

Module 07: "Adapter"



Agenda

- ▶ Introductory Example: Computing Areas of Shapes
- ▶ Challenges
- ▶ Implementing the Adapter Pattern
- ▶ Pattern: Adapter
- ▶ Overview of Adapter Pattern
- ▶ Object vs. Class Adapters



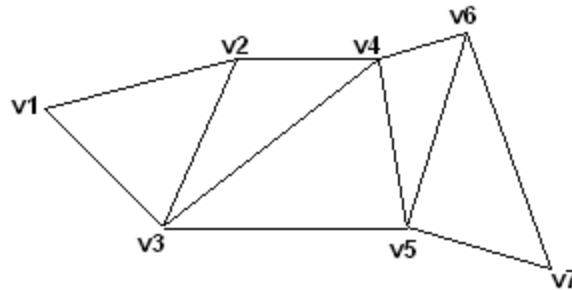
Introductory Example: Computing Areas of Shapes

```
public interface IAreaCalculator
{
    double Compute( Rectangle rectangle );
}
```

```
public class ShapeProcessor
{
    ...
    public double GetArea( TriangleStrip ts )
    {
        ...
    }
}
```

Background: Triangle Strips

- ▶ Used low-level by graphics cards and APIs in
 - 2D or 3D

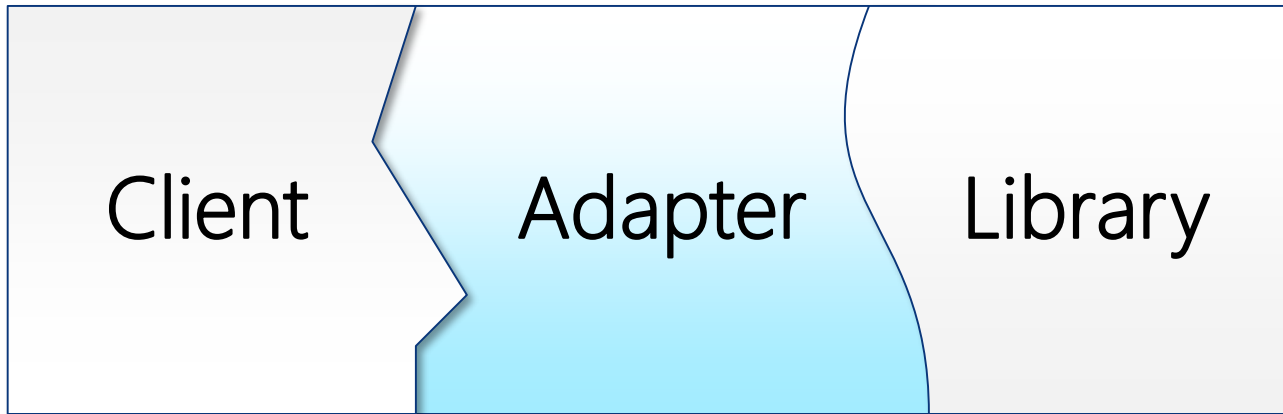


- See [https://msdn.microsoft.com/en-us/library/windows/desktop/bb206274\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/bb206274(v=vs.85).aspx)



