Patterns in Software Engineering

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Lecture 12

Refactoring Patterns

Part 3

Dealing with Generalization: *Pull Up Constructor Body*

- **Pull Up Constructor Body**
  - You have constructors on subclasses with mostly identical bodies.
  - *Create a superclass constructor; call this from the subclass methods.*

```
class Manager extends Employee...
  public Manager (String name, String id, int grade) {
      _name = name;
      _id = id;
      _grade = grade;
  }
```

⇓

```
  public Manager (String name, String id, int grade) {
      super (name, id);
      _grade = grade;
  }
```

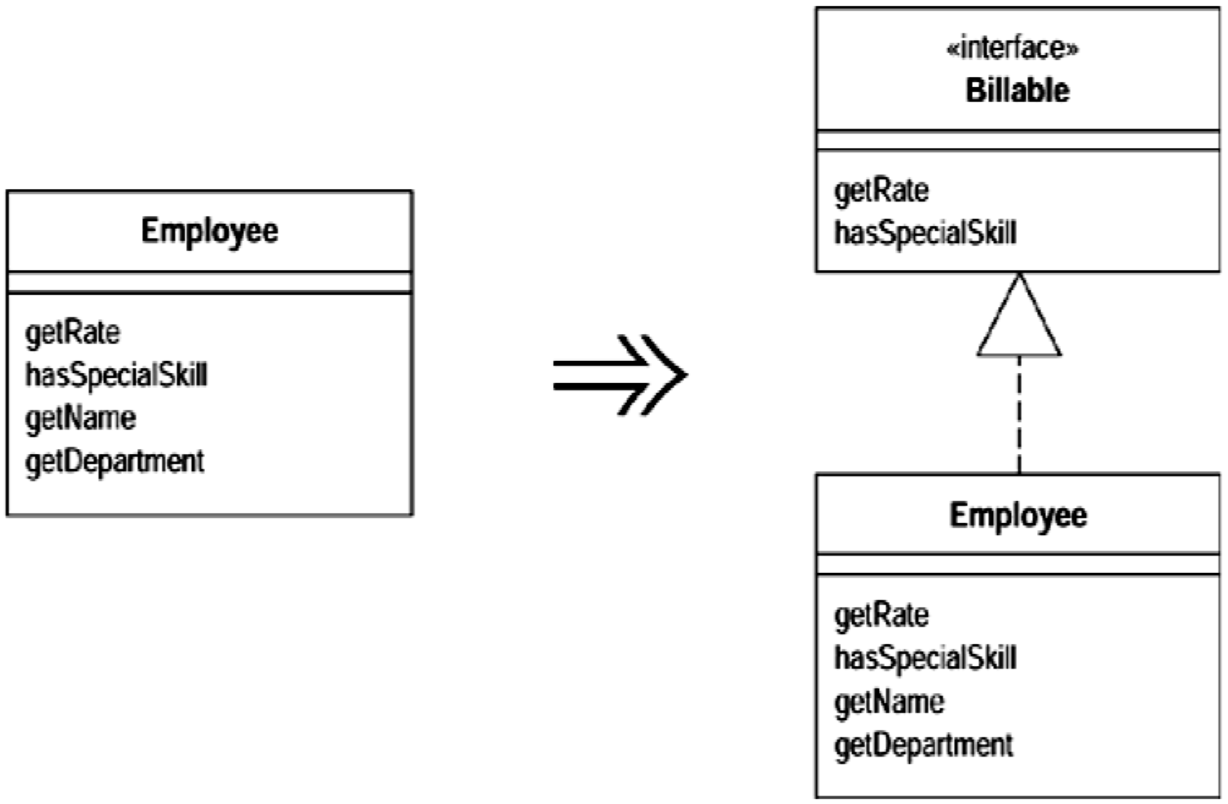
Dealing with Generalization: *Extract Subclass/Superclass*

- **Extract Subclass**
  - A class has features that are used only in some instances.
  - *Create a subclass for that subset of features.*

- **Extract Superclass**
  - You have two classes with similar features.
  - *Create a superclass and move the common features to the superclass.*

