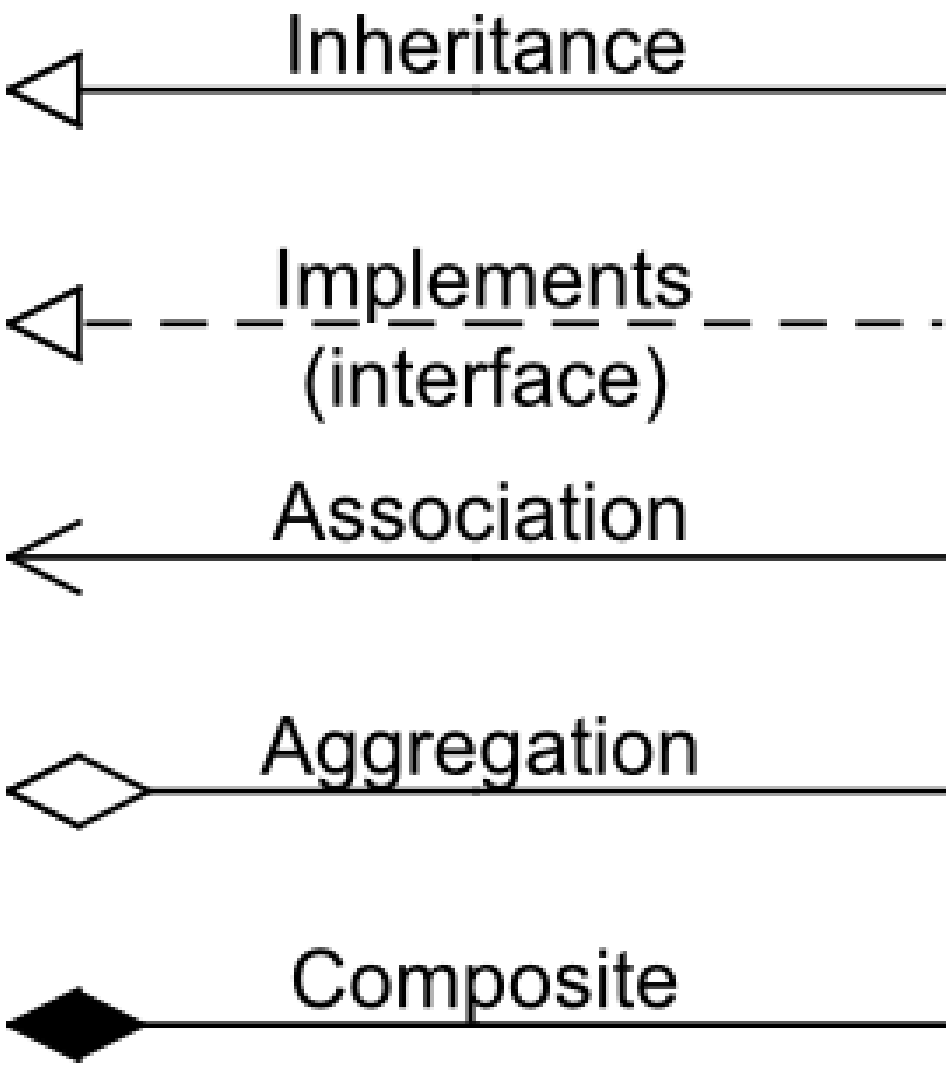
Class Diagrams, the finale

Comp-304 : Class Diagrams, the finale
Lecture 10

Alexandre Denault
Original notes by Hans Vangheluwe
Computer Science
McGill University
Fall 2006

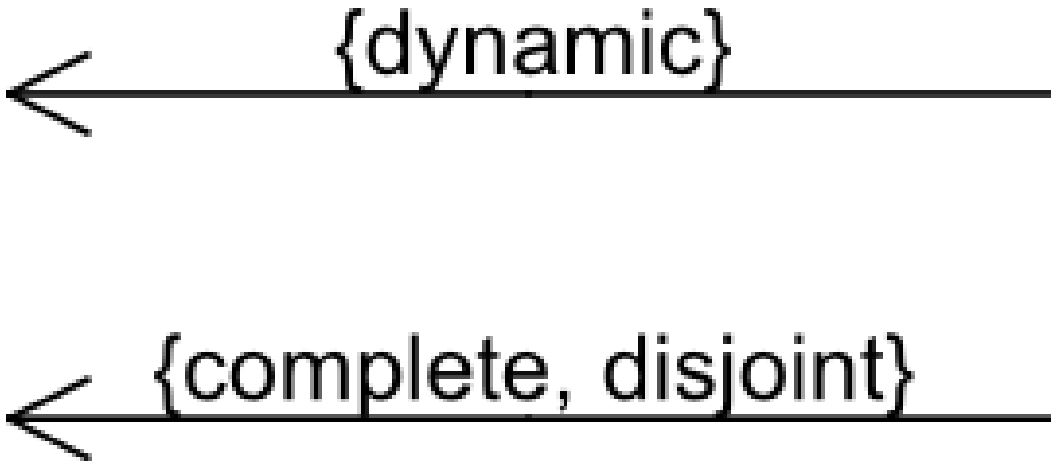
Arrows

- Arrows in UML can have various purpose.
- Open arrows most often describe an inheritance relation.
- Closed arrows are used to describe associations.
- Square arrows define composition relations.



