SOFTWARE ENGINEERING

Class 8 & 9

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TOPICS

- Overview
- Creational Design Patterns
- Structural Design Patterns
- Behavioral Design Patterns

OVERVIEW

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Object Oriented Design

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- Identify the objects and their responsibilities

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- Identify how they are structured

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- Identify how they interact

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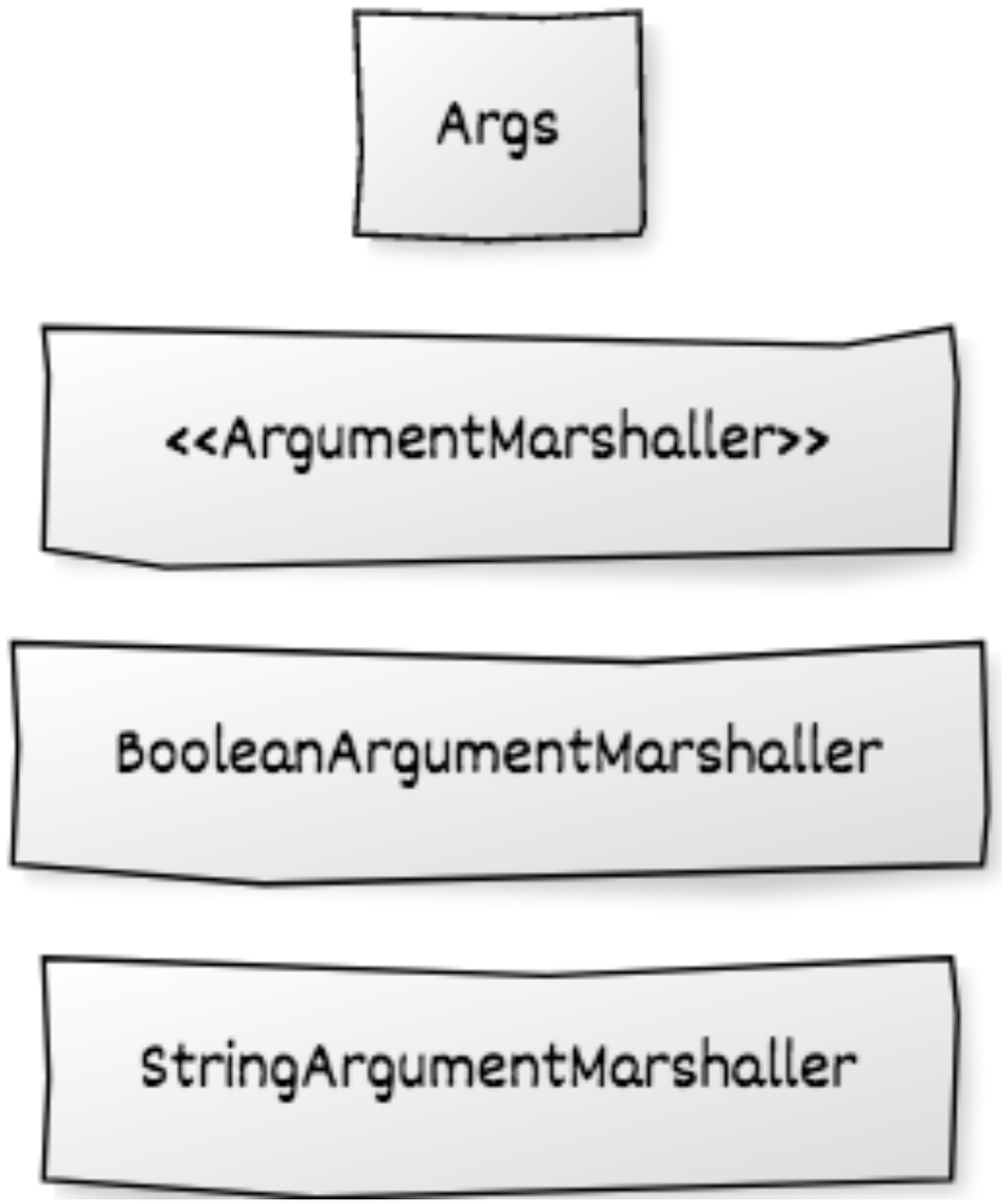
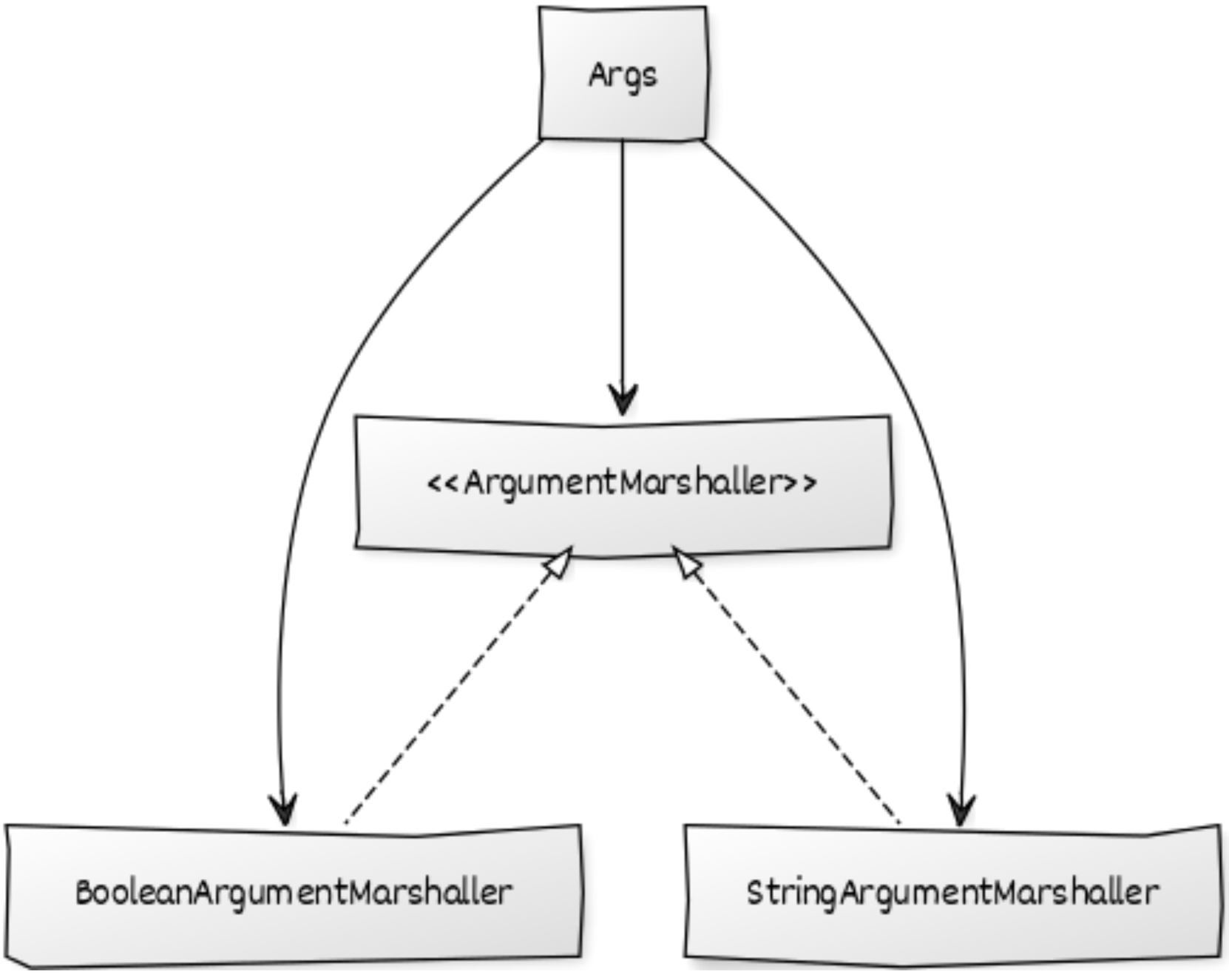
Object Oriented Design