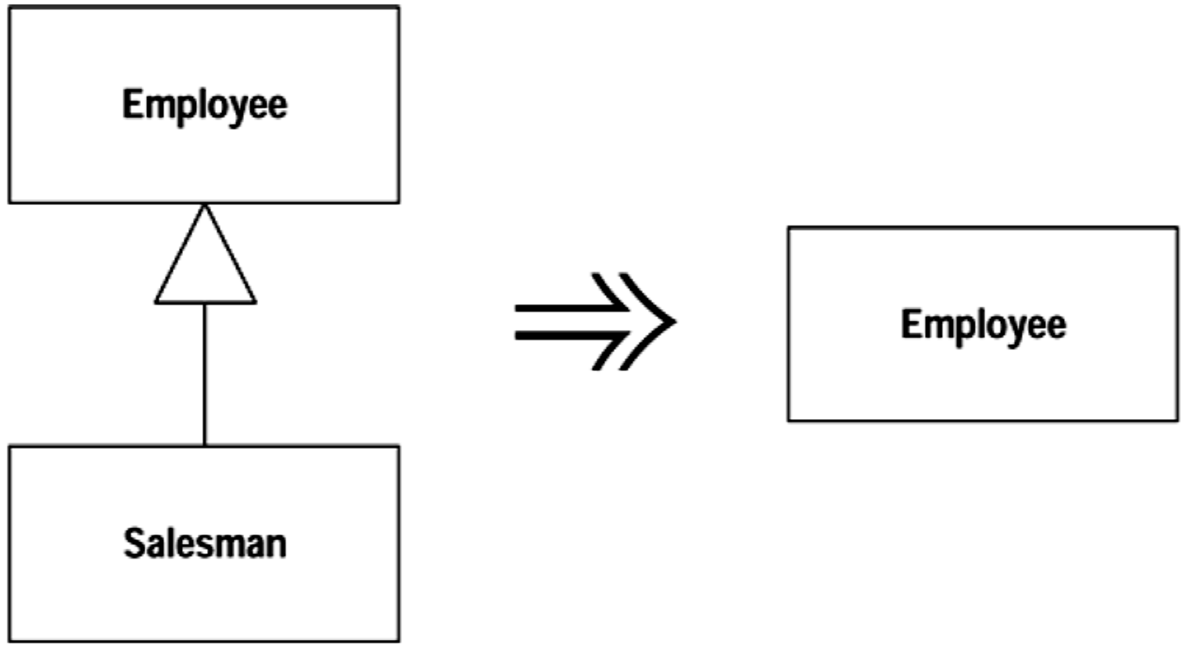
Dealing with Generalization: *Extract Interface*

- **Extract Interface**
  - Several clients use the same subset of a class's interface, or two classes have part of their interfaces in common.
  - *Extract the subset into an interface.*