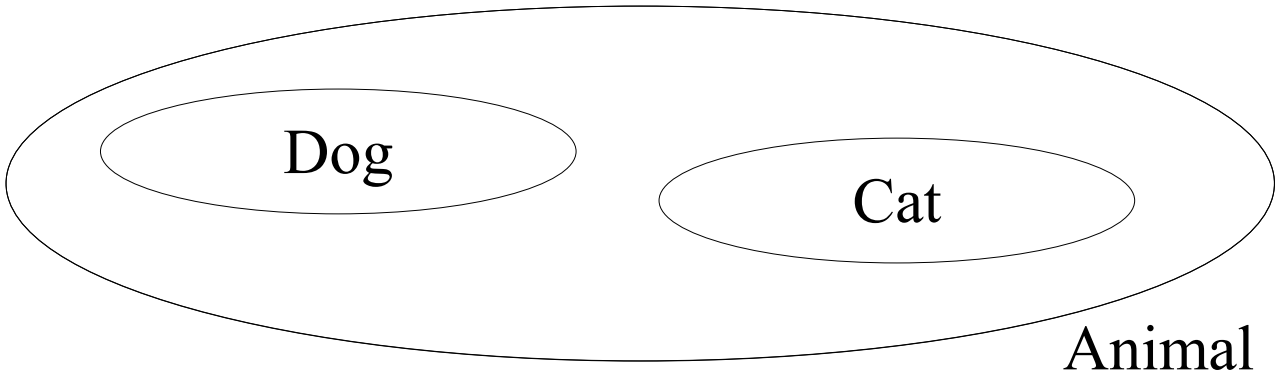
Stereotypes

- Stereotypes are also annotations put over arrows in class diagrams.
- A collection of stereotypes is a profile.

