CS 525 - ASD

Advanced Software Development

MS.CS Program

Department of Computer Science

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Lesson 8 Adapter pattern

L1: ASD Introduction
L2: Strategy, Template method
L3: Observer pattern
L4: Composite pattern, iterator pattern
L5: Command pattern
L6: State pattern
L7: Chain Of Responsibility pattern

Midterm

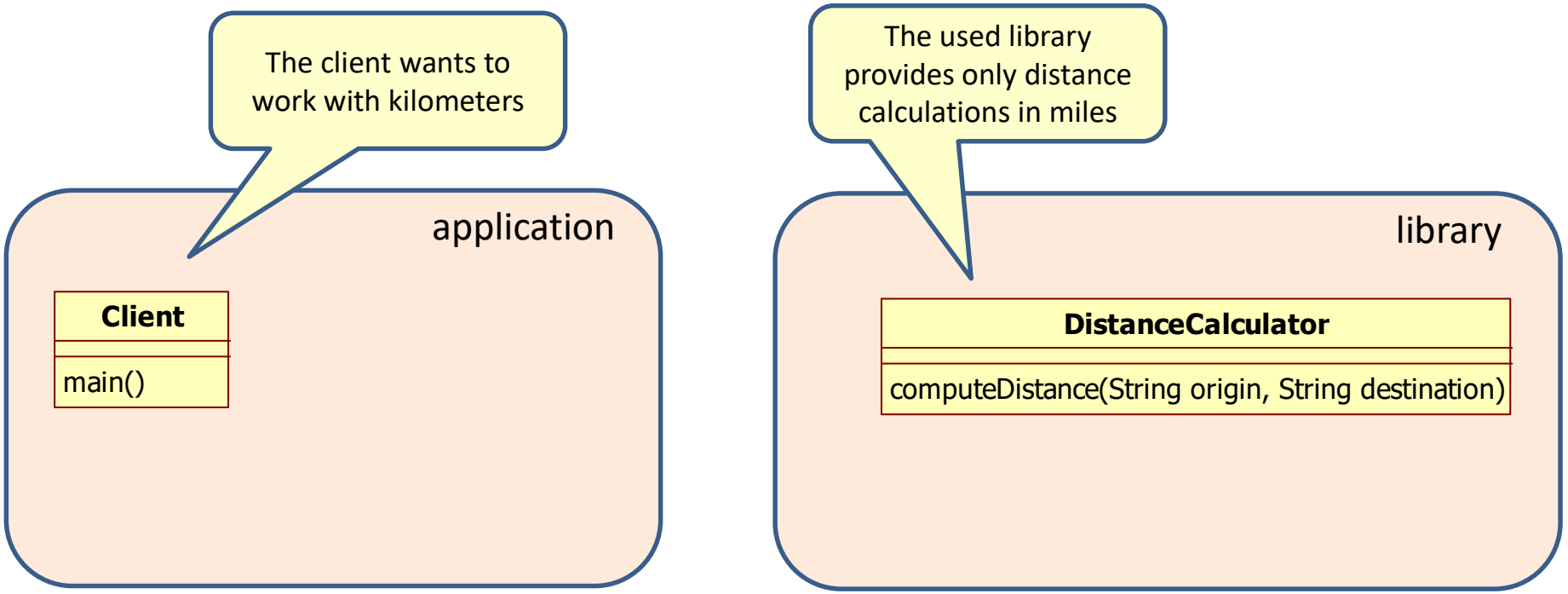
L8: Proxy, Adapter, Mediator
L9: Factory, Builder, Decorator, Singleton
L10: Framework design
L11: Framework implementation
L12: Framework example: Spring framework
L13: Framework example: Spring framework

