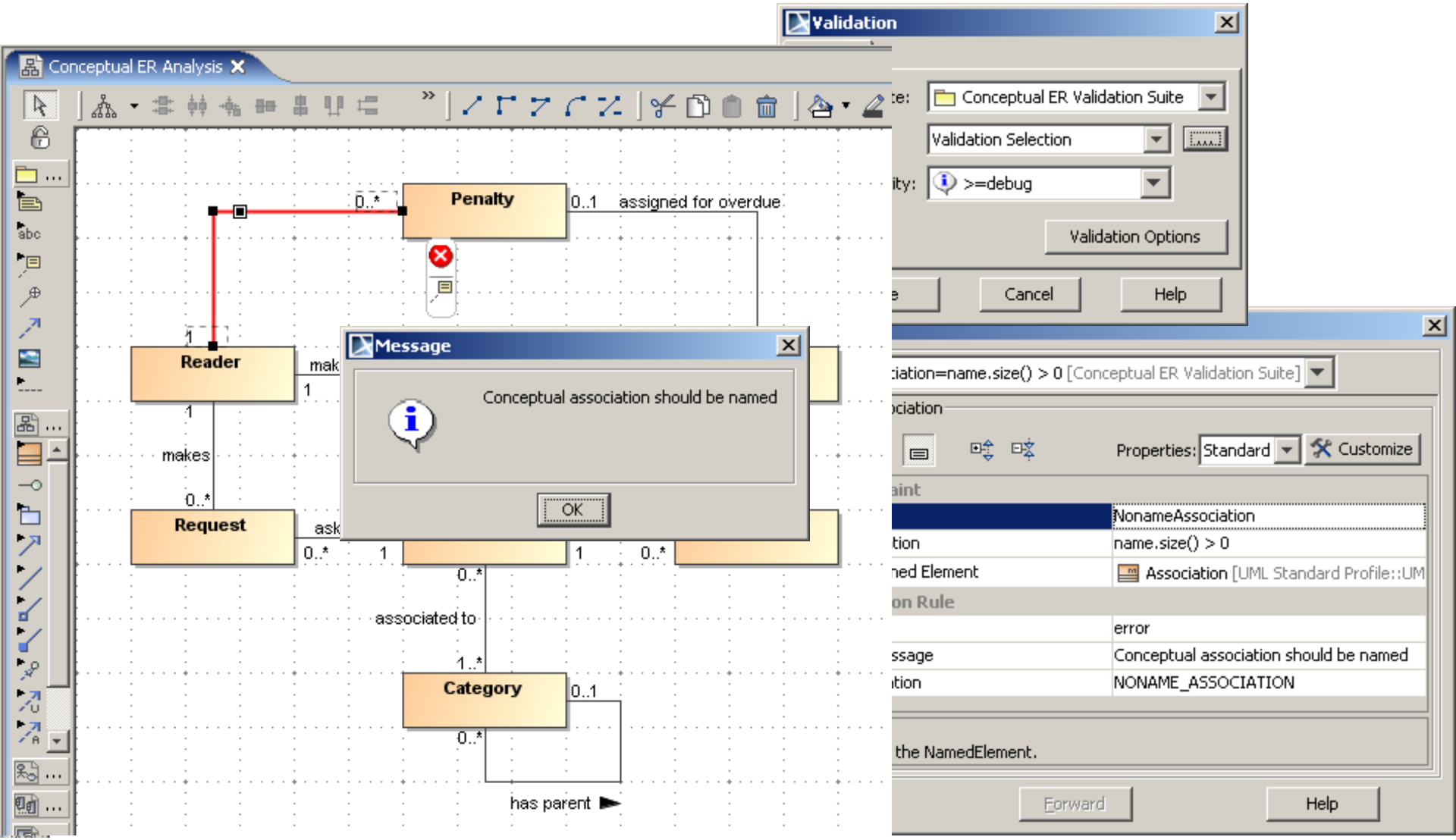
- Validation rules can be specified on OCL 2.0 or Java