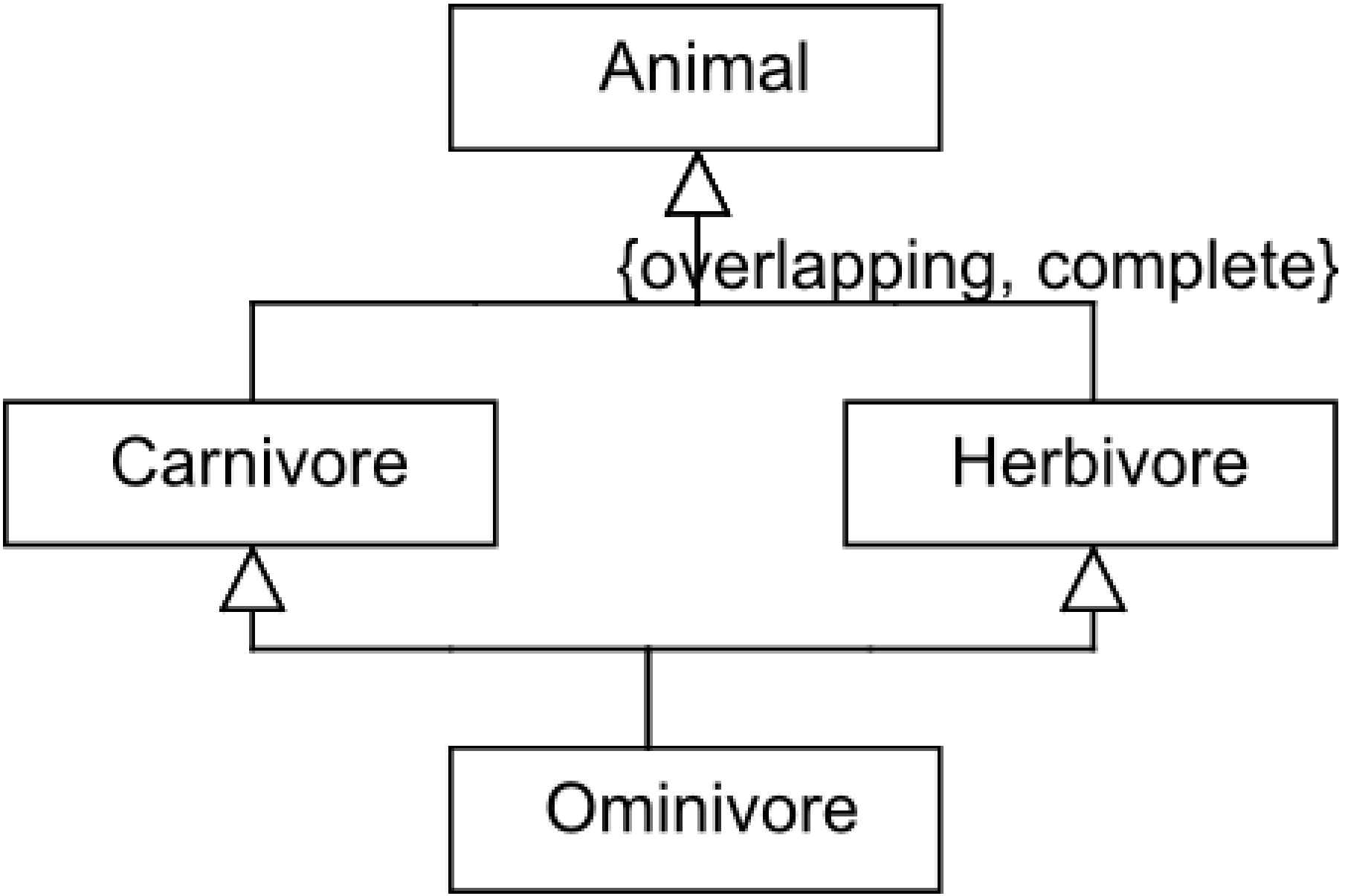


Inheritance Relations

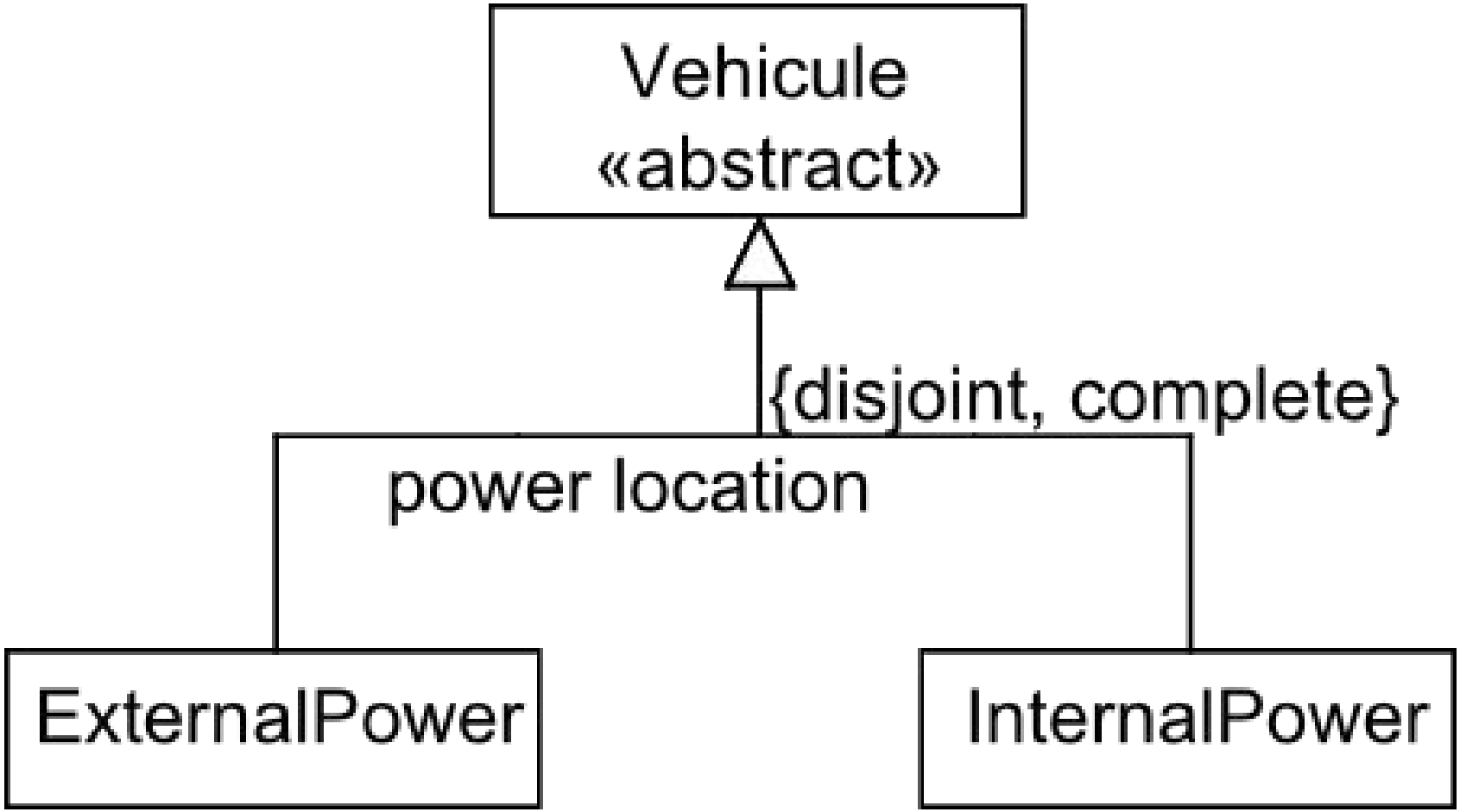
- We can use stereotype relations to better define the type of inheritance.
- The three attributes are
  - Disjoint or Overlapping
  - Complete or Non-complete
  - Dynamic or Static
- These attributes are best understood using set theory.