- Identify the objects and their responsibilities
- Identify how they are structured
- Identify how they interact
- Identify how they behave

OVERVIEW


Args
<<ArgumentMarshaller>>
BooleanArgumentMarshaller
StringArgumentMarshaller

OVERVIEW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OVERVIEW

Design Pattern Categories

(Based on purpose)

- Creational Design Patterns
- Structural Design Patterns
- Behavioral Design Patterns

Design Pattern Categories

(Based on scope)

- Class based Design Patterns
- Object based Design Patterns

OVERVIEW

Object Oriented Basics

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- Concrete Classes

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- Abstract Classes

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- Interfaces

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Object Oriented Basics

- Concrete Classes
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- Inheritance

OVERVIEW

Object Oriented Basics

- Concrete Classes
- Abstract Classes
- Interfaces
- Inheritance
- Composition

CREATIONAL DESIGN PATTERNS

Creational Design Patterns

- Encapsulate knowledge about ***which*** concrete classes are being used
- Encapsulate knowledge about ***how*** concrete classes are created.

Builder Pattern

Builder pattern delegates creation of a complex object to another object.

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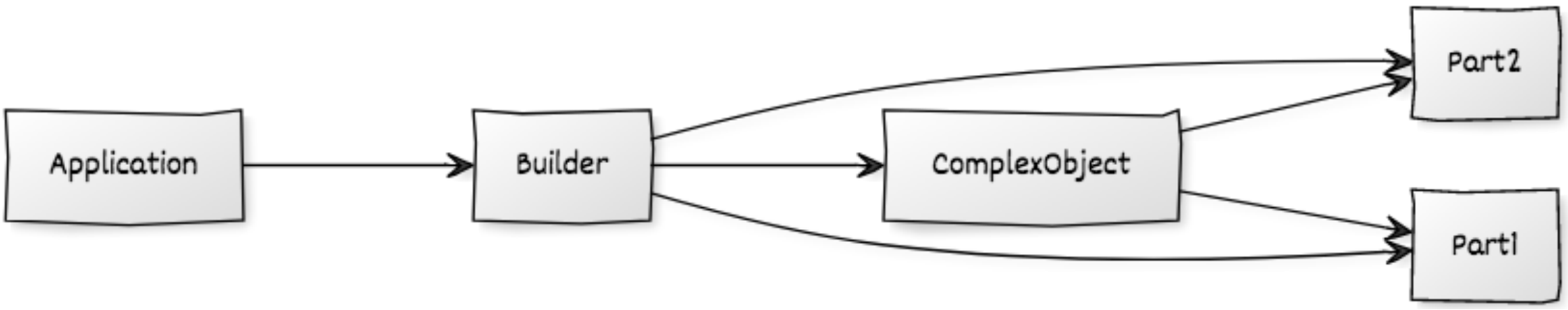

Builder Pattern Example

```
Locale aLocale = new Locale.Builder()
        .setLanguage(“sr")
        .setScript(“Latn")
        .setRegion(“RS")
        .build();
```

Factory Method Pattern

Factory method pattern delegates creation of a complex object to subclasses.