Dealing with Generalization: *Collapse Hierarchy*

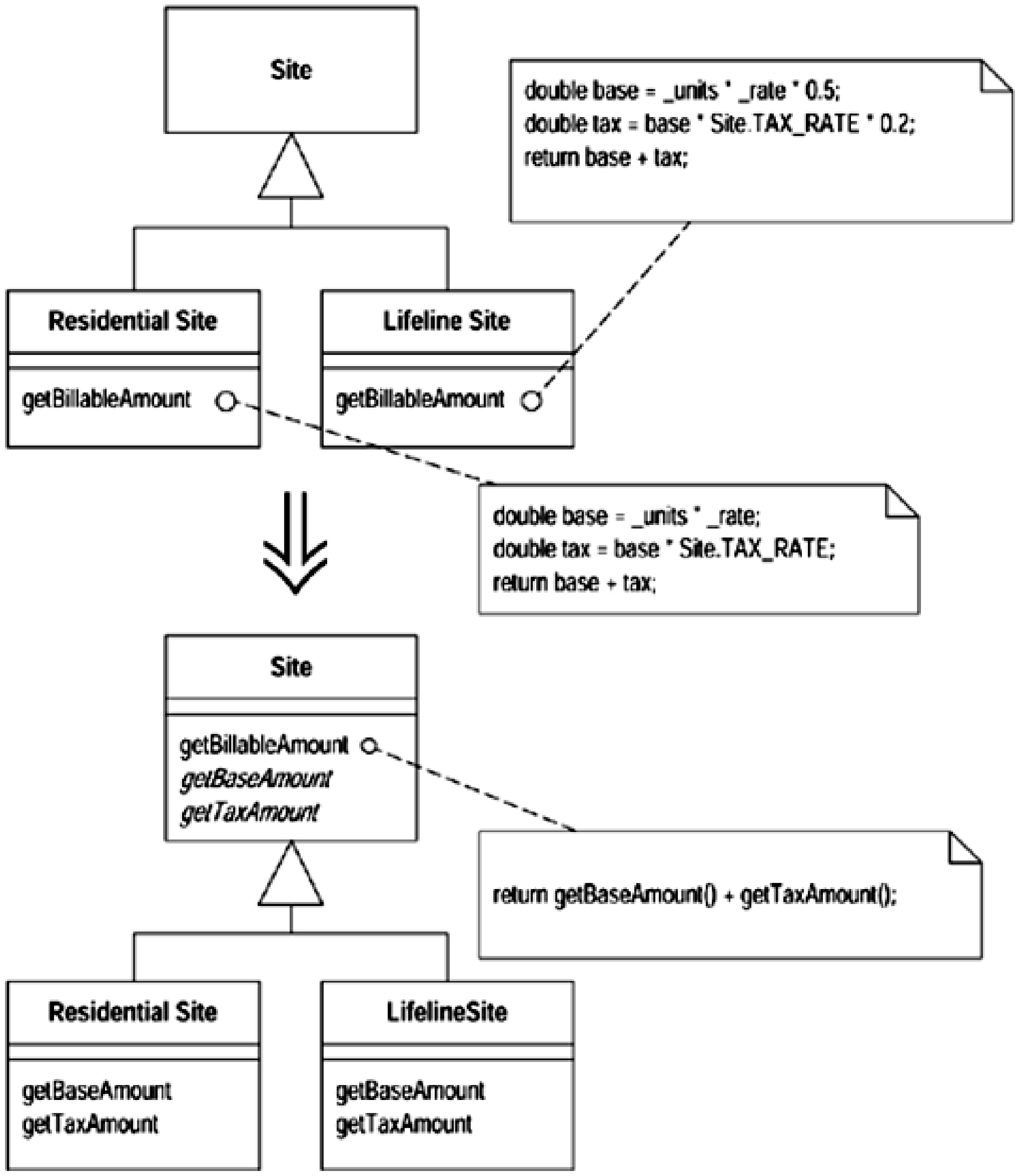
- **Collapse Hierarchy**
  - A superclass and subclass are not very different.
  - *Merge them together.*



