

Module 4.2:

"Decorator"



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Agenda

- ▶ Introductory Example: Rental Vehicles
- ▶ Challenges
- ▶ Implementing the Decorator Pattern
- ▶ Pattern: Decorator
- ▶ Overview of Decorator Pattern
- ▶ To Decorate or Not To Decorate?

Introductory Example: Rental Vehicles

```
interface IVehicle
{
    string Make { get; }
    VehicleColor Color { get; }
}
```

```
abstract class Vehicle : IVehicle
{
    public string Make { get; }
    public VehicleColor Color { get; }
}
```

```
class Car : Vehicle
{
    public CarBodyStyle BodyStyle { get; }
    public int Doors { get; }
    ...
}
```

```
class Motorcycle : Vehicle
{
    public int Wheels { get; }
    public int Cc { get; }
    ...
}
```

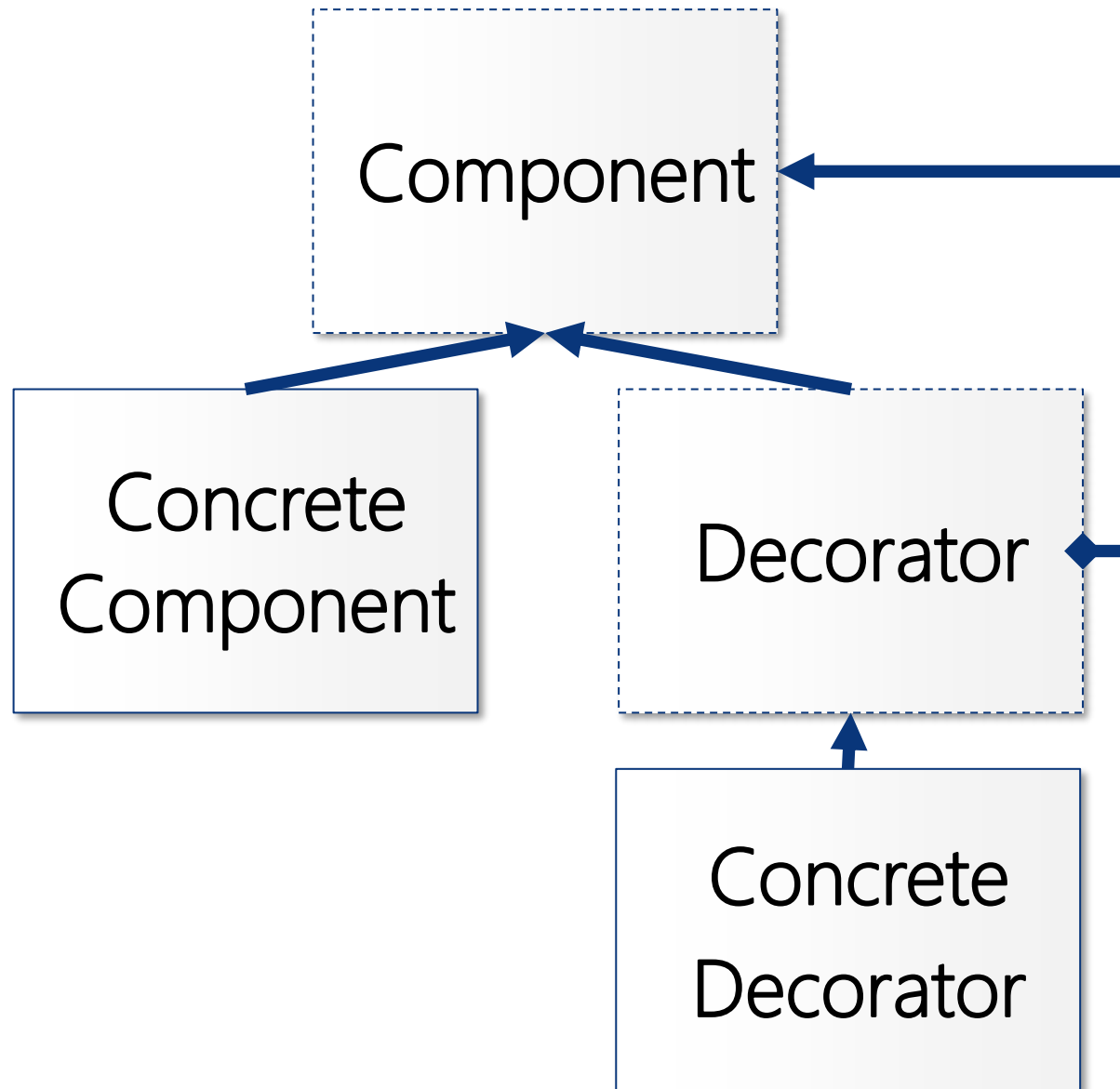
Challenges

- ▶ How do we add Rental state and behavior?
- ▶ How would we then subsequently add
 - Shop state and behavior?
 - ...?
- ▶ Can we uphold the Single Responsibility Principle?

Pattern: Decorator

- ▶ *Attach additional responsibilities to an object dynamically. Decorators provide a flexible alternative to subclassing for extending functionality.*
- ▶ Outline
 - Extend functionality without modifying existing classes
 - Avoid “explosion” in number of subclasses
 - Create add-on classes adding “aspect”
- ▶ Origin: Gang of Four

Overview of Decorator Pattern



Overview of Decorator Pattern

- ▶ Component
 - Interface or abstract base class for class hierarchy
- ▶ Concrete Component
 - Concrete subclass in class hierarchy
- ▶ Decorator
 - Wraps an instance of Component
- ▶ Concrete Decorator
 - Adds concrete state or behavior

To Decorate or Not To Decorate?

► Pros

- Decorator is central for upholding Single Responsibility Principle of SOLID
- Can activate several decorators simultaneously
- Avoids exponential explosion of subclasses
- Can “wrap” legacy systems
- Can create decorators for “aspects”

► Cons

- System design can get increasingly complicated
- End up with many quite similar classes



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