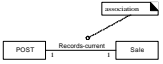


Conceptual Models (Ch. 10)

- ❖ Adding Associations to Conceptual Models
- ❖ Objectives:
 - Identify associations
 - Distinguish between *need-to-know* and *comprehension-only* associations
- ❖ Definition:
 - Relationships between objects of different types
 - Semantically, the weakest link type in the UML

1

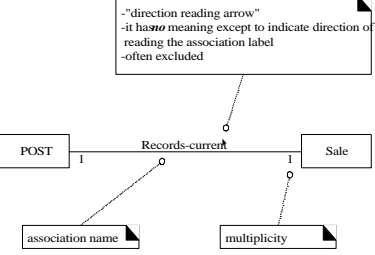
Associations



- ❖ Associations imply knowledge of a relationship that needs to be preserved over time
 - could be milliseconds or years!
 - such associations are *need-to-know* assocs.
- ❖ Represented as a solid line between objects
 - the association is inherently bi-directional
 - may contain a *cardinality* or *multiplicity* value
 - optionally contains an arrow for easy reading

2

POST Example Association



3

Types of Associations

- ❖ *Common Association List* includes ...
 - A is a physical part of B
 - A is a logical part of B
 - A is a description for B
 - A is a member of B
 - A uses or manages B
 - A communicates with B
 - A is owned by B
 - A is responsible for B

Finding *concepts* is more important than finding *associations* in the model!

4

Roles in Associations

- ❖ Roles indicate how one side views the other in the relationship
- ❖ Roles optionally have:
 - a name
 - navigability
 - ◆ indicates visibility and makes link uni-directional
 - multiplicity expression
 - ◆ some still say cardinality!

5

Multiplicity

—*	T	zero or more; "many"
—1..*	T	one or more
—1..40	T	one to forty
—5	T	exactly five
—3, 5, 8	T	exactly three, five or eight

6

Naming Associations

- ❖ Association names should start with a capital letter (same as concepts, objects)
- ❖ Noun phrases help identify objects/concepts
- ❖ Verb phrases help identify associations
- ❖ Use hyphens to separate words when a phrase is used to name something.

7

Some Examples

8

Multiple Associations

- ❖ Two types may have multiple associations between them!
- ❖ None are present in POST example
 - the following comes from the Airline Reservation System:

9

Regarding Associations

- ❖ During the analysis phase, an association is not a statement about data flows, instance variables, or object messages in a software solution.
- ❖ Associations are real-world relationships, which may or may not be implemented in the final system.
- ❖ Conversely, we may discover associations that need to be implemented but were missed in analysis. The conceptual model should be updated!
- ❖ Usually, associations are implemented by placing an instance variable which "points to" (references) an instance of the associated class.
- ❖ Only add associations (or concepts) to the model that aid in the comprehension of the system by others.
- ❖ Remember, conceptual models are communication tools, used to express concepts in the problem domain.

10

11

12