Dealing with Generalization: *Form Template Method*

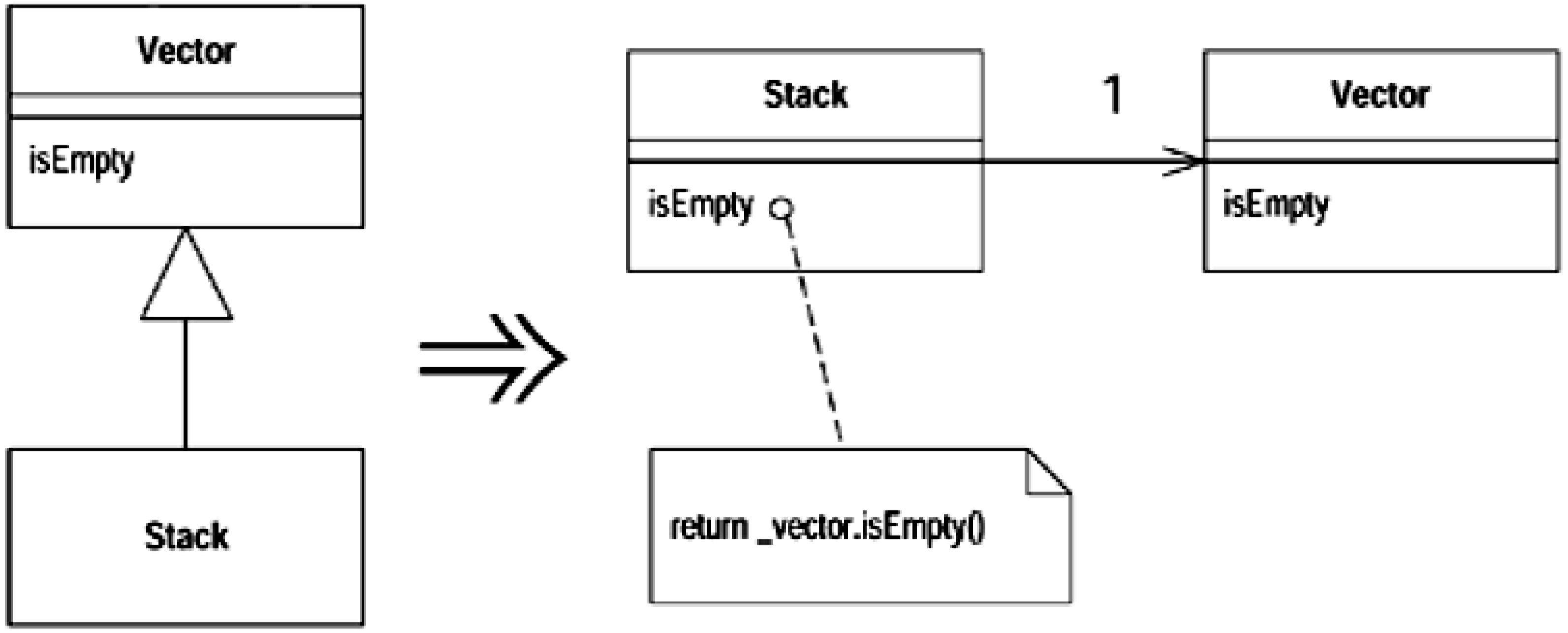
- **Form Template Method**
  - You have two methods in subclasses that perform similar steps in the same order, yet the steps are different.
  - *Get the steps into methods with the same signature, so that the original methods become the same. Then you can pull them up.*

Dealing with Generalization: *Form Template Method*



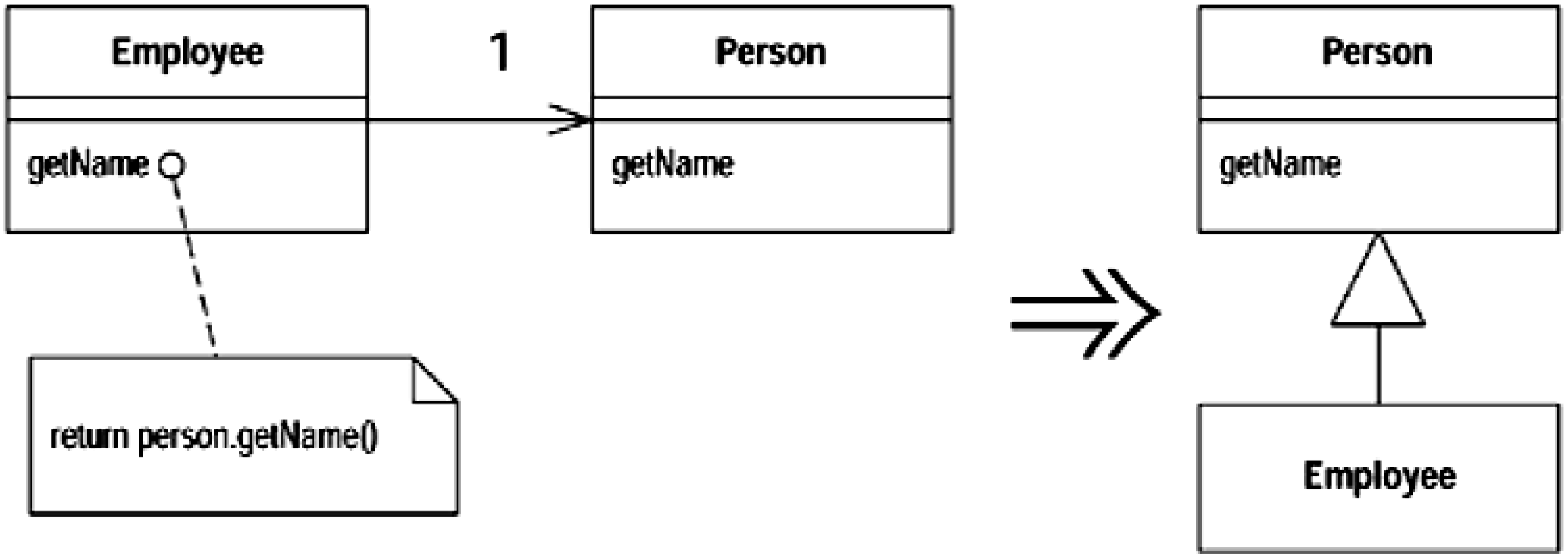
Dealing with Generalization: *Replace Inheritance with Delegation*