Validating Data Structure with Data Samples



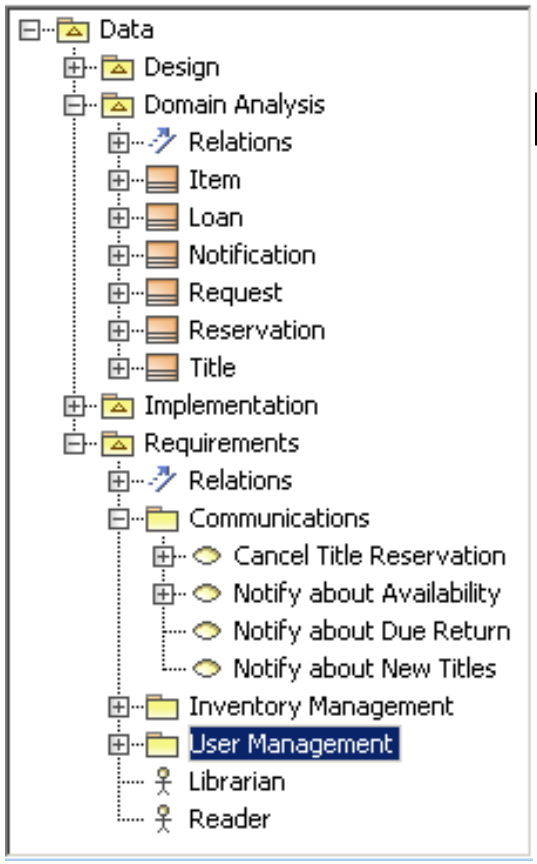
- ✓ MagicDraw automatically detects model inconsistency
- ✓ Design choice: correct data structure or data example?

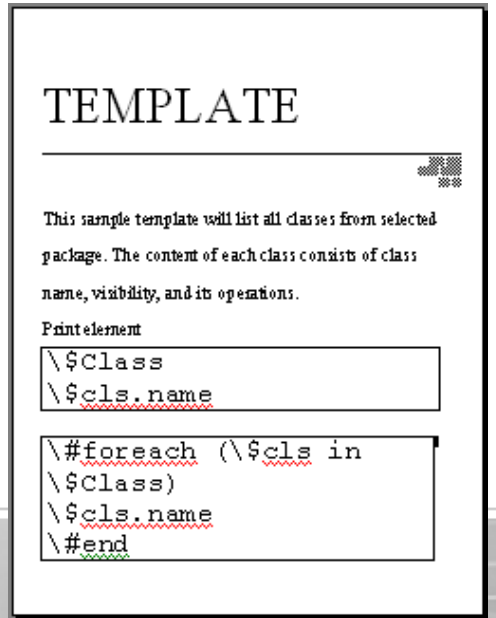
Custom Validation of Model Completeness

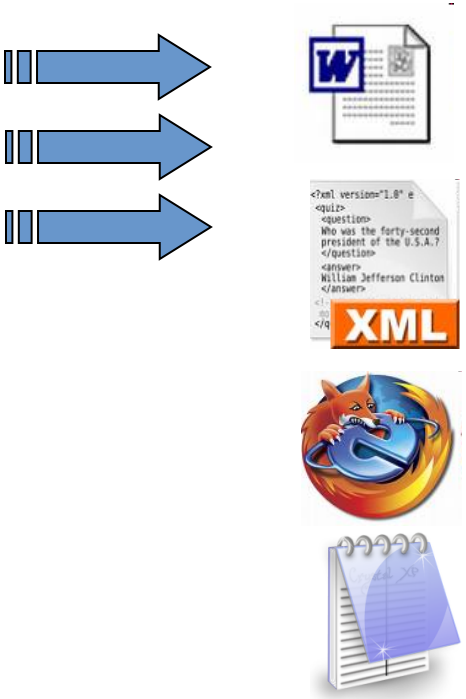


Transforming Data Model to Documents (1)

Using MagicDraw Report Wizard, you can transform your model into HTML, XML, Microsoft Word, and other formats based on customizable report templates