Final

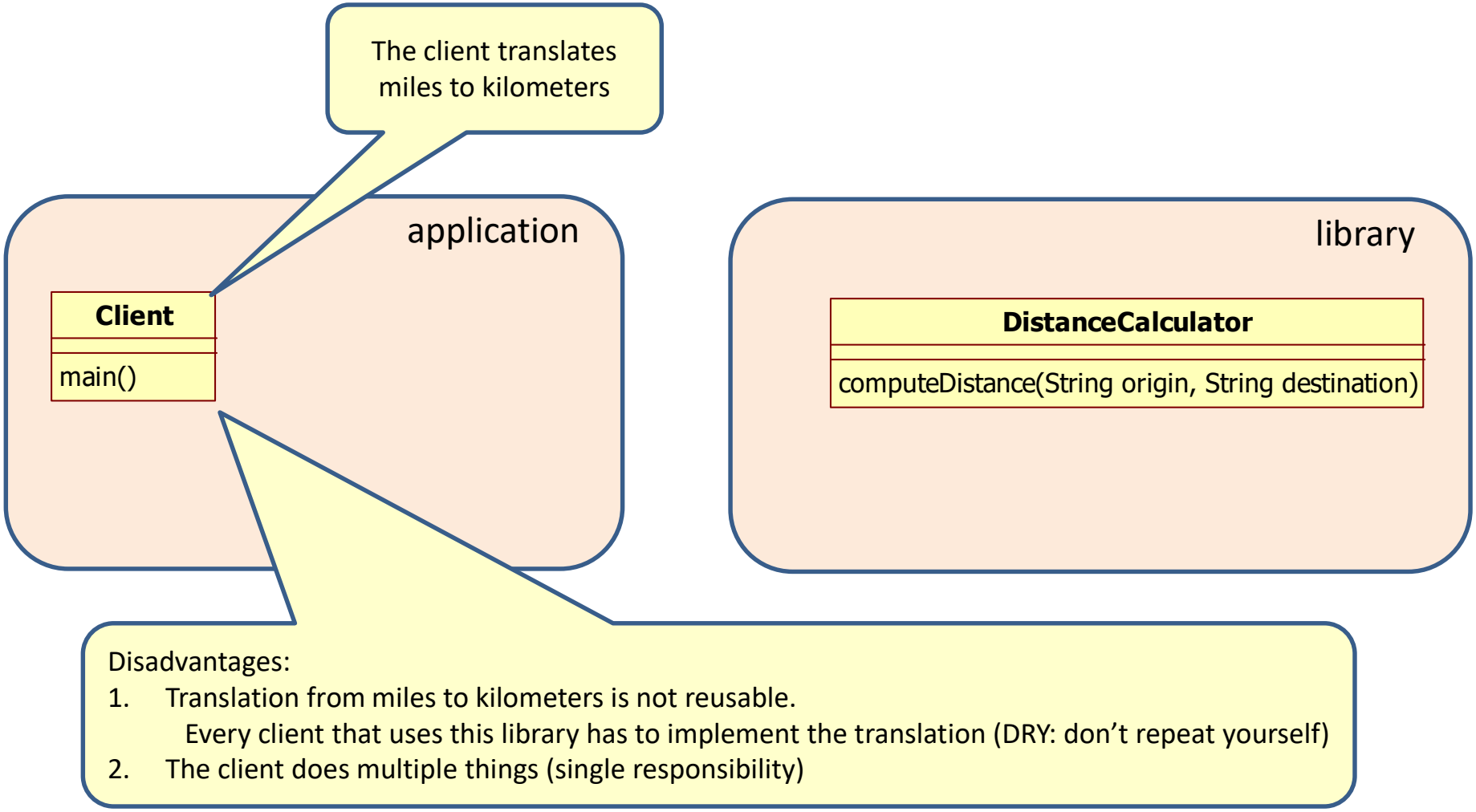
Adapter pattern

- Translates the existing interface of a class into an interface that the client requires.
  - (Reusable) wrapper