- **Replace Inheritance with Delegation**
  - A subclass uses only part of a superclass's interface or does not want to inherit data.
  - *Create a field for the superclass, adjust methods to delegate to the superclass, and remove the subclassing.*



Dealing with Generalization: *Replace Delegation with Inheritance*

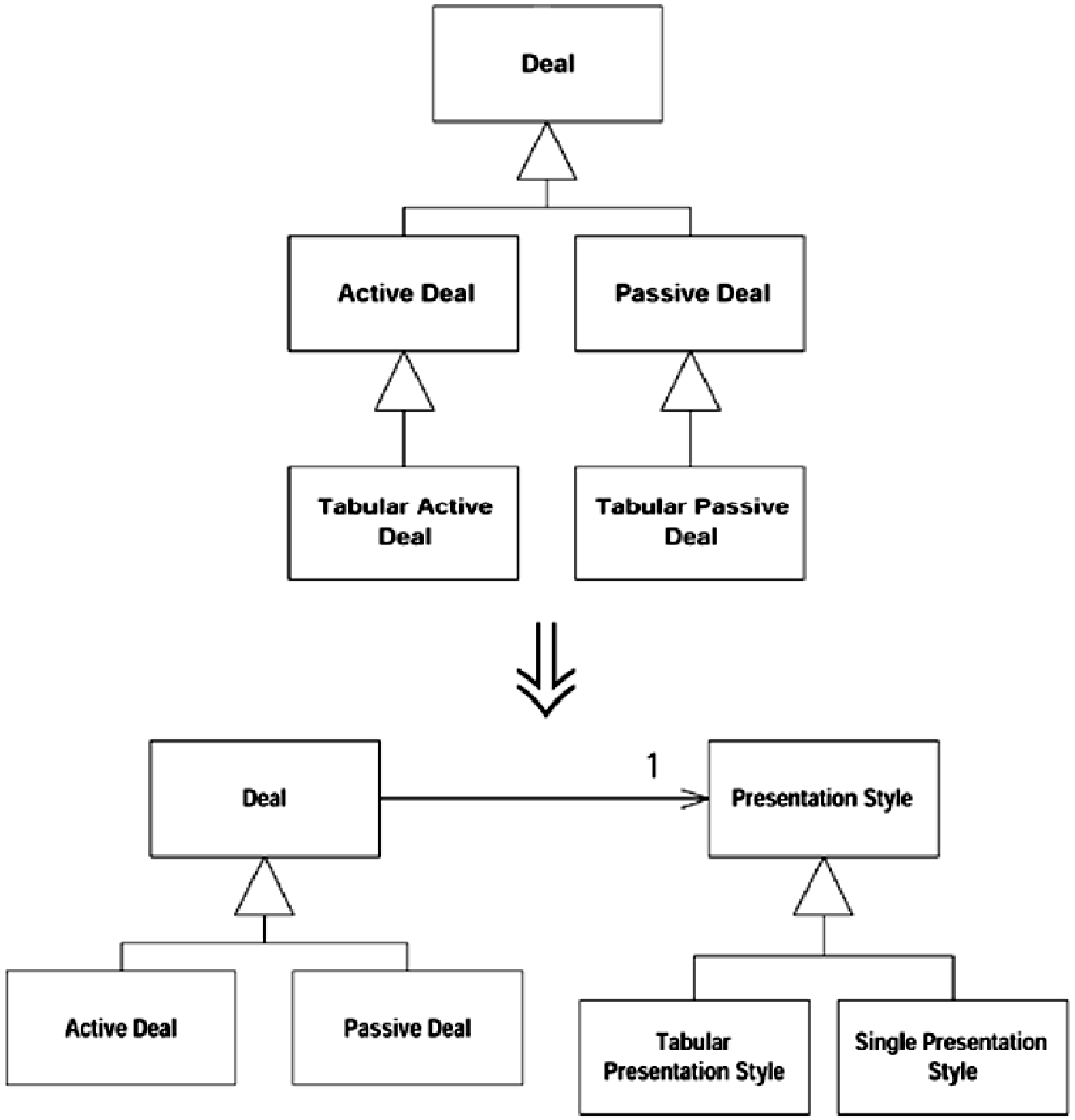
- **Replace Delegation with Inheritance**
  - You're using delegation and are often writing many simple delegations for the entire interface.
  - *Make the delegating class a subclass of the delegate.*