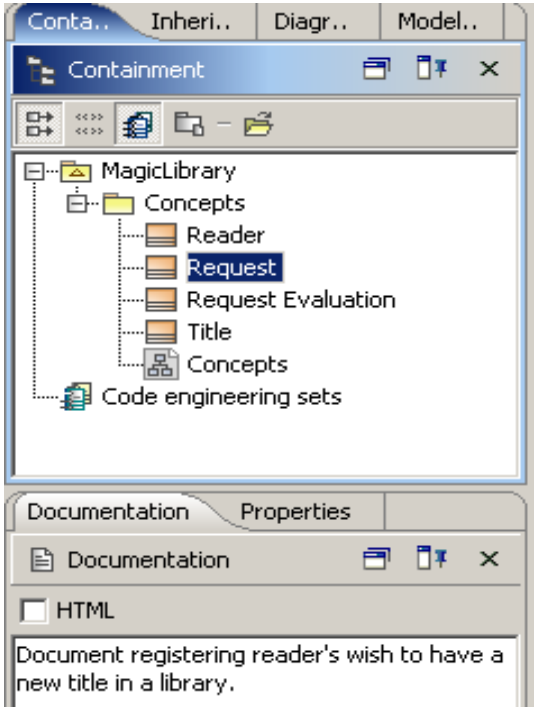






Transforming Data Model to Documents (2)

- It is recommended to publish model contents on the web accessible without MagicDraw on a regular basis



Concept	Description
#forrow ($class in $sorter.sort($Class, "name")) $report.getIconFor($class) **$class.name**	*$report.getComment($class)* #endrow

Concept	Description
Reader	*Information about library customer.*
Request	*Document registering reader's wish to have a new title in a library.*
Request Evaluation	*Librarian's decision whether to approve or deny reader's request.*
Title	*Information about a book, journal or another kind of library inventory item. Library may contain multiple copies of the same title.*

- You can start with standard Web Publisher 2.0 template, but a custom report template typically gives the best output

