Class Diagrams

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Q1

Plan for the Day

- Pre-break course evaluations
- Quick overview on class diagram notation
  - Not much detail since pre-course exam showed solid understanding of this
- Design exercise that should help with homework 4

Help Me Help You

- Pre-break course evaluation on ANGEL
- Please take 10 minutes or so to help me improve the course

UML Class Diagrams

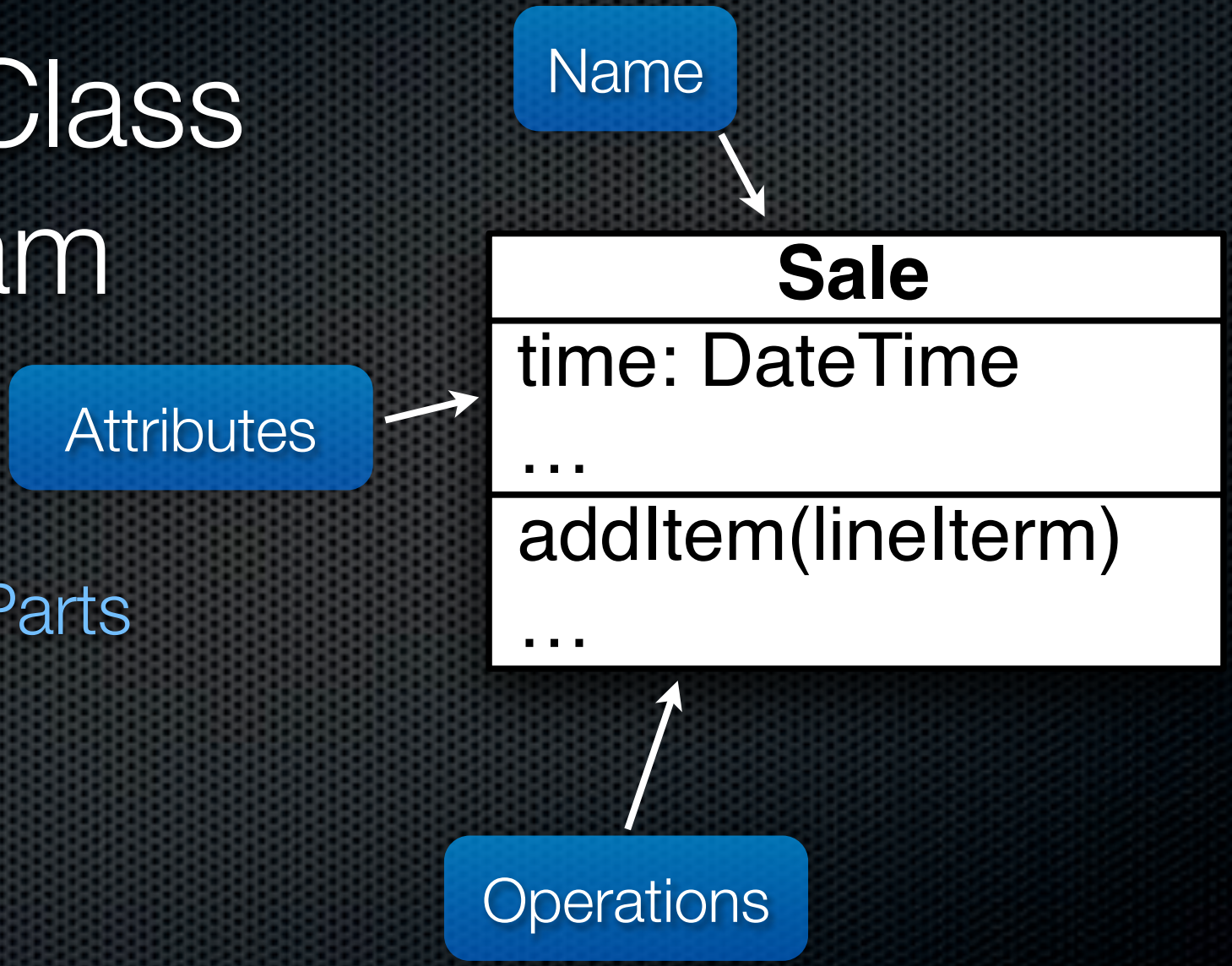
Class Diagrams Do Double Duty

- Call them **domain models** when used for analysis at the conceptual level
- Call them **design class diagrams** when used for design
  - **Design model** includes: design class diagrams, package diagrams, and interaction diagrams