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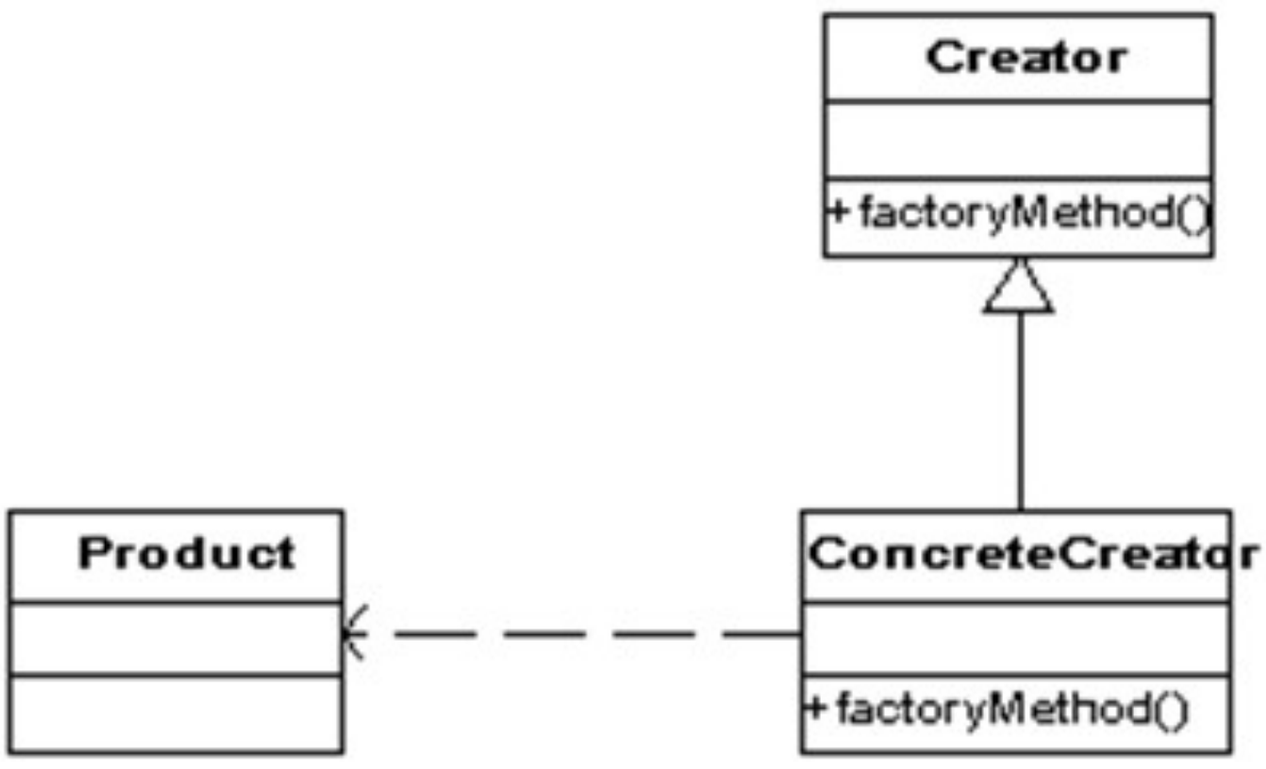

Factory Method Pattern Example

```
DecimalFormat numberFormat =
        (DecimalFormat) NumberFormat.getInstance(locale);
```

STRUCTURAL DESIGN PATTERNS

STRUCTURAL

Structural Design Patterns

- Solve problems by structuring object relationships using class inheritance
- Solve problems by structuring object relationships using object composition

Adapter Pattern

Adapter Pattern allows the interface of an existing class to be used as another interface.

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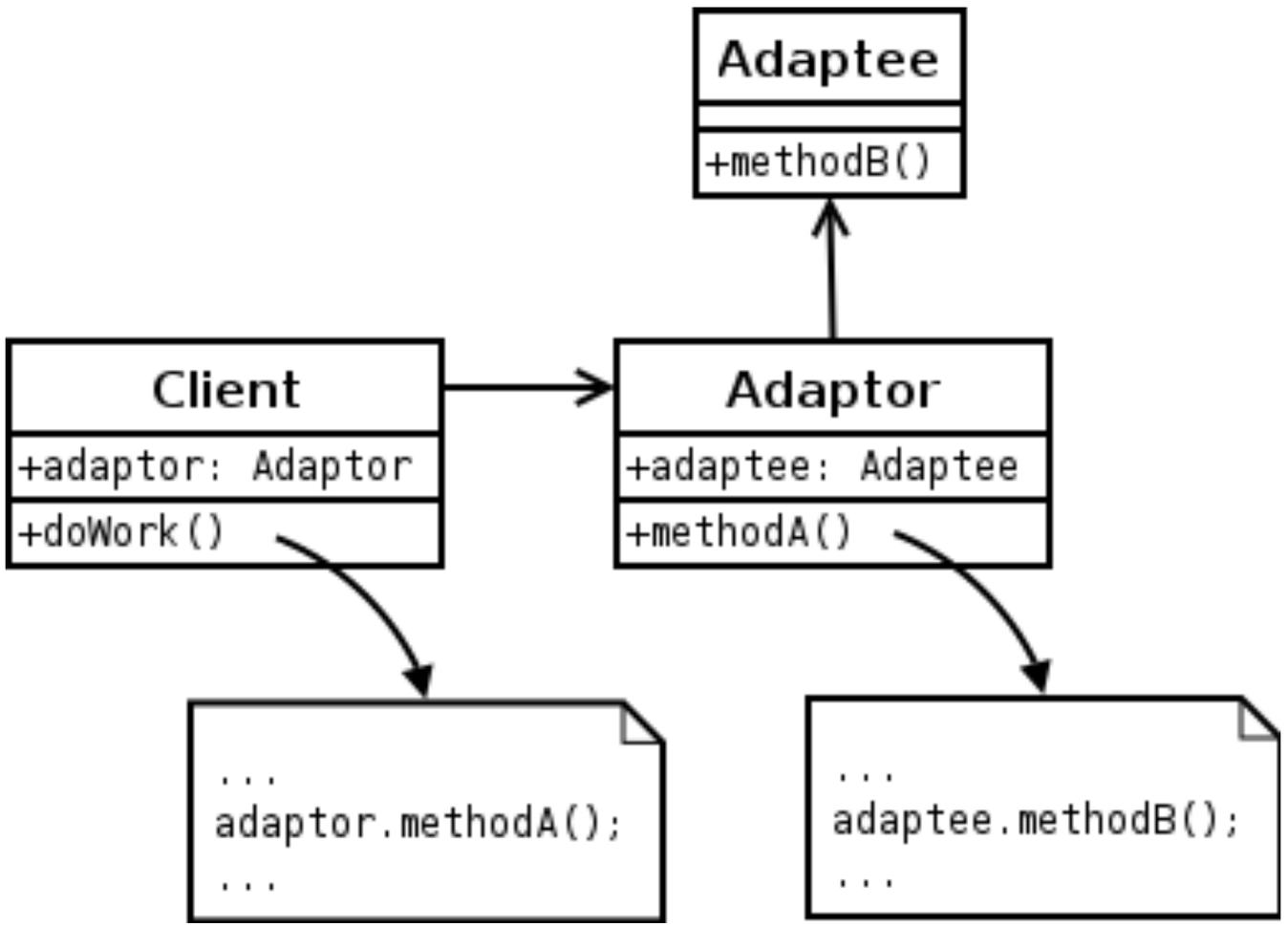