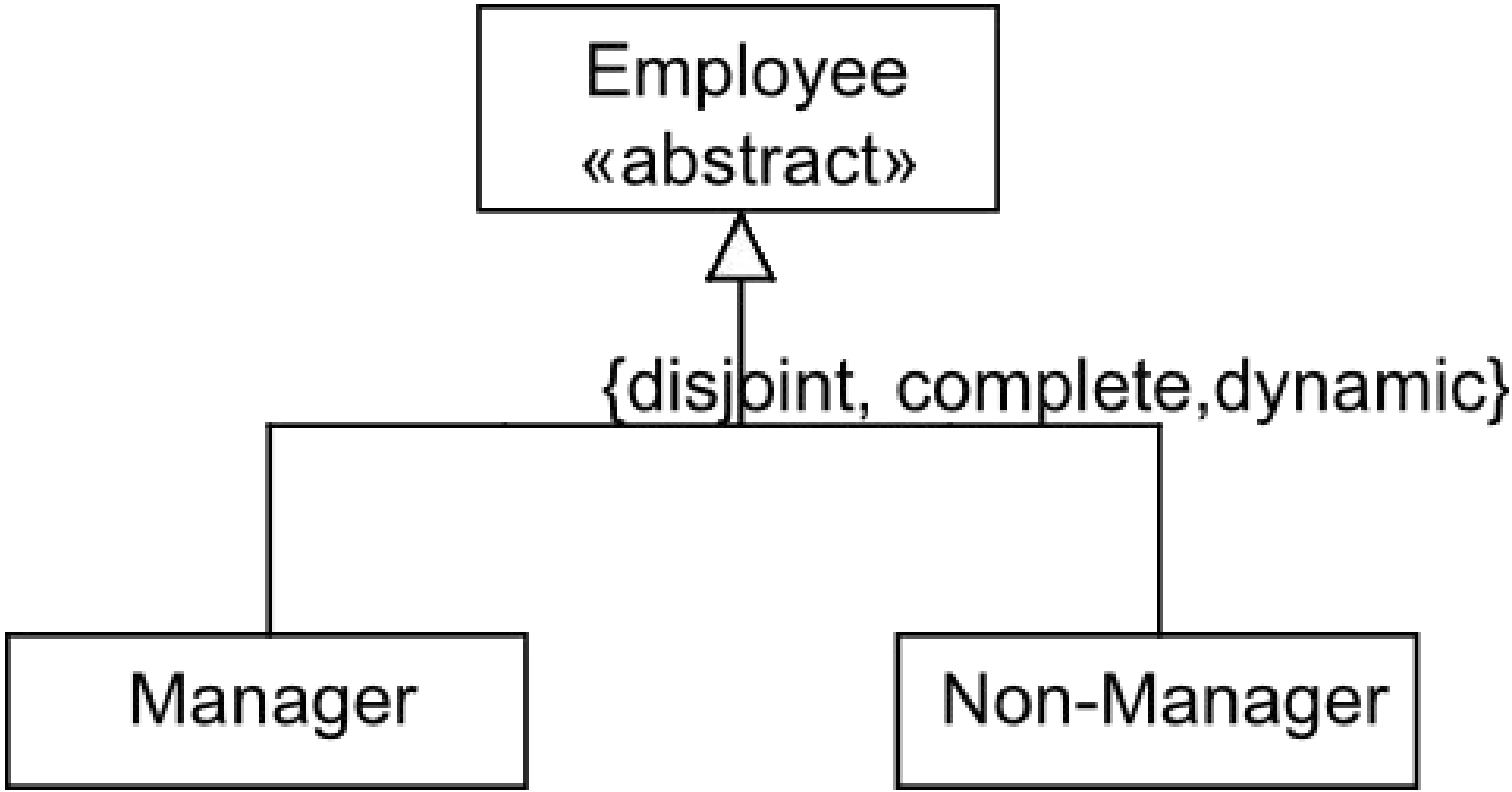
Animal Example



Vehicle Example



Employee Example



Implementation

- Employees can get promotion and become managers.
- Employees can get demoted and become non-managers.
- How would you implement this change?