Big Refactorings: *Tease Apart Inheritance*

- **Tease Apart Inheritance**
  - You have an inheritance hierarchy that is doing two jobs at once.
  - *Create two hierarchies and use delegation to invoke one from the other.*

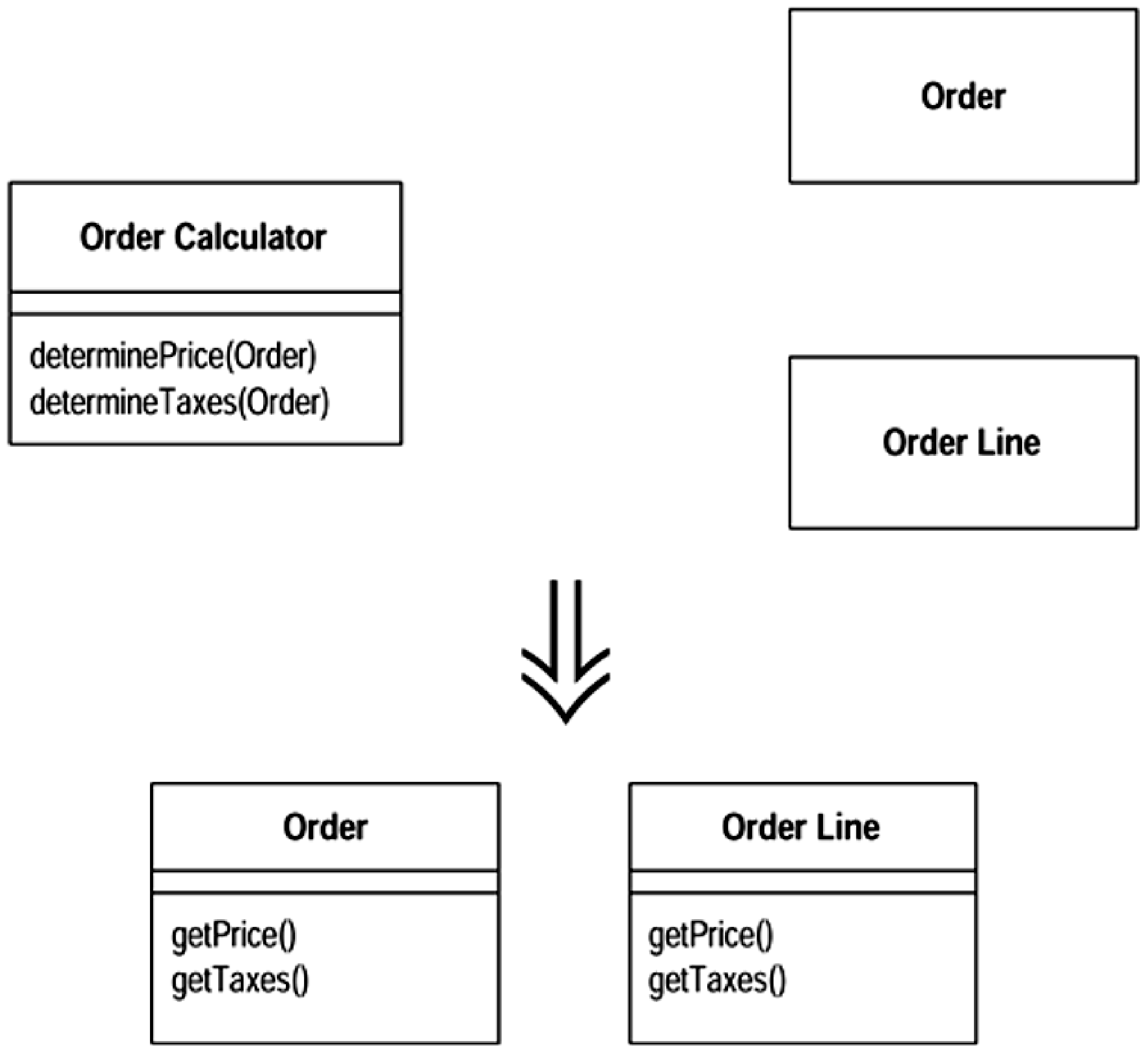
Big Refactorings: *Tease Apart Inheritance*