Adapter Pattern Example

```
List<String> stooges = Arrays.asList("Larry", "Moe", "Curly");
```

Decorator Pattern

Decorator Pattern allows behavior to be added to an individual object, dynamically, without affecting the behavior of other objects from the same class

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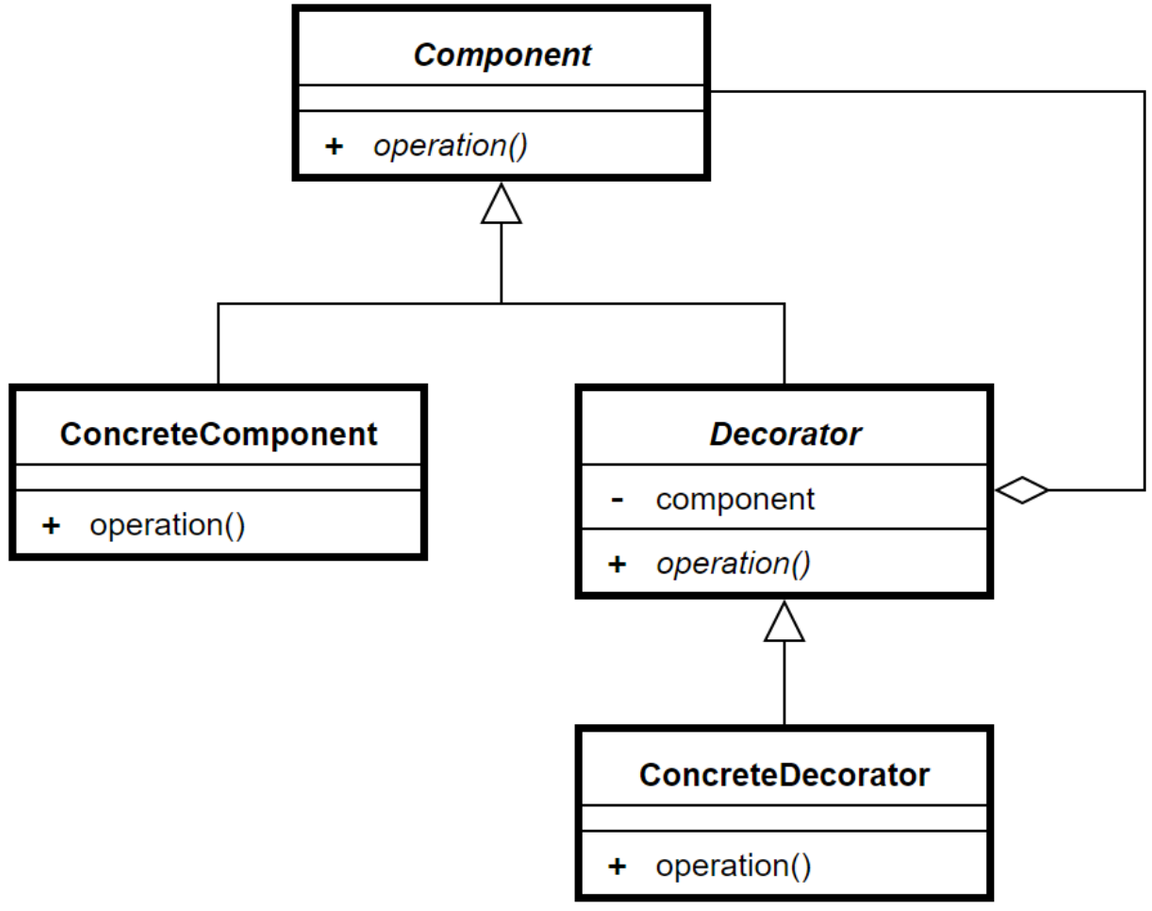