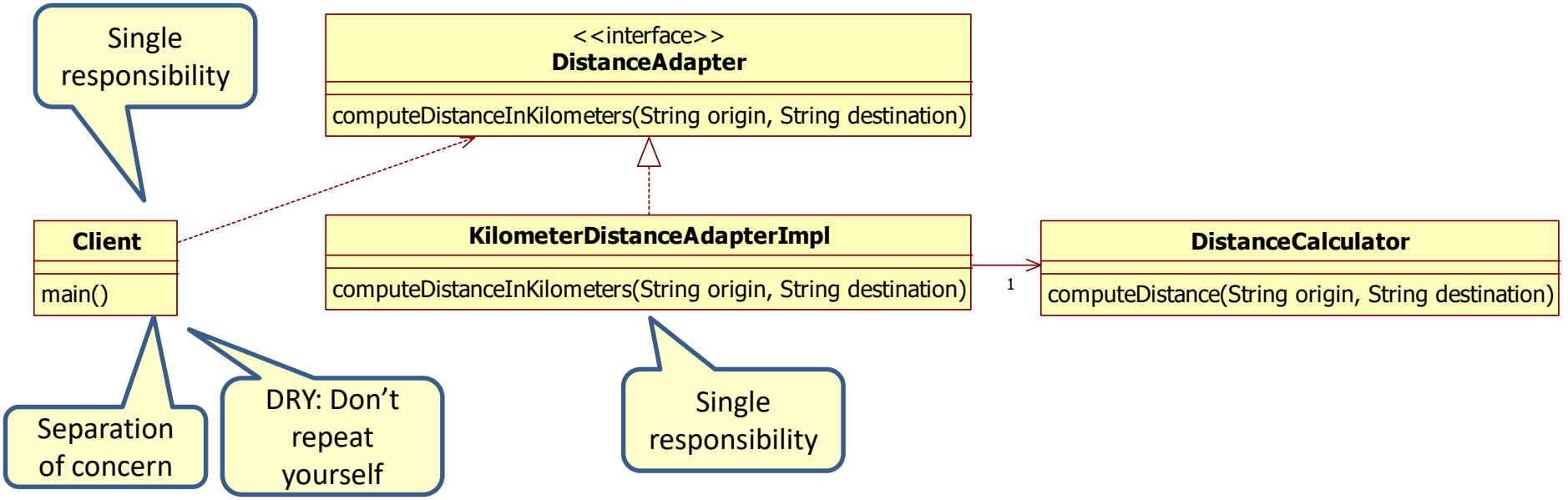
Design problem

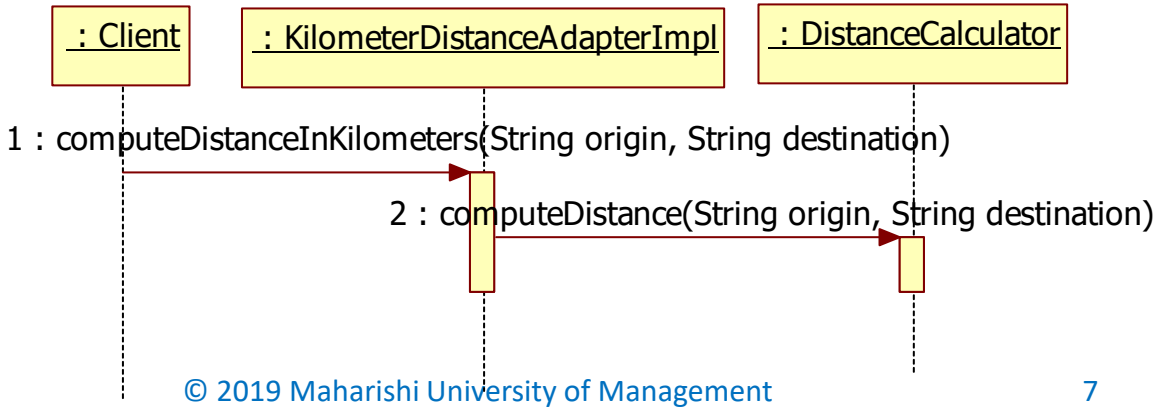


Solution



Better solution: Adapter





Adapter + Adaptee

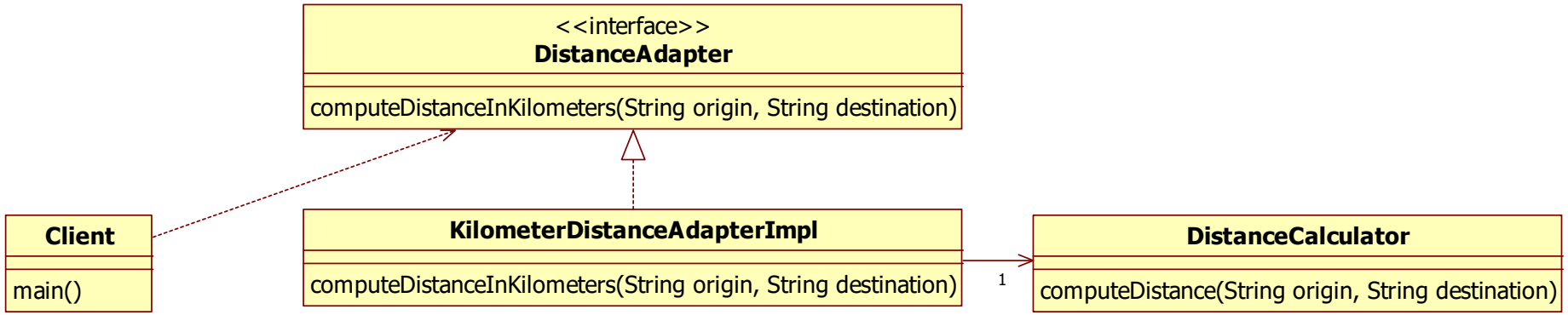
```
public class DistanceCalculator {
  public double computeDistance(String origin, String destination) {
    return (new Random()).nextInt(100);
  }
}
```

```
public interface DistanceAdapter {
  double computeDistanceInKilometers(String origin, String destination);
  void setDistanceCalculator(DistanceCalculator distanceCalculator);
}
```

