Decorator Pattern

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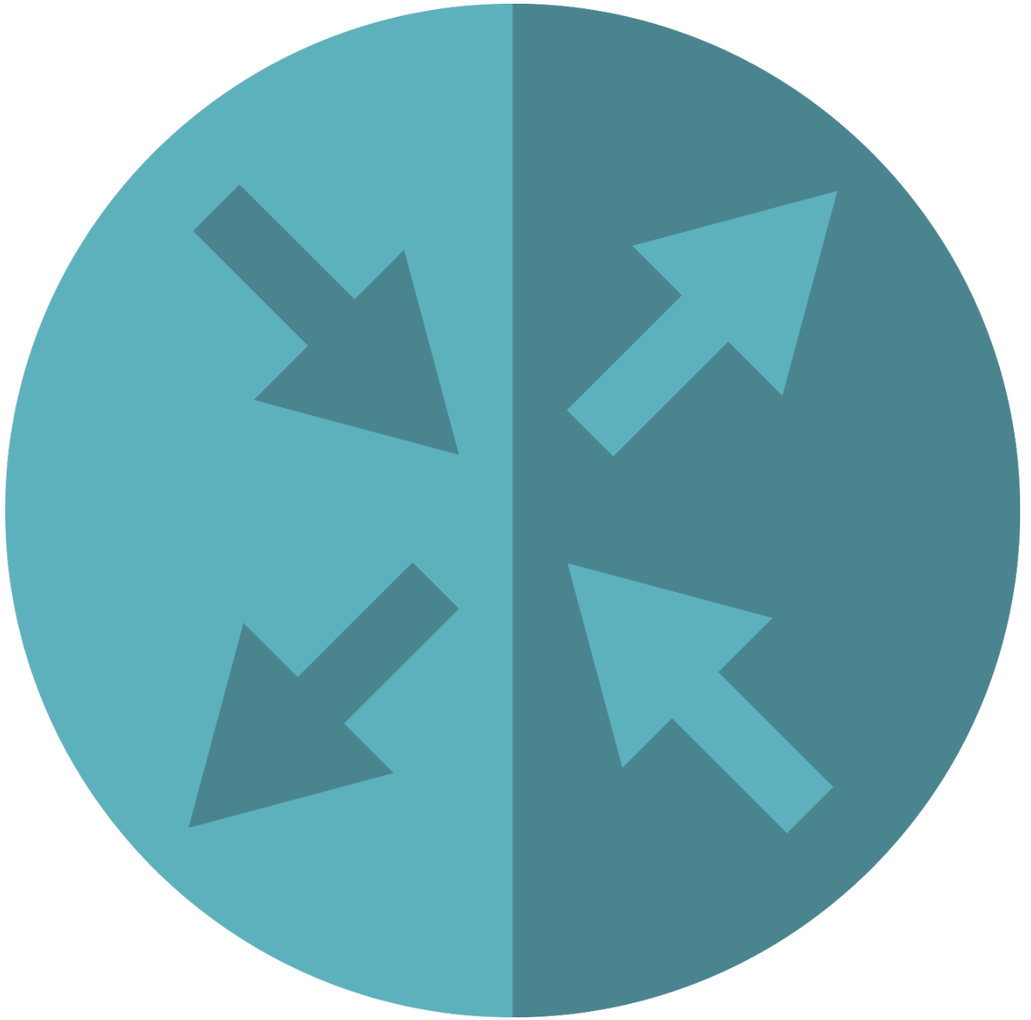
Concepts