Decorator Pattern Example

```
Collection set = new HashSet();
Collection stringSet =
    Collections.checkedCollection(set, String.class);
```

BEHAVIORAL DESIGN PATTERNS

Behavioral Design Patterns

- Behavioral design patterns are concerned with algorithms and assignment of responsibilities between objects.
- Behavioral design patterns are related to control flow between objects.

State Pattern

State pattern is used to encapsulate varying behavior for the same object, based on its internal state.

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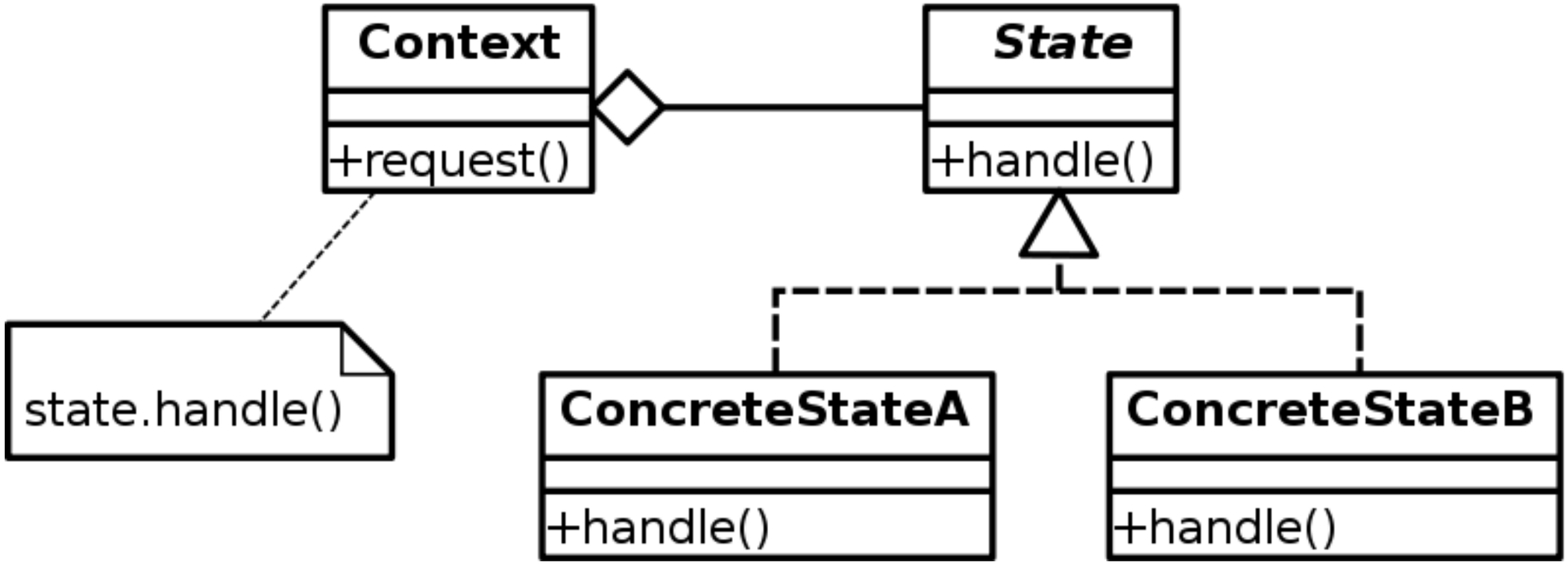