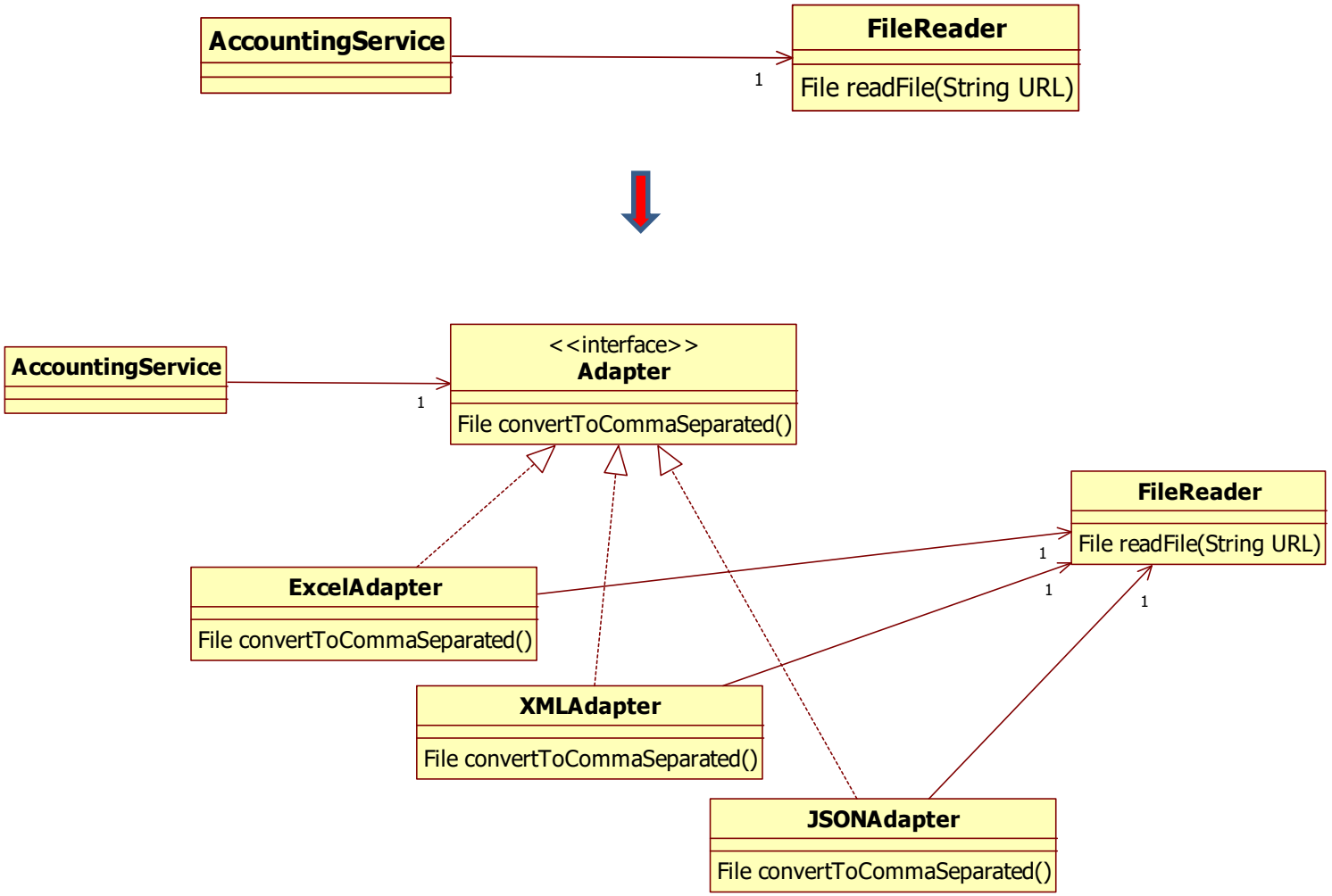
```
public class KilometerDistanceAdapterImpl implements DistanceAdapter {
  private DistanceCalculator distanceCalculator;

  public double computeDistanceInKilometers(String origin, String destination) {
    double distanceInMiles = distanceCalculator.computeDistance(origin, destination);
    return distanceInMiles * 1.609344;
  }

  public void setDistanceCalculator(DistanceCalculator distanceCalculator) {
    this.distanceCalculator = distanceCalculator;
  }
}
```