Big Refactorings: *Convert Procedural Design to Objects*

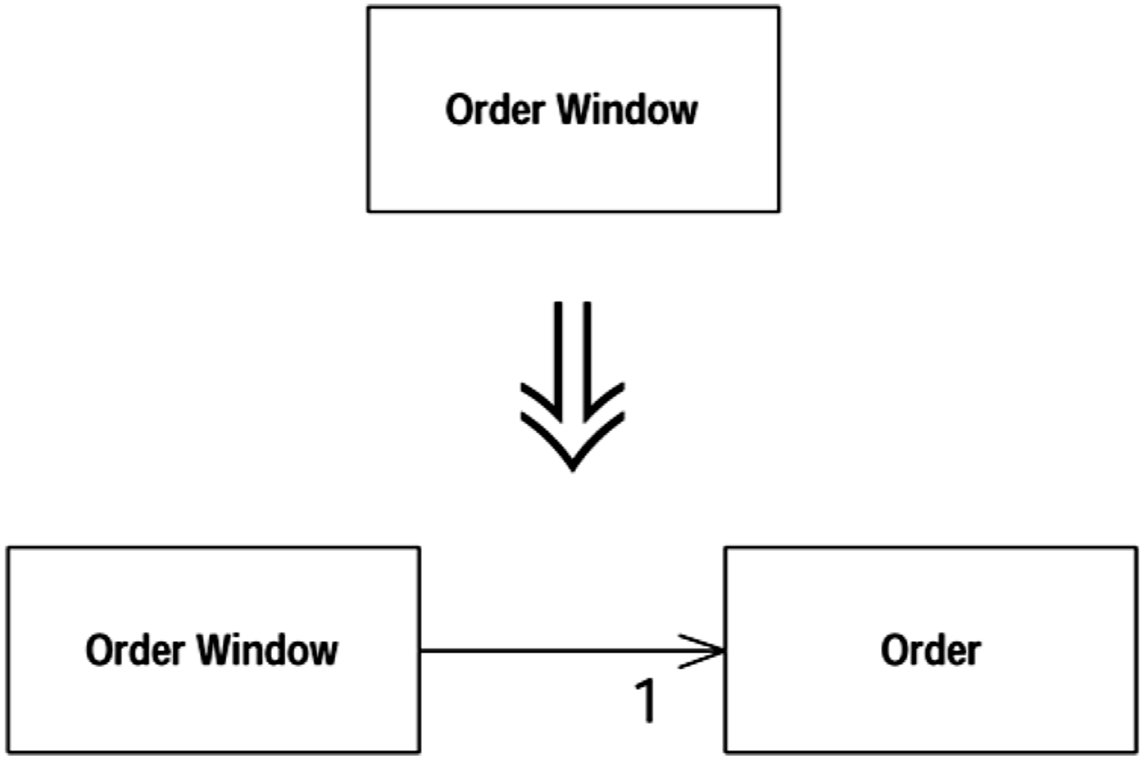
- **Convert Procedural Design to Objects**
  - You have code written in a procedural style.
  - *Turn the data records into objects, break up the behavior, and move the behavior to the objects.*