Strategy Pattern

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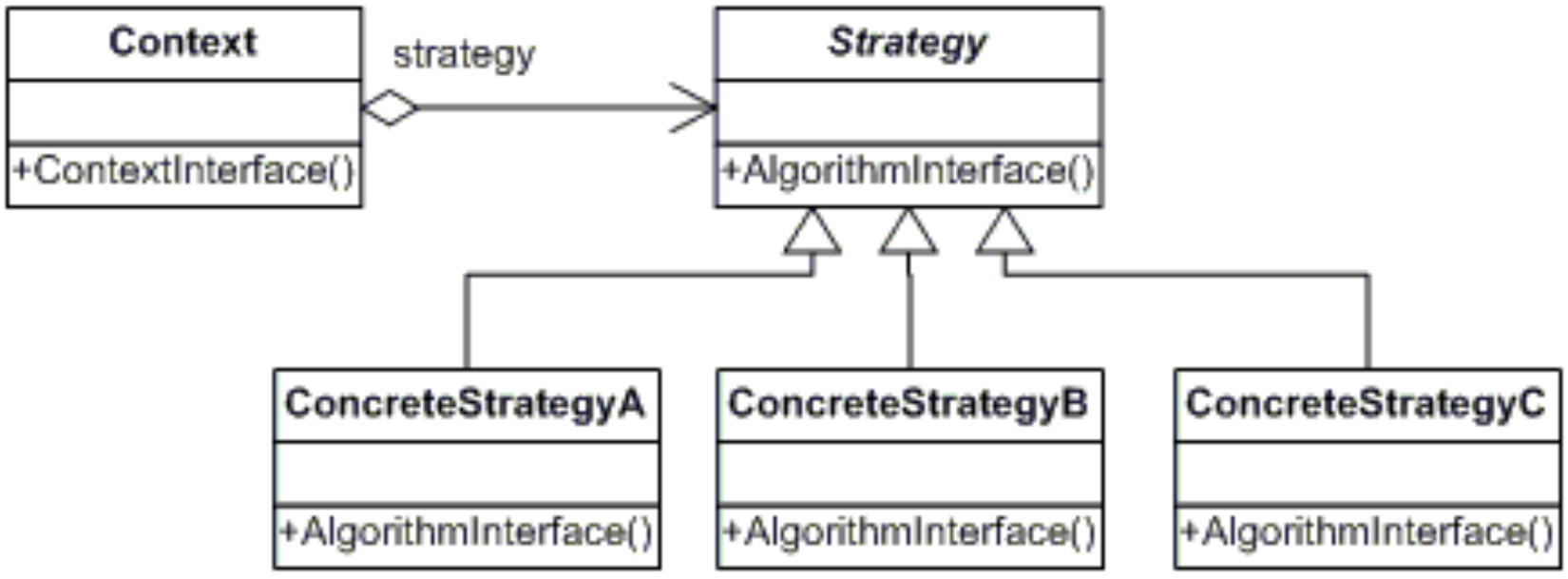

REFERENCE

		Purpose		
		Creational	**Structural**	**Behavioral**
Scope	**Class**	Factory Method	Adapter	Interpreter Template Method
	Object	Abstract Factory Builder Prototype Singleton	Adapter Bridge Composite Decorator Facade Proxy	Chain of Responsibility Command Iterator Mediator Memento Flyweight (195) Observer State Strategy Visitor

REFERENCE

- https://en.wikipedia.org/wiki/Software_design_pattern
- Design Patterns: Elements of Reusable Object-Oriented Software (Addison-Wesley Professional Computing Series)
- https://en.wikipedia.org/wiki/Object-oriented_design