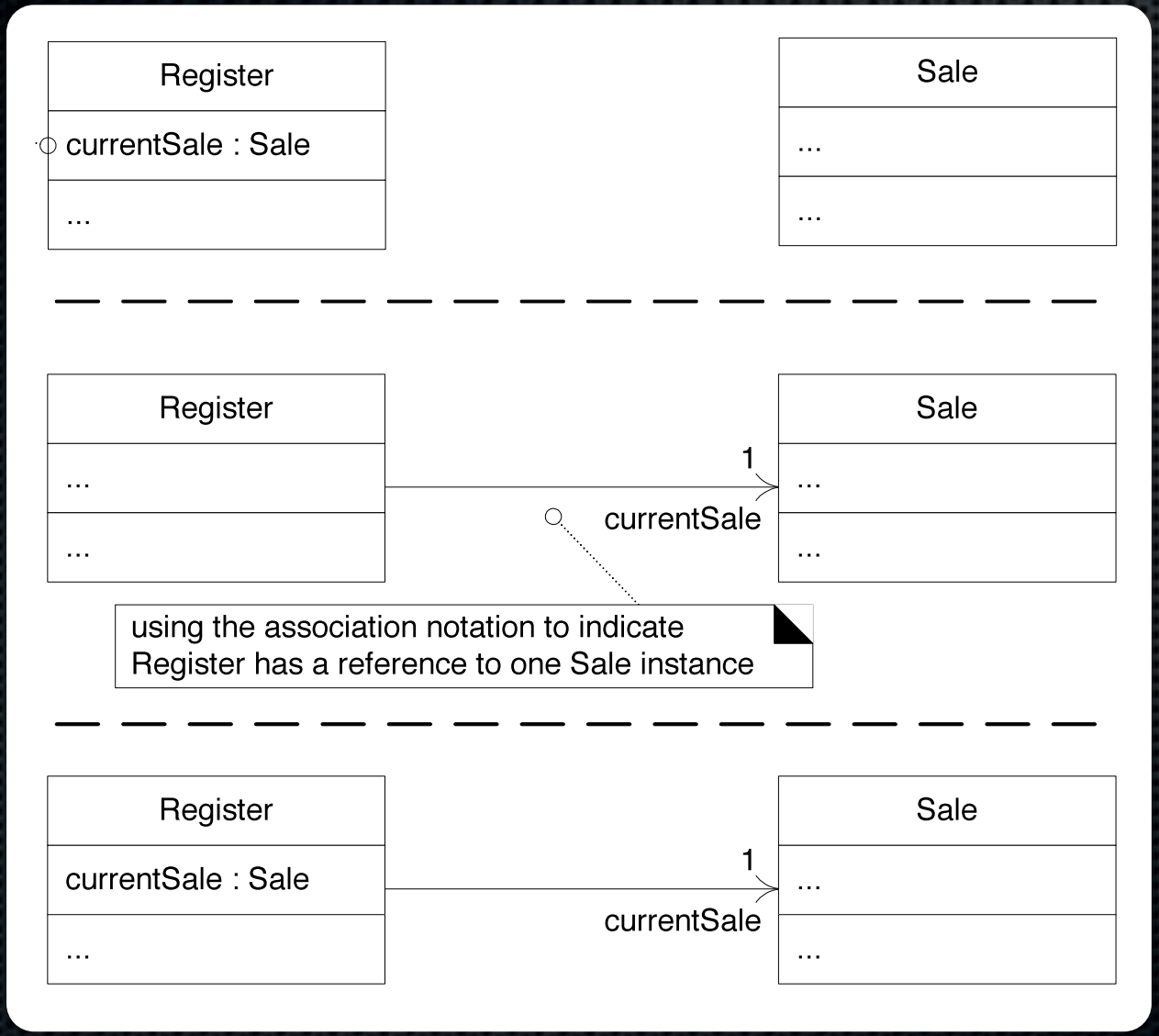
Q2

UML Class Diagram Box

Recall the Standard Parts



Attributes Three Ways



Use for data types

Use for other types

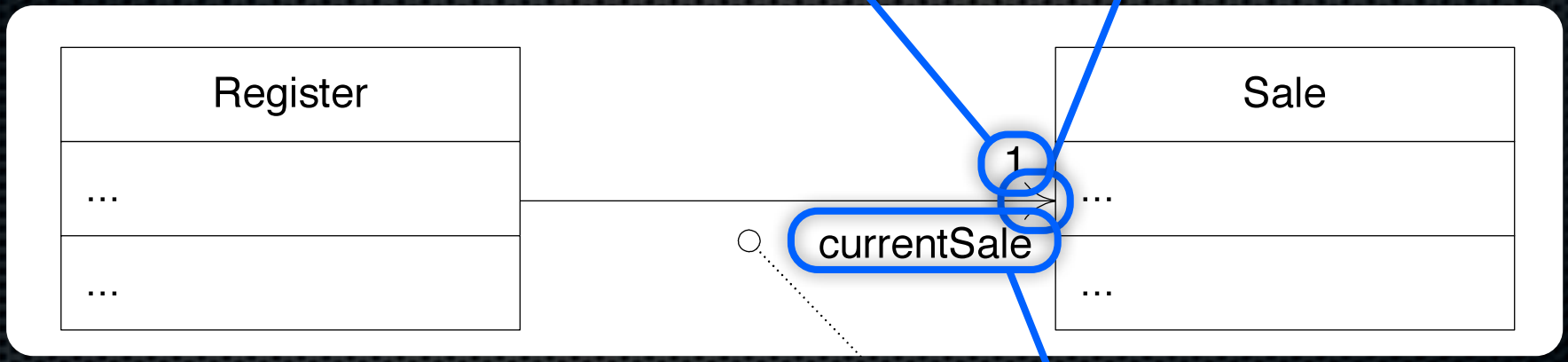