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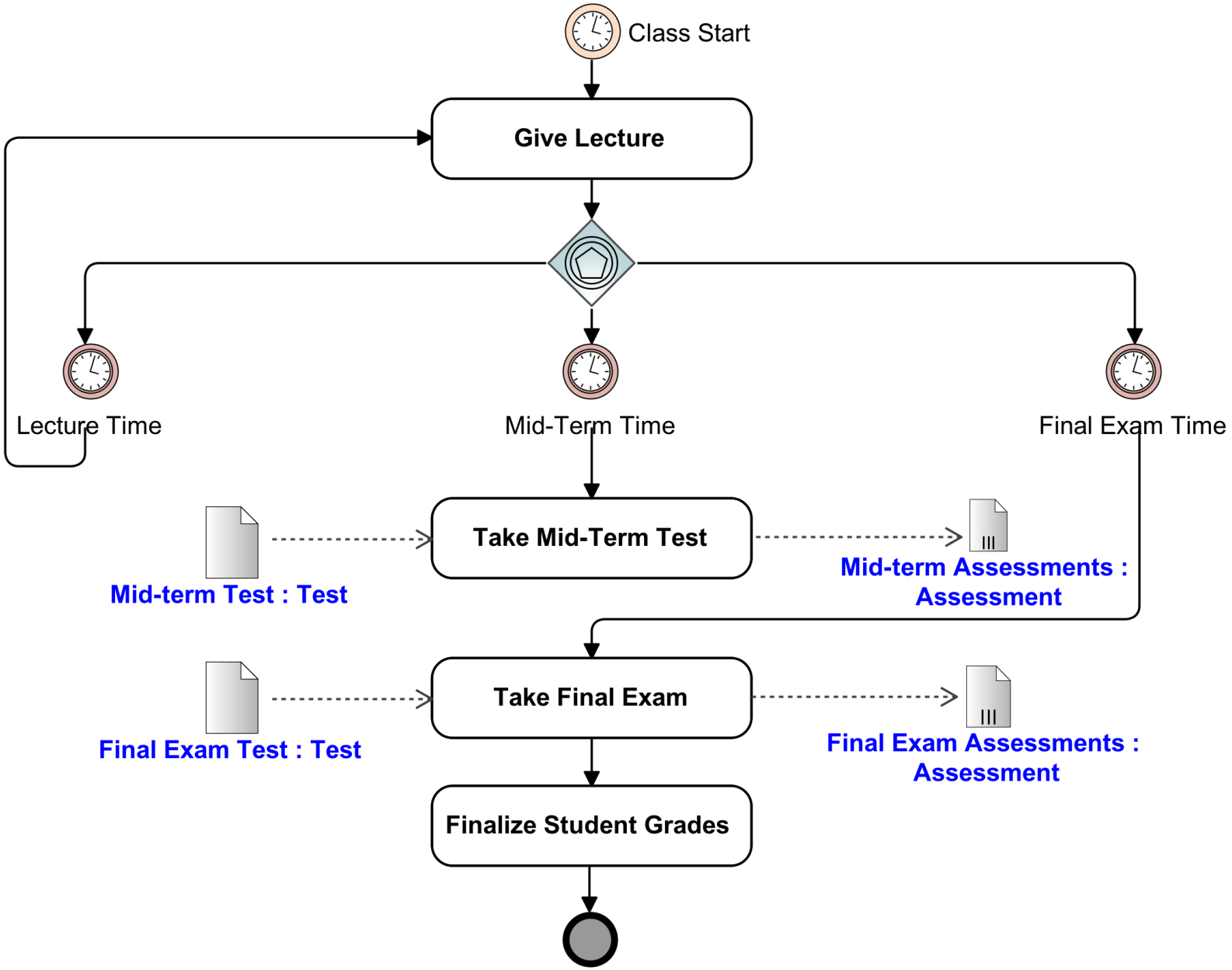
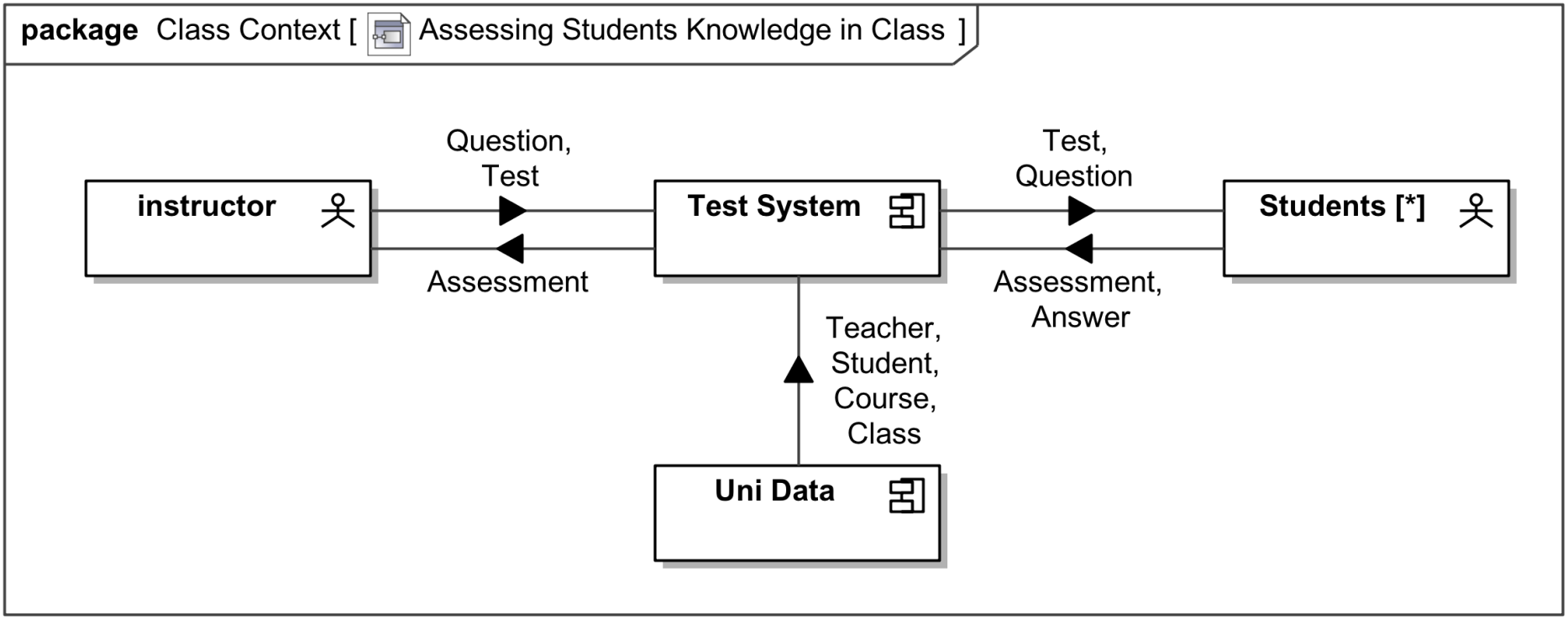
Using Data Objects in Business Processes

