

# Module 10: "Decorator"



# 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 do we add Shop state and behavior?
- ▶ ...
- ▶ Can we uphold the Single Responsibility Principle?

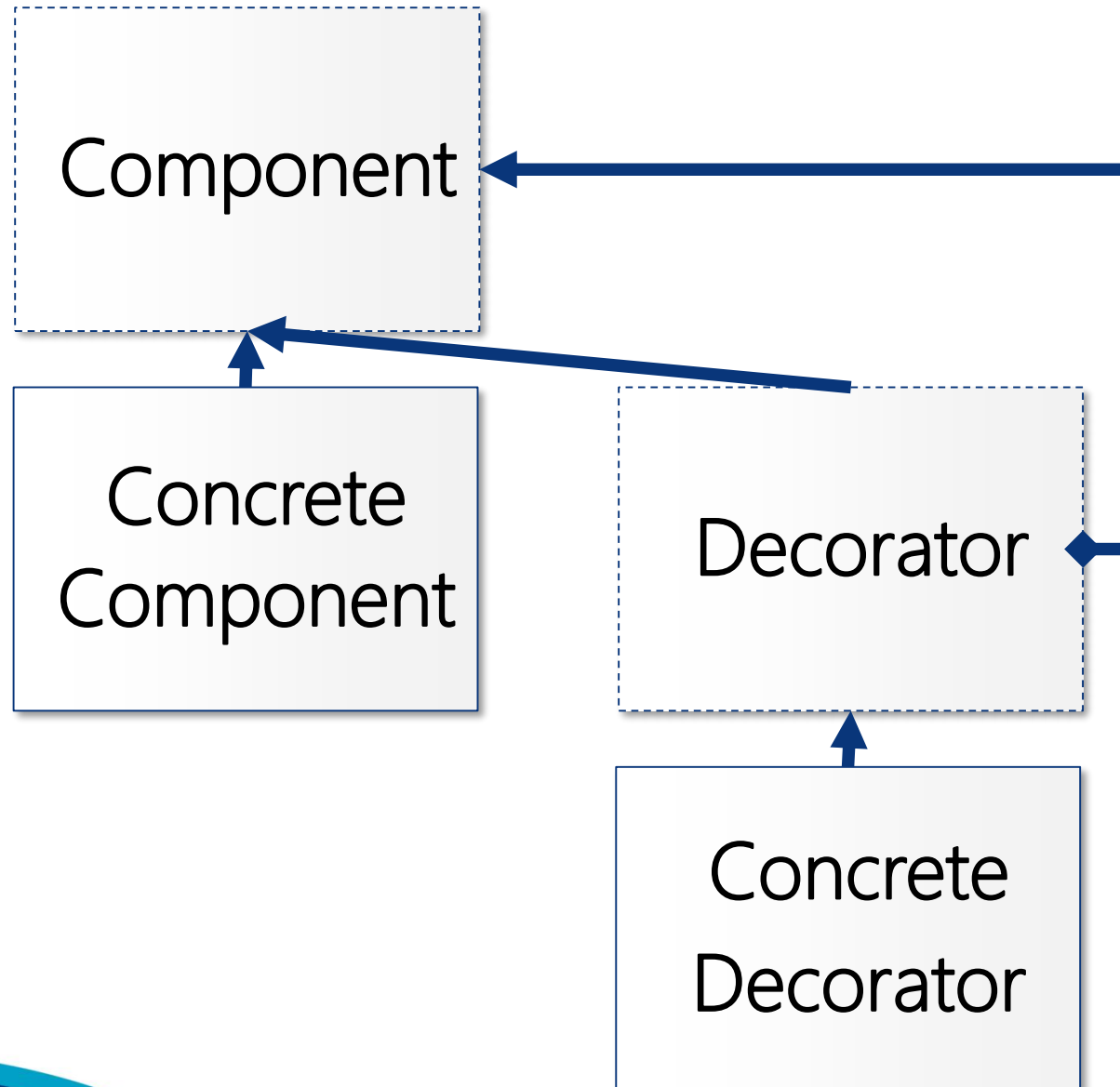


# Pattern: Decorator

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