Redundant, blech

Q3

Association Style in DCDs Differs from Domain Models

Multiplicity only at target end

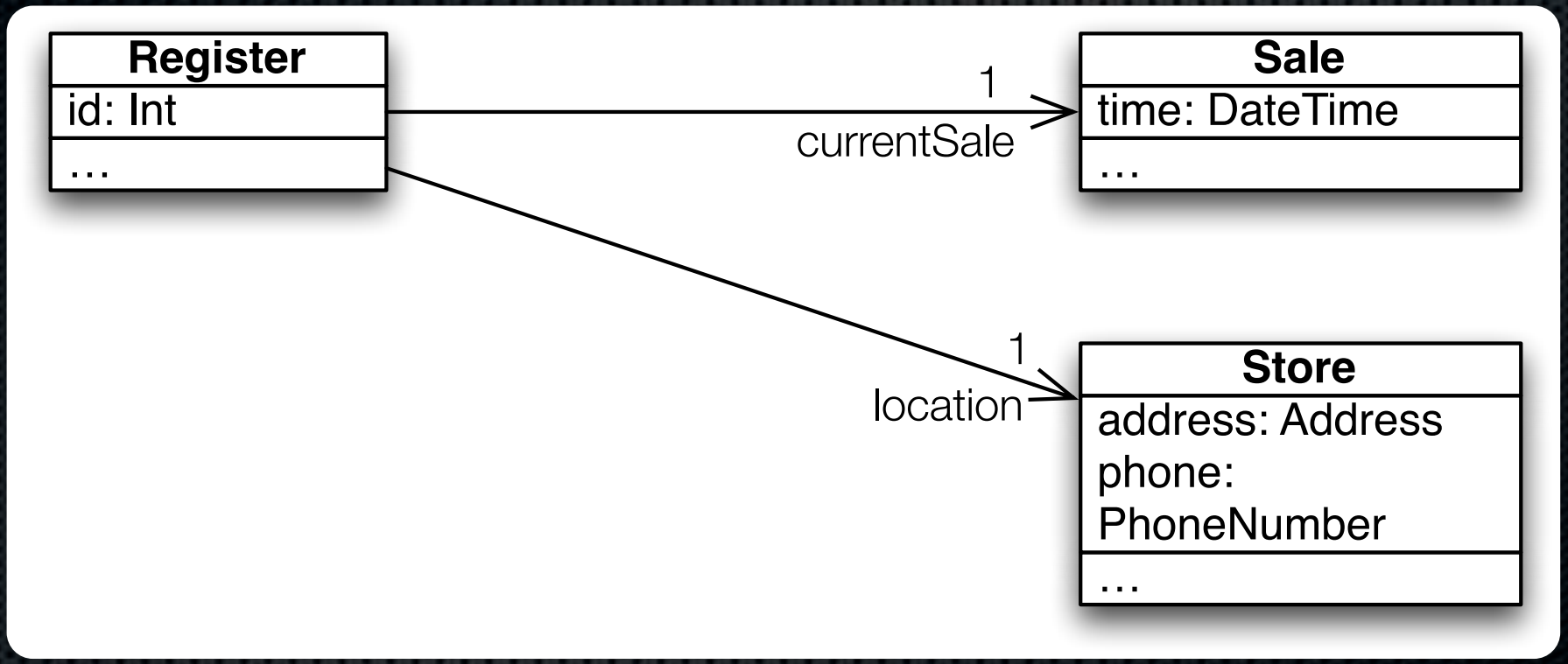
Navigability arrow



Role name only at target end