Non-Manager to Manager

- How do we implement the dynamic change of a Non-Manager becoming a Manager?
- Option A: Create new object Manager. Copy fields. Destroy old object Non-Manager.
- Option B: Flag if Manager or not. So we only need an object employee and it contains all the attributes for Non-Manager and Manager.

Association

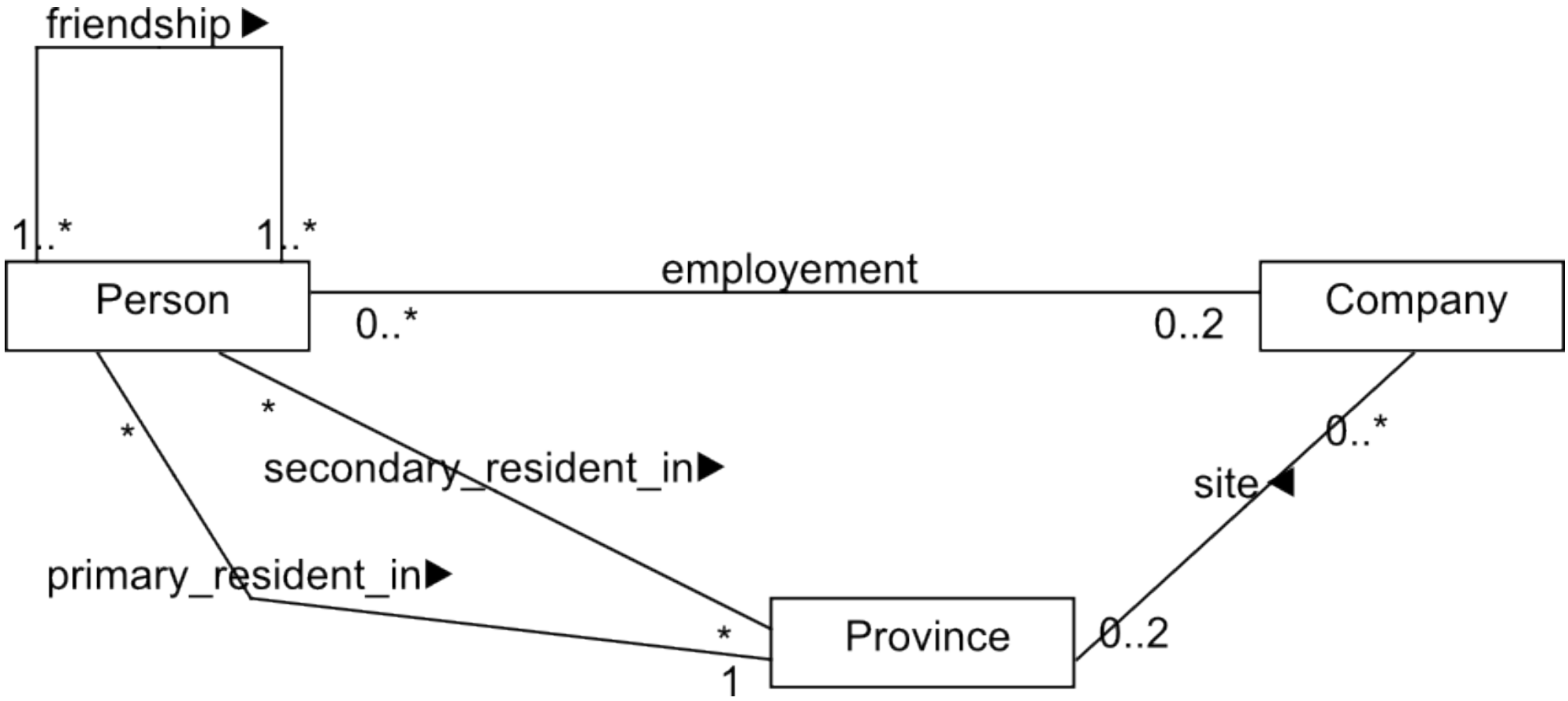
- Associations describe which/how classes interact which each others.
  - You can give an association a name (always a noun)
    - A full black arrow next to a name indicates the direction the diagram can be read.
  - You can put roles at the end of connectors.
  - You can also put numbers to indicate cardinality.