Challenges

- ▶ Problems:
 - Client interface does not match what Library provides

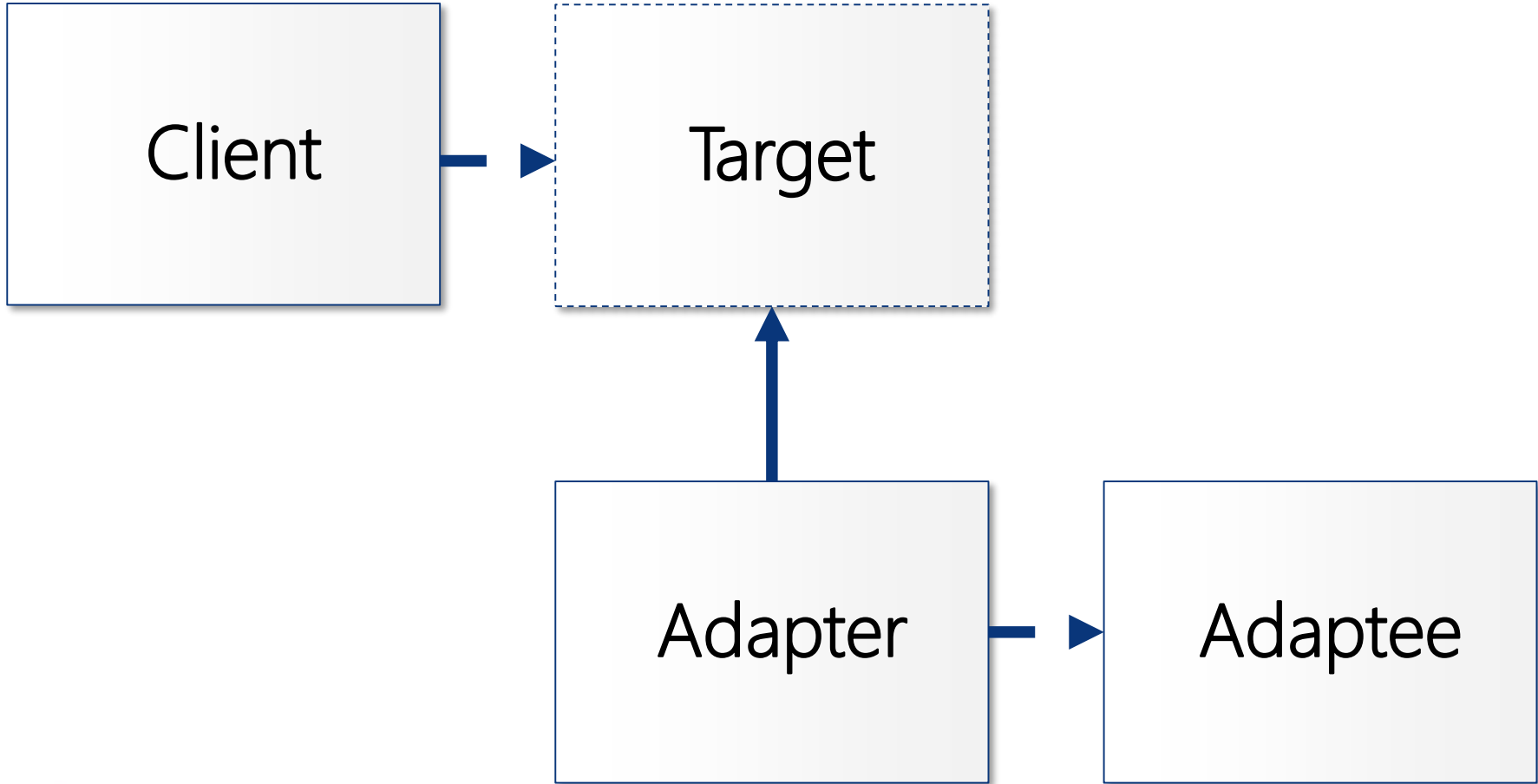


Pattern: Adapter

- ▶ *Convert the interface of a class into another interface clients expect. Adapter lets classes work together that couldn't otherwise because of incompatible interfaces.*
- ▶ Purpose
 - Adapt Client interface to Adaptee interface
 - Adapter implements Target interface and invokes Adaptee
 - Potentially: Also loosely couple or future-proof Client
- ▶ Origin: Gang of Four



Overview of Adapter Pattern



Overview of the Adapter Pattern

- ▶ Adaptee
 - Existing interface, abstract, or concrete class that needs adapting
- ▶ Client
 - Concrete component communicating via the Target interface
- ▶ Target
 - Interface or abstract class that the Client expects
- ▶ Adapter
 - Concrete class exposing the Target interface to Client
 - Implements adaptation by invoking Adaptee operations



Object Adapters

- ▶ Object Adapters use composition

```
class ShapeProcessorAdapter : Client.IAreaCalculator
{
    private Library.ShapeProcessor _adaptee;

    public ShapeProcessorAdapter( Library.ShapeProcessor adaptee )
    {
        _adaptee = adaptee;
    }

    public double Compute( Rectangle rectangle )
    {
        ...
        return _adaptee.GetArea(triangles);
    }
}
```

Class Adapters

- ▶ Class Adapters (when possible) use inheritance

```
class ShapeProcessorClassAdapter :  
    Library.ShapeProcessor, Client.IAreaCalculator  
{  
    public ShapeProcessorAdapter()  
    {  
    }  
  
    public double Compute( Rectangle rectangle )  
    {  
        ...  
        return GetArea(triangles);  
    }  
}
```

Object vs. Class Adapters

- ▶ Which approach is better...?
- ▶ ... and why?





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