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

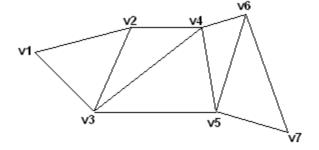
```
public interface IAreaCalculator
{
    double Compute( Rectangle rectangle );
}
```

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



Background: Triangle Strips

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

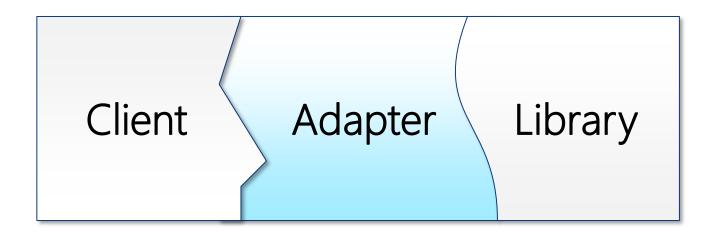


• See https://msdn.microsoft.com/en-us/library/windows/desktop/bb206274(v=vs.85).aspx



Challenges

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





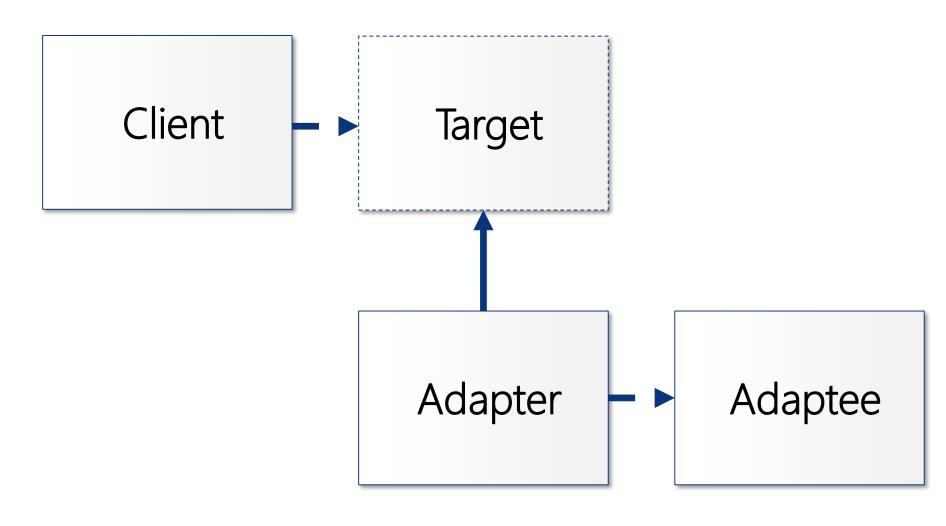
Pattern: Adapter

Convert the interface of a class into another interface clients expect. Adapter lets classes work together that couldn't otherwise because of incompatible interfaces.

- Outline
 - 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?