Big Refactorings: *Convert Procedural Design to Objects*



Big Refactorings: *Separate Domain from Presentation*

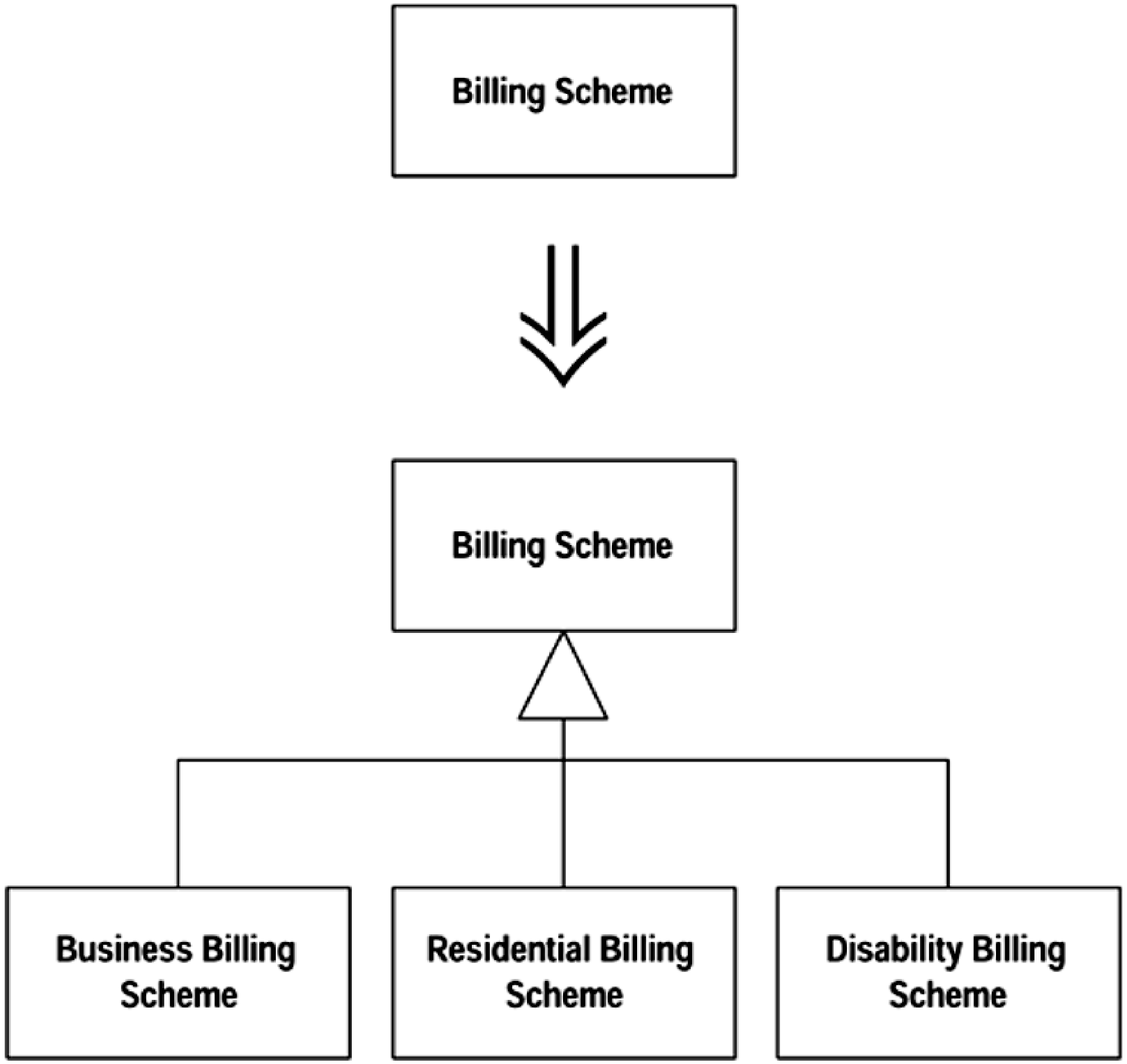
- **Separate Domain from Presentation**
  - You have GUI classes that contain domain logic.
  - *Separate the domain logic into separate domain classes.*



Big Refactorings: *Extract Hierarchy*

- **Extract Hierarchy**
  - You have a class that is doing too much work, at least in part through many conditional statements.
  - *Create a hierarchy of classes in which each subclass represents a special case.*

Big Refactorings: *Extract Hierarchy*



Reference

- Fowler, M., *Refactoring: Improving the Design of Existing Code,* Addison-Wesley, 1999.