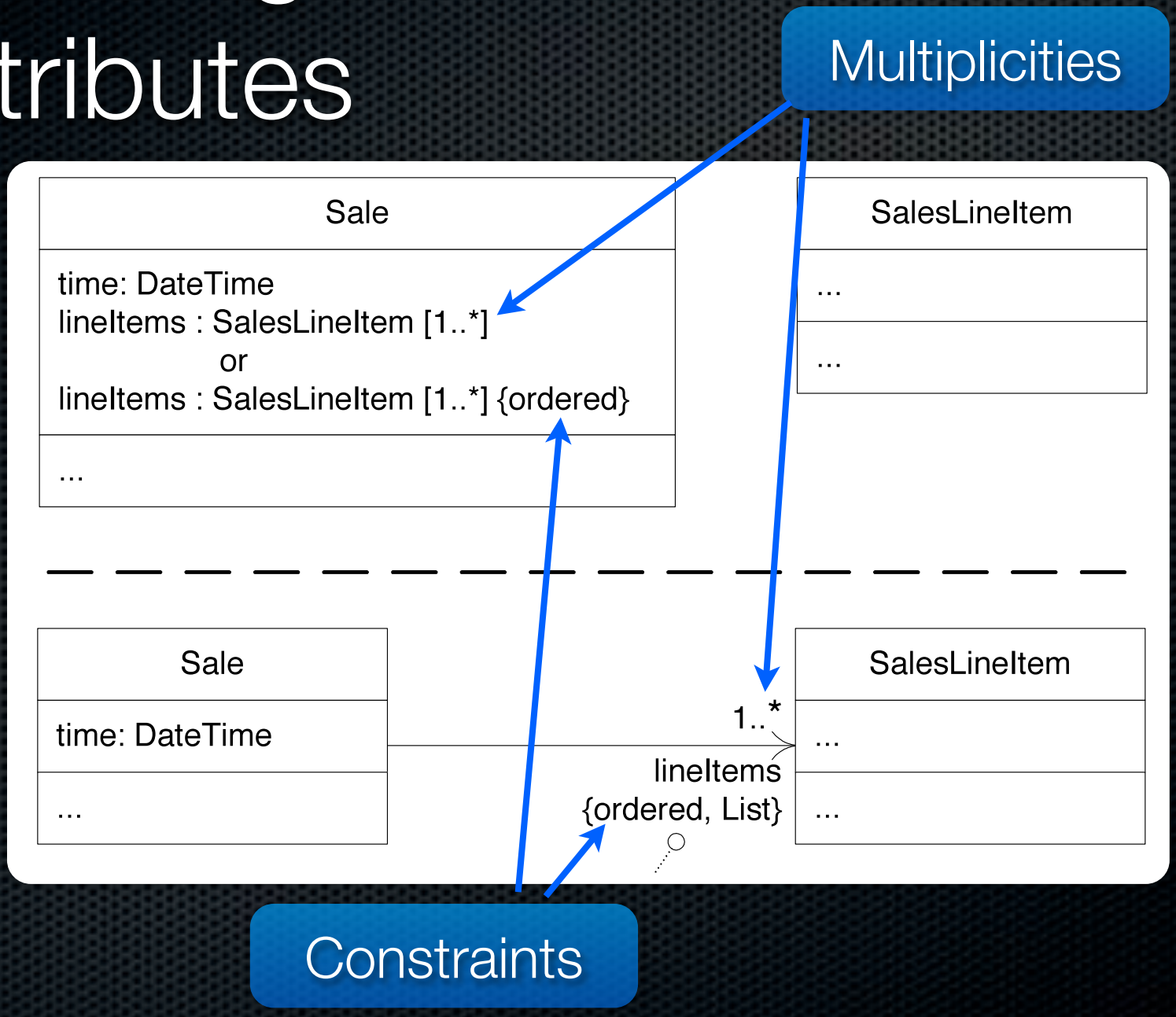
No **association name**

Example


Register
id: Int
…
1
currentSale
Sale
time: DateTime
…
1
location
Store
address: Address
phone:
PhoneNumber
…