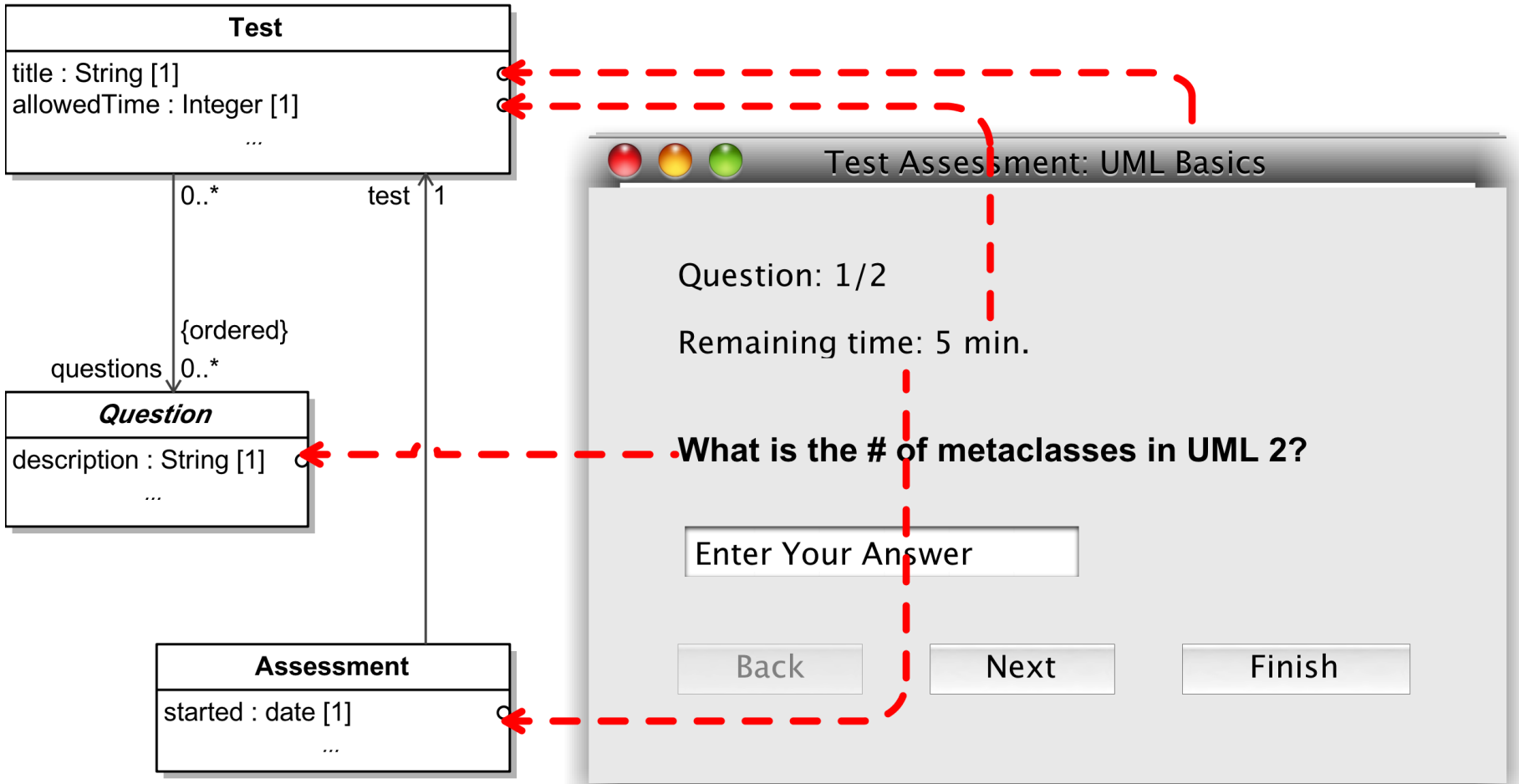


Modeling System Context with Information Flows



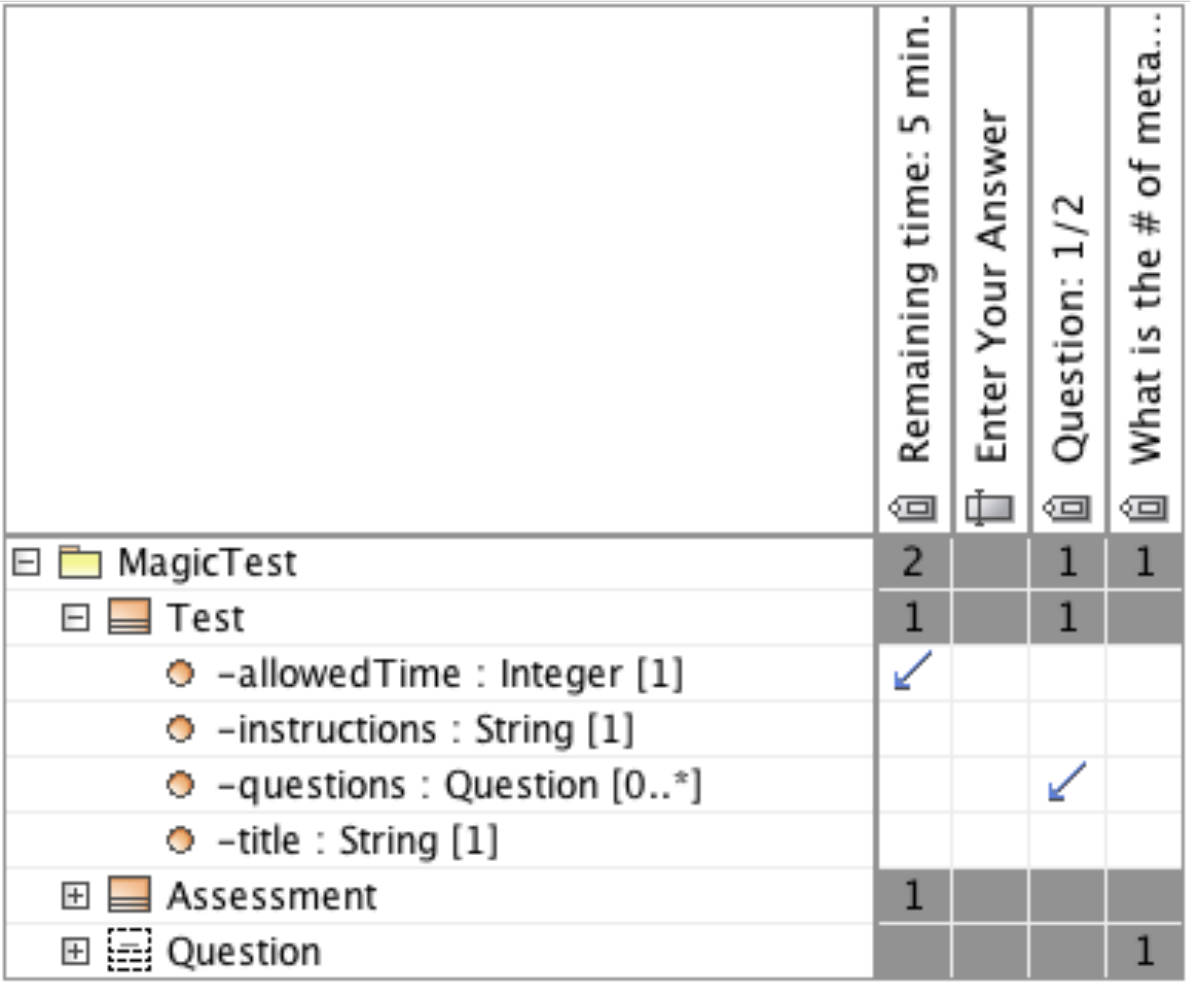
- ✓ System context diagram is often included in project vision in order to understand solution's environment

Designing GUI Based on Data Models



✓ System analysts often do data modeling via GUI design. They should rather trace GUI elements to data design!

Tracing Use of Data Structures



	Remaining time: 5 min.	Enter Your Answer	Question: 1/2	What is the # of meta...
MagicTest	2		1	1
Test	1		1	
-allowedTime : Integer [1]	↙			
-instructions : String [1]				
-questions : Question [0..*]			↙	
-title : String [1]				
Assessment	1			
Question				1

✓ MagicDraw provides data modelers with an easy way to visualize and edit traces between elements in matrix form

Agenda

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Wrap up

- ✓ UML has mature capabilities for modeling data structures
- ✓ A small subset of UML is enough for data modeling
- ✓ Data models should contain both data structure definitions and representative examples
- ✓ Modeling tool should enable data model analysis, including model validation for correctness and completeness, and transformation to documents and code
- ✓ There are many ways to utilize data model elements in modeling various aspects of system architecture

Questions?

Thank you!