Cardinal Relations

- One-to-one
- Many-to-one or One-to-many
- Many-to-many

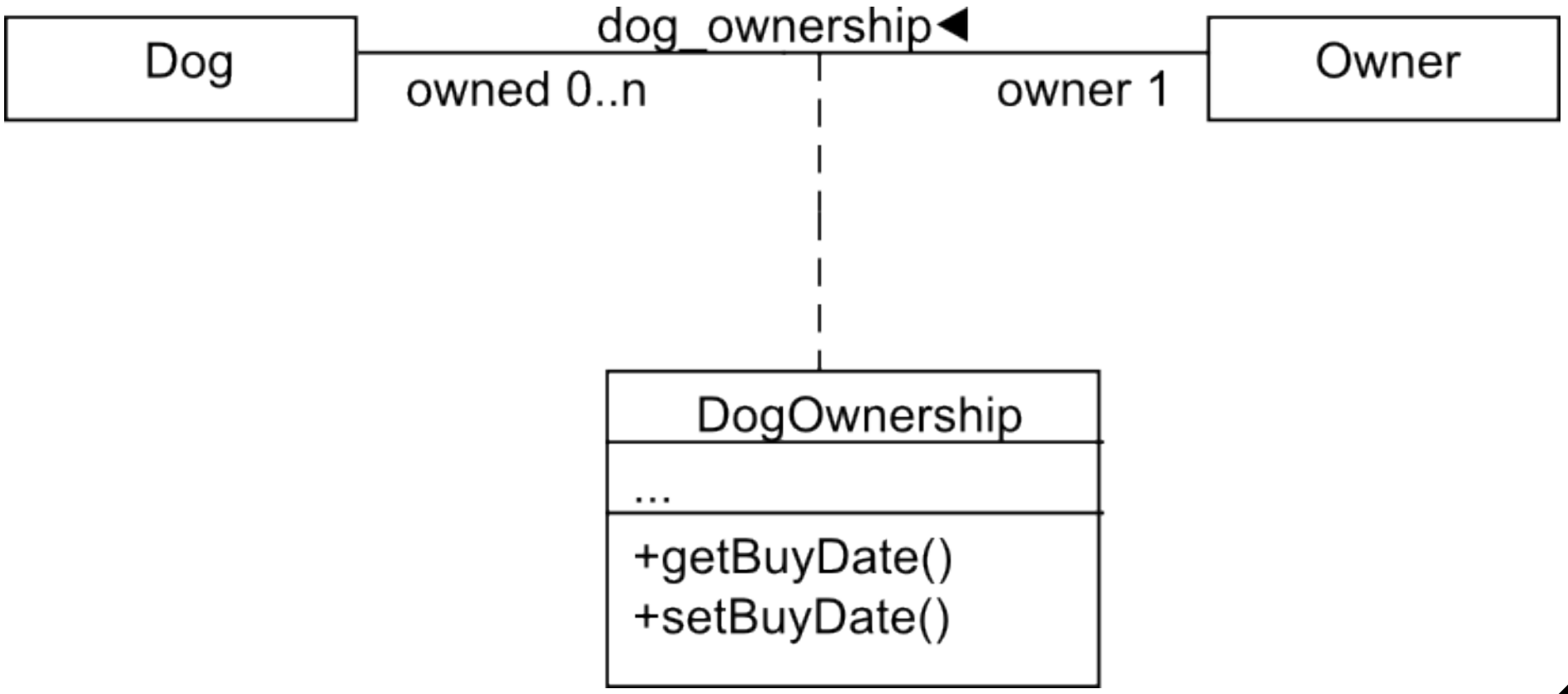
- Can you give me examples?

Employee Example



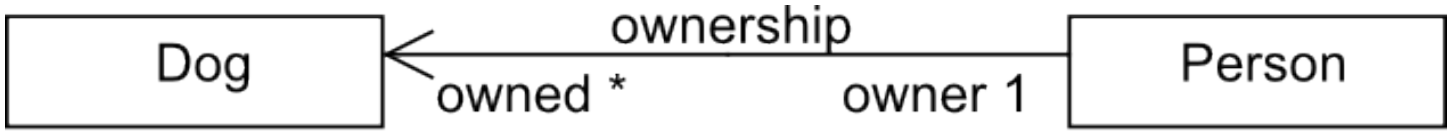
Association Class

- Sometimes, a class can be used to represent the association.

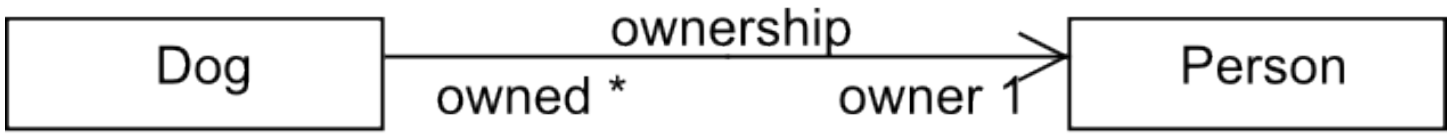


Navigation

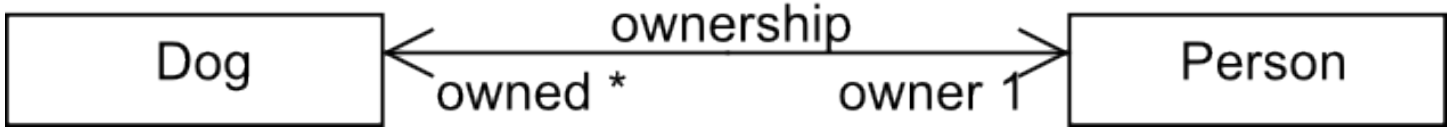
- Person object has a reference to dog object(s).