Q4

Showing Collection Attributes

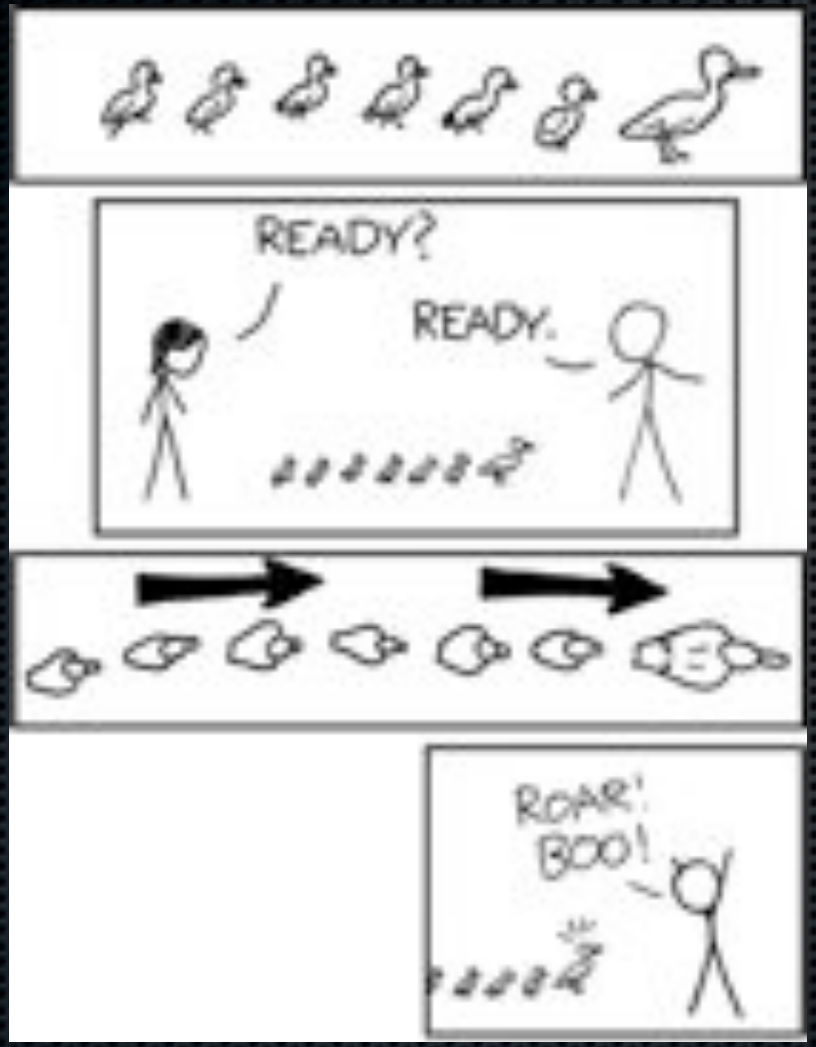


Q5

Operations

- Syntax:
  - `visibility name(paramName:type, ...) : returnType {properties}`
  - `+ getPlayer(name:String) : Player {exception IOException}`
- Can also use syntax of implementation language
  - `public Player getPlayer(String name) throws IOException`
- Operation vs. operation contract vs. method