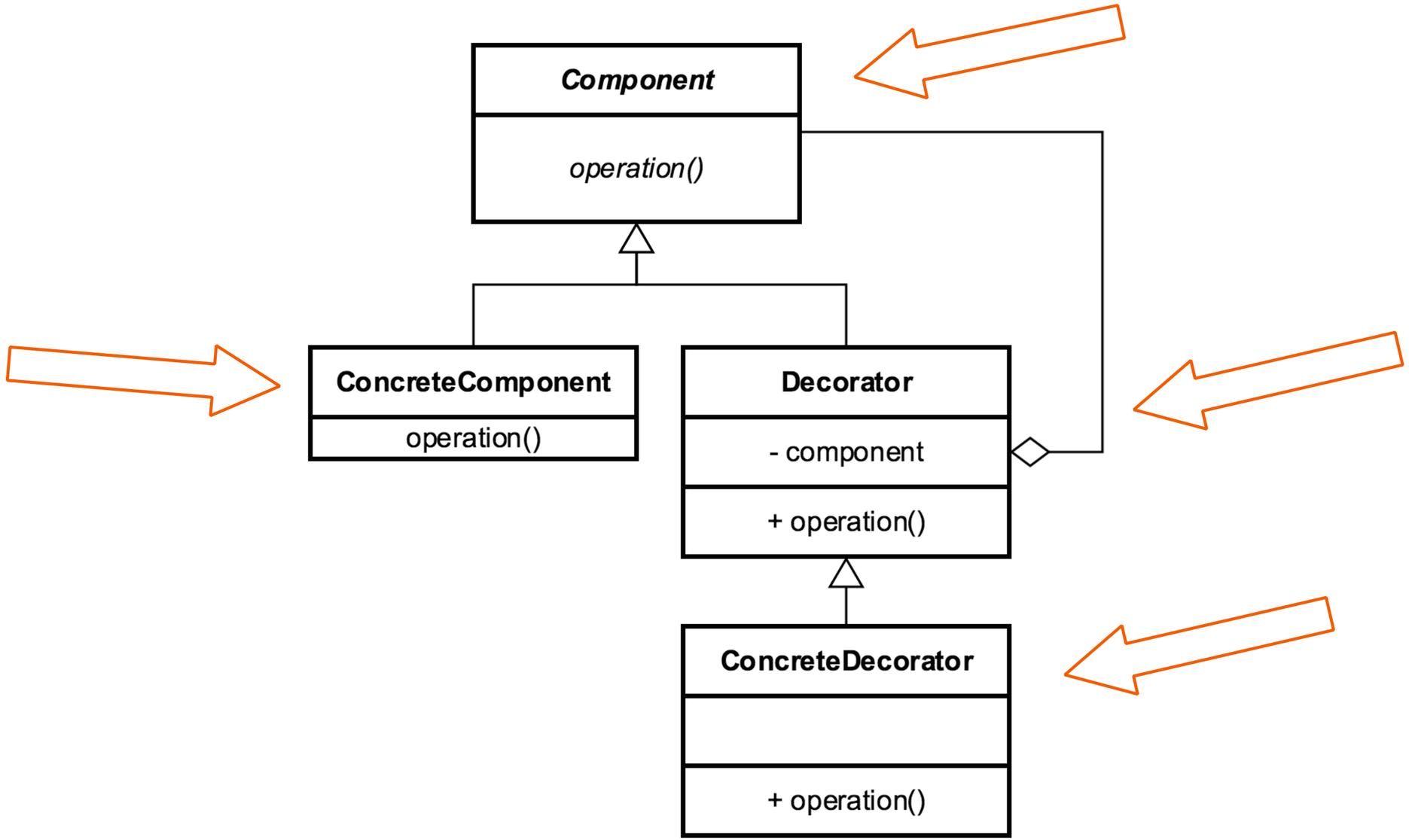
- Also called a wrapper
- Add behavior without affecting others
- More than just inheritance
- Single Responsibility Principle
- Compose behavior dynamically
- Examples:
  - java.io.InputStream
  - java.util.Collections#checkedList
  - UI components



Design

- Inheritance based
- Utilizes composition and inheritance (is-a, has-a)
- Alternative to subclassing
- Constructor requires instance from hierarchy

UML


Component
operation()
ConcreteComponent
operation()
Decorator
- component
+ operation()
ConcreteDecorator
+ operation()

Everyday Example - InputStream

```
File file = new File("./output.txt");
file.createNewFile();

OutputStream oStream = new FileOutputStream(file);

DataOutputStream doStream = new DataOutputStream(oStream);
doStream.writeChars("text");
```

Exercise Decorator

Component, ConcreteComponent,
Decorator, ConcreteDecorator

Create Decorator

Implement another Decorator

Not a Creational Pattern

Pitfalls

- New class for every feature added
- Multiple little objects
- Often confused with simple inheritance

Contrast

Composite

- Tree structure
- Leaf and Composite have same interface
- Unity between objects

Decorator

- Contains another entity
- Modifies behavior (adds)
- Doesn’t change underlying object

Decorator Summary

- Original object can stay the same
- Unique way to add functionality
- Confused with inheritance
- Can be more complex for clients