- Dog object has a reference to person object.



- Both objects have references to each other.



- This relates to performance (at the cost of space).

Association, in whole or in part

Two special types of associations exists:

- Composition
- Aggregation

Which is which?

Scenario 1

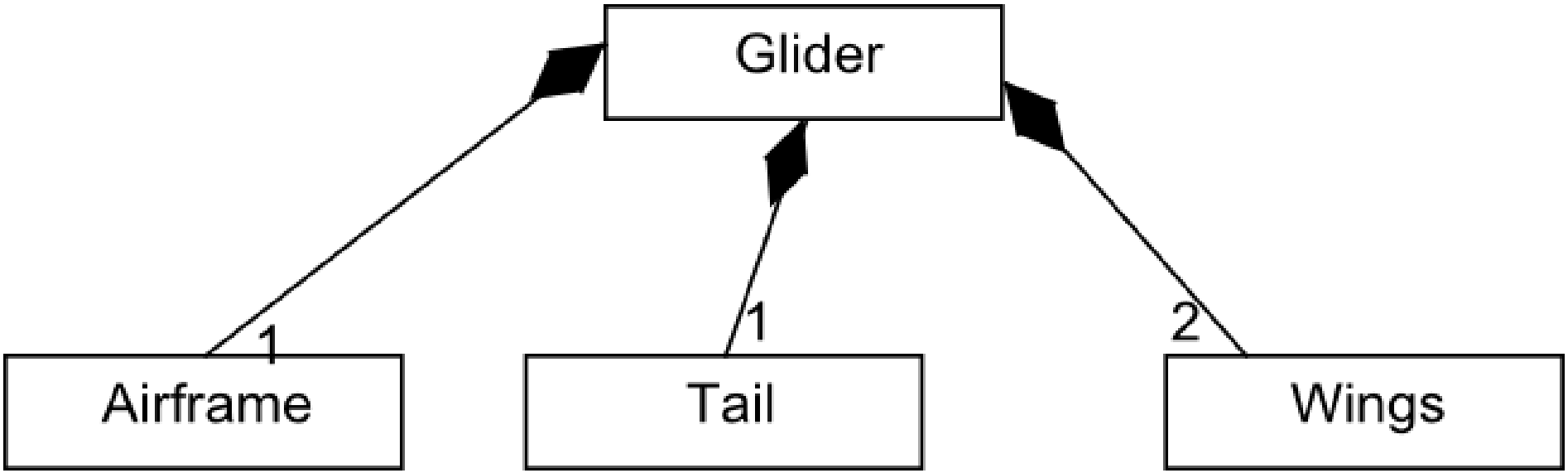
- You can find books in a bookcase.

Scenario 2

- You can find shelves in a bookcase.