Cartoon of the Day



http://www.brickfetish.com/toys/duck.html

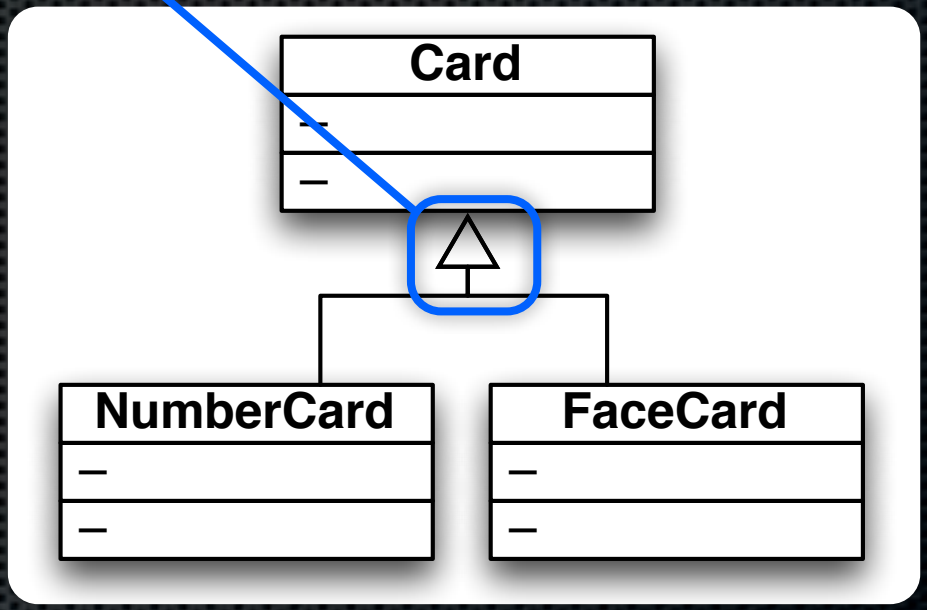
http://xkcd.com/537/

Keywords Categorize Model Elements

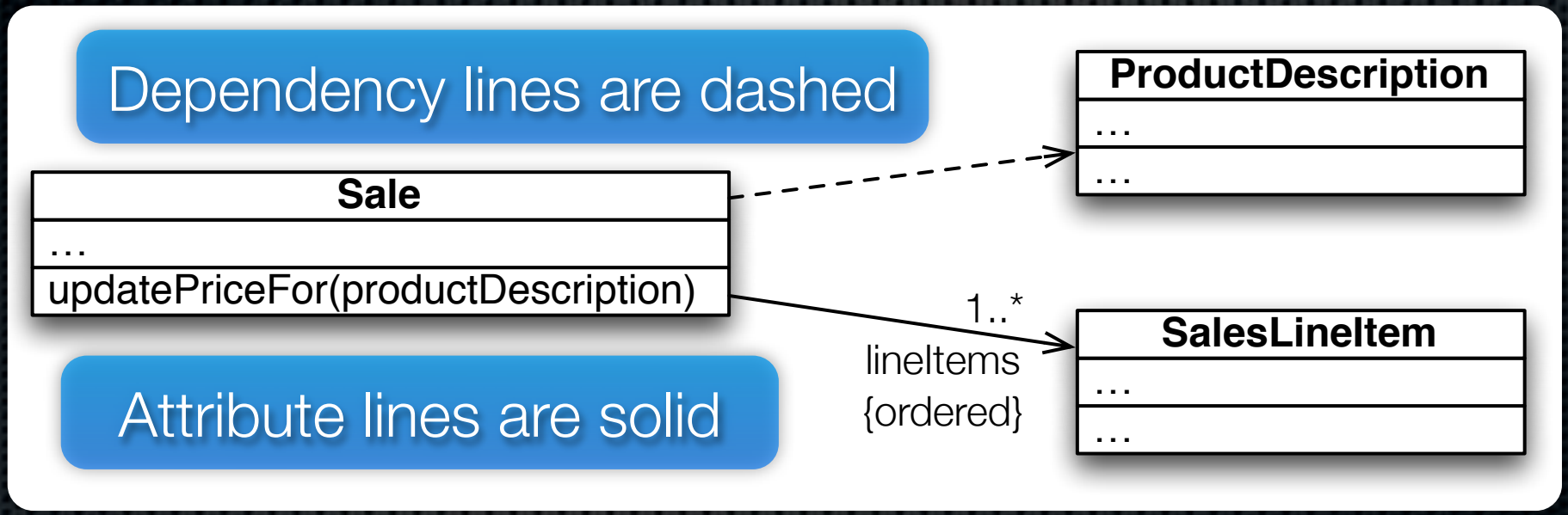
Keyword	Meaning	Example Usage
«actor»	classifier is an actor	shows that classifier is an actor without getting all xkcd
«interface»	classifier is an interface	«interface» MouseListener
{abstract}	can't be instantiated	follows classifier or operation
{ordered}	set of objects has defined order	follows role name on target end of association
{leaf}	can't be extended or overridden	follows classifier or operation

Generalization

- In domain model:
  - Says that the set of all NumberCards is a **subset** of the set of all Cards
- In DCD:
  - Says that, and that NumberCard **inherits** from Card



Dependencies

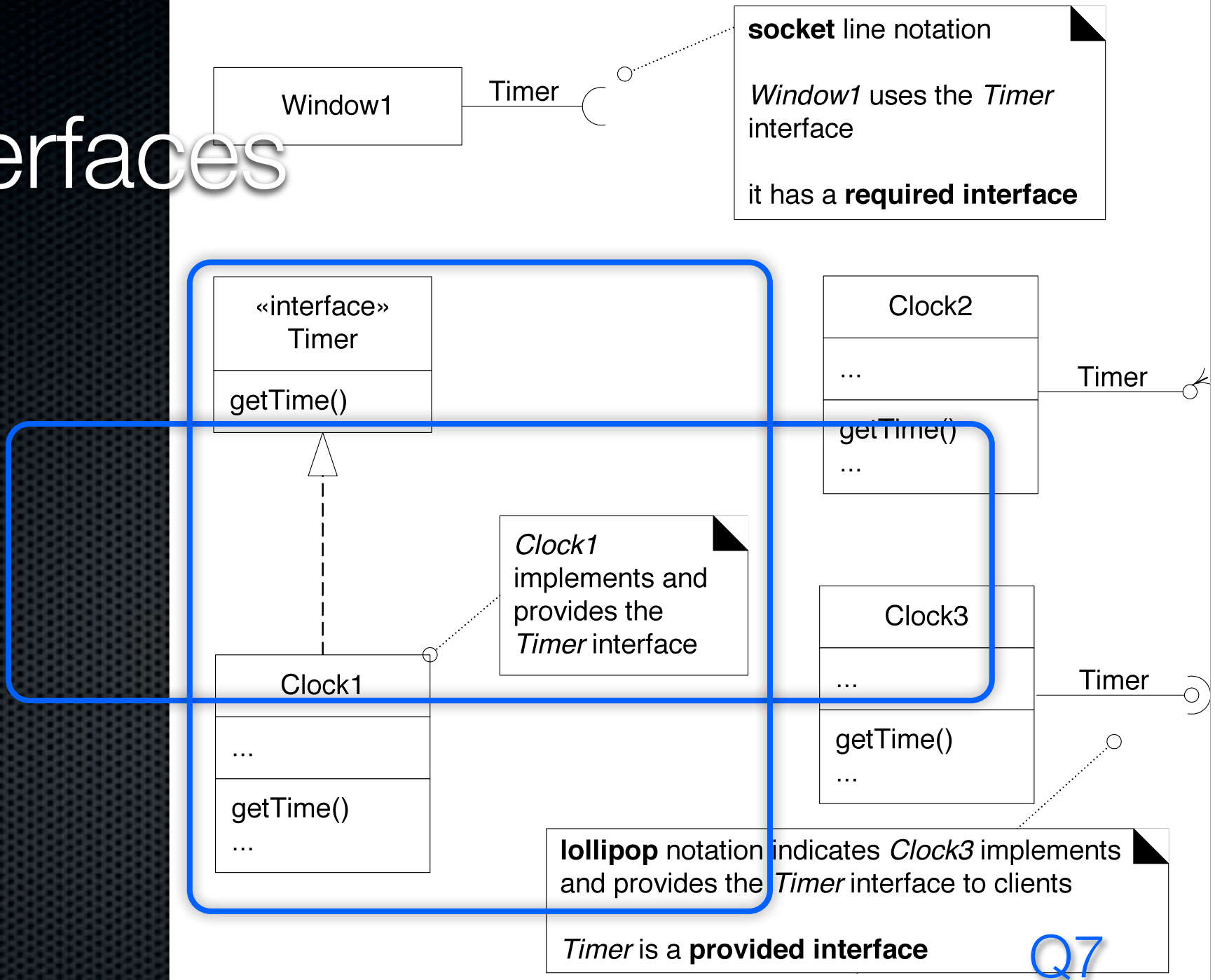


Use dependency lines when a more specific line type doesn't apply.