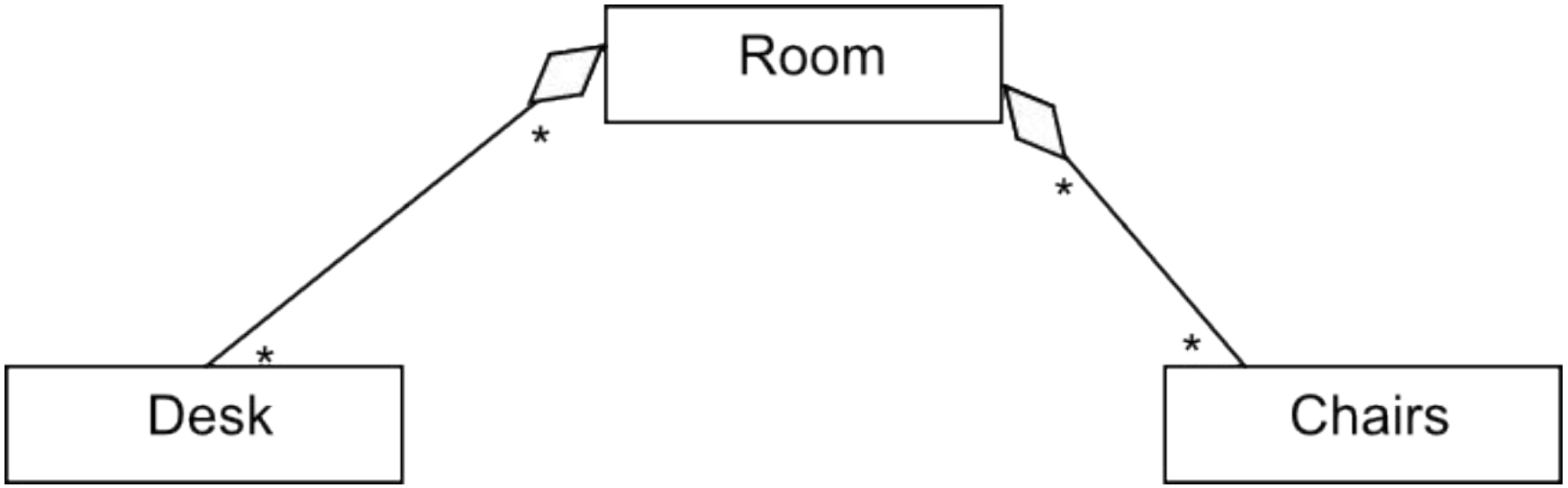
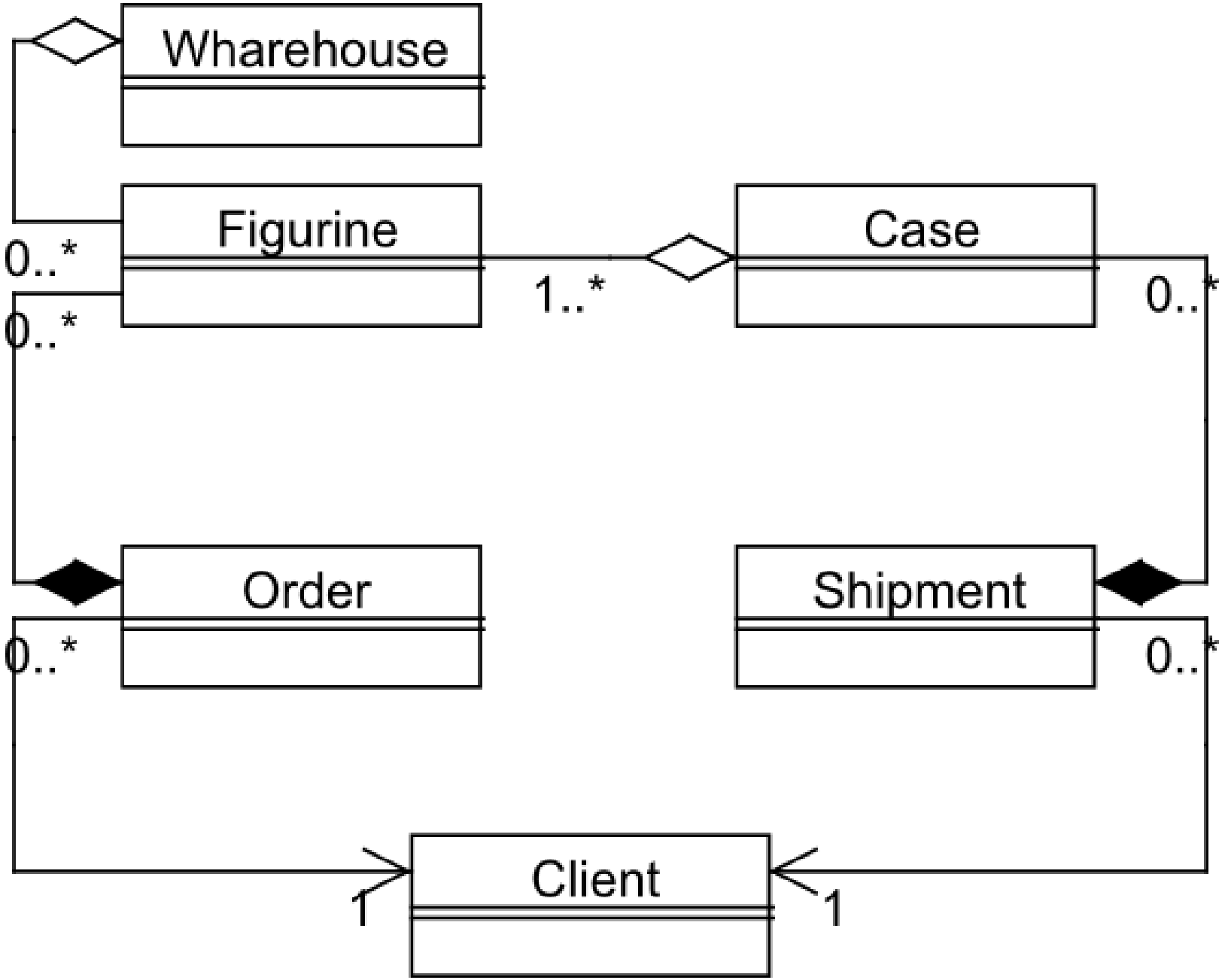
Composition

- A composite object does not exist without its components.
  - Composite does not outline its components.
  - If we delete a composite object, we should cascade-delete it's components.
- For each components C, each C is a part of a single composite.



Aggregation

- Aggregate (whole) object can exist without aggregands (parts).
- Objects may be part of multiple aggregates.
- Typically, components are of same types.



Again