Can label dependency arrows: e.g. «call», «create»

Q6

Interfaces



Q7

Composition

- More powerful than an attribute arrow
- Describes whole-part relationship

- Implies
  - Instance of part belongs to only one composite at a time
  - Part always belongs to a composite
  - Composite creates/ deletes parts

Common to omit association or role name with compositions

Q8

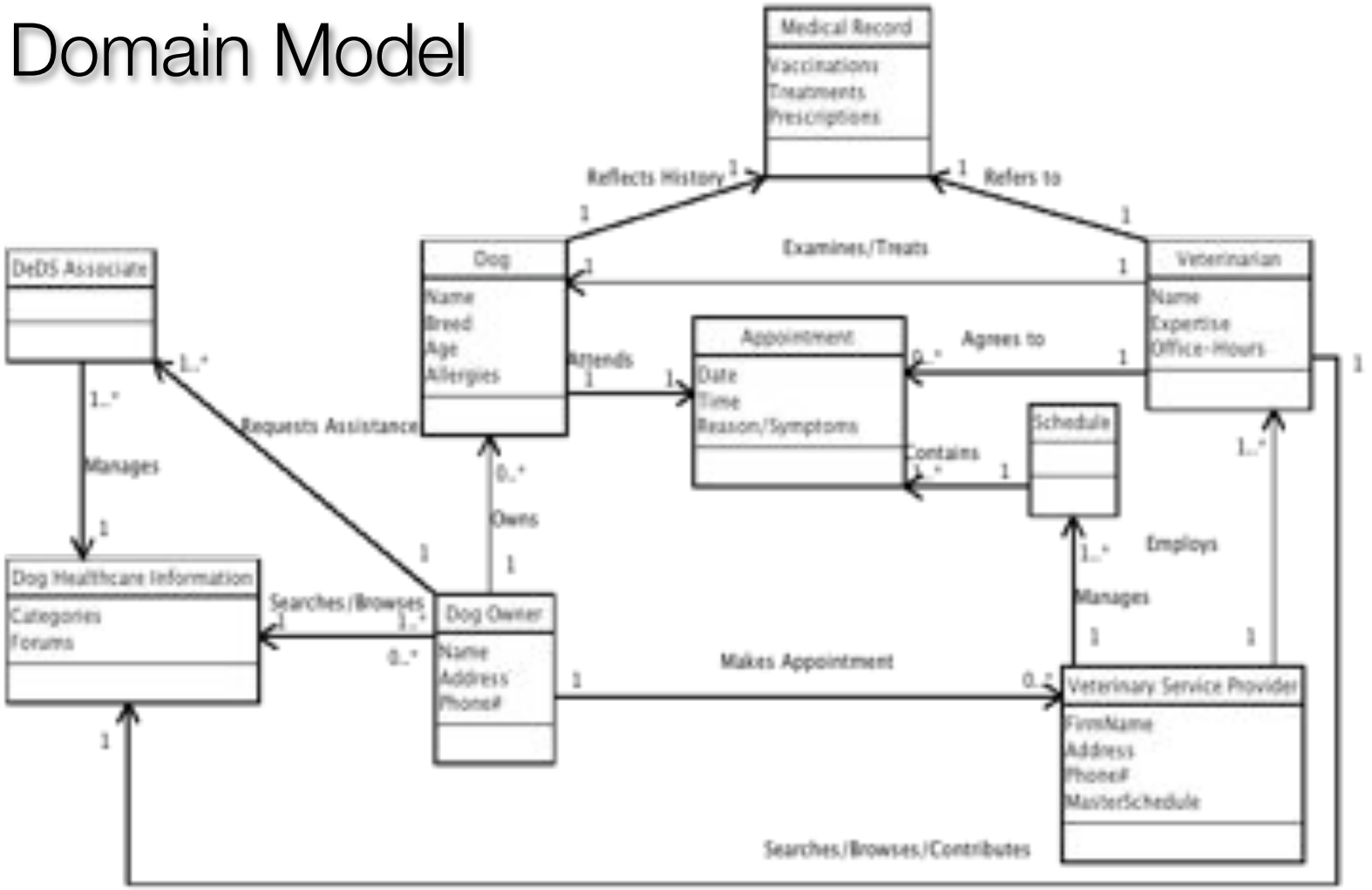
Interaction Diagrams and Class Diagrams

- Interaction diagrams show dynamic behavior
- Class diagrams show static behavior
- Tips:
  - Draw concurrently
  - Use two adjacent whiteboards, one for static and one for dynamic
  - Sketch communication diagrams, document using sequence diagrams

Example…

Guideline: Avoid having anything depend on something less stable than itself

Domain Model



Q9,10