Client

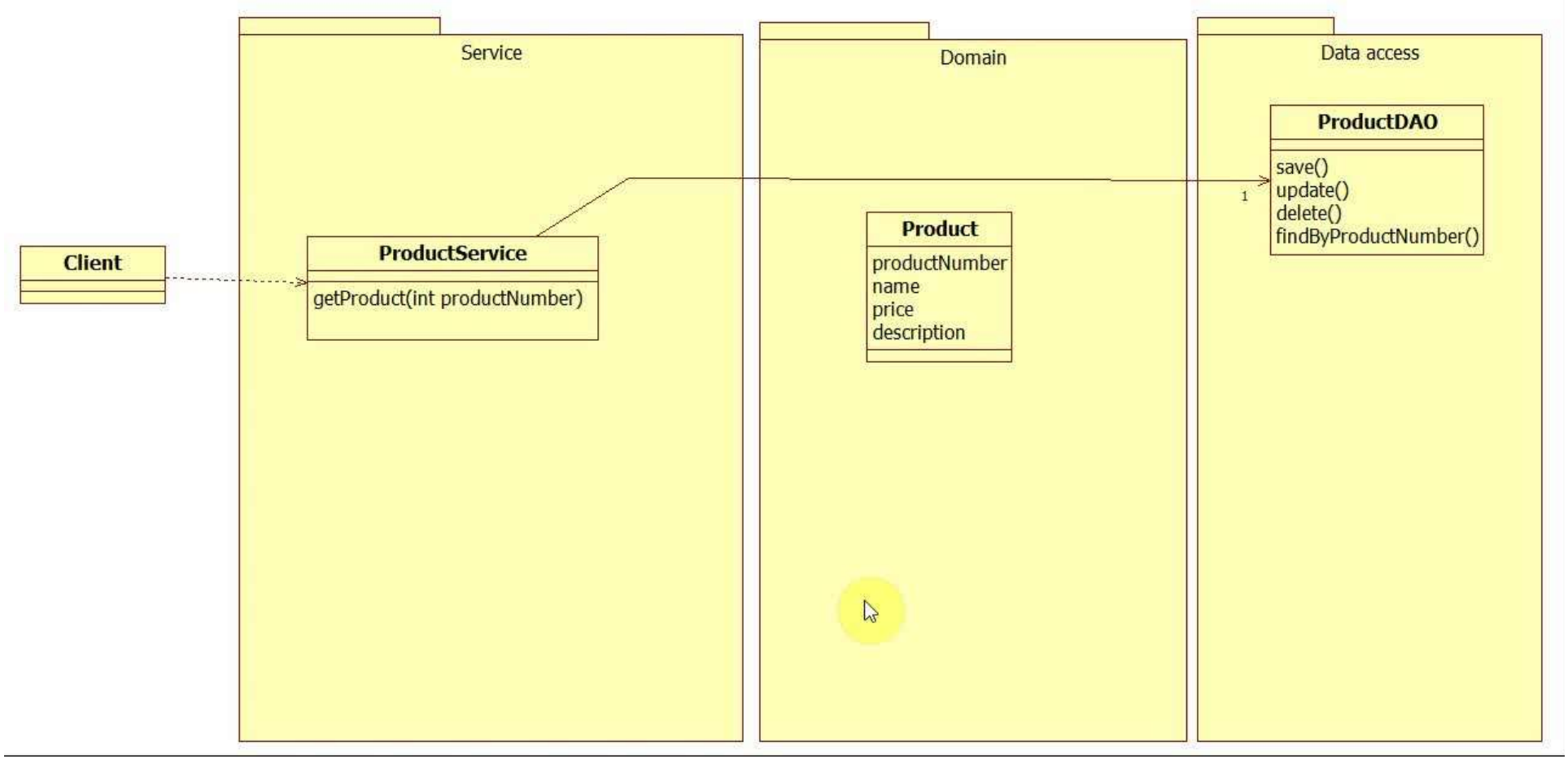
```
public class Client {

  public static void main(String[] args) {
    DistanceCalculator distanceCalculator = new DistanceCalculator();
    double distanceInMiles = distanceCalculator.computeDistance("city1", "city2");
    System.out.println("The distance between city1 and city2 ="+distanceInMiles+" miles");

    DistanceAdapter distanceAdapter = new KilometerDistanceAdapterImpl();
    distanceAdapter.setDistanceCalculator(distanceCalculator);

    double distanceInKilometers = distanceAdapter.computeDistanceInKilometers("city3", "city4");
    System.out.println("The distance between city3 and city4 ="+distanceInKilometers+" kilometers");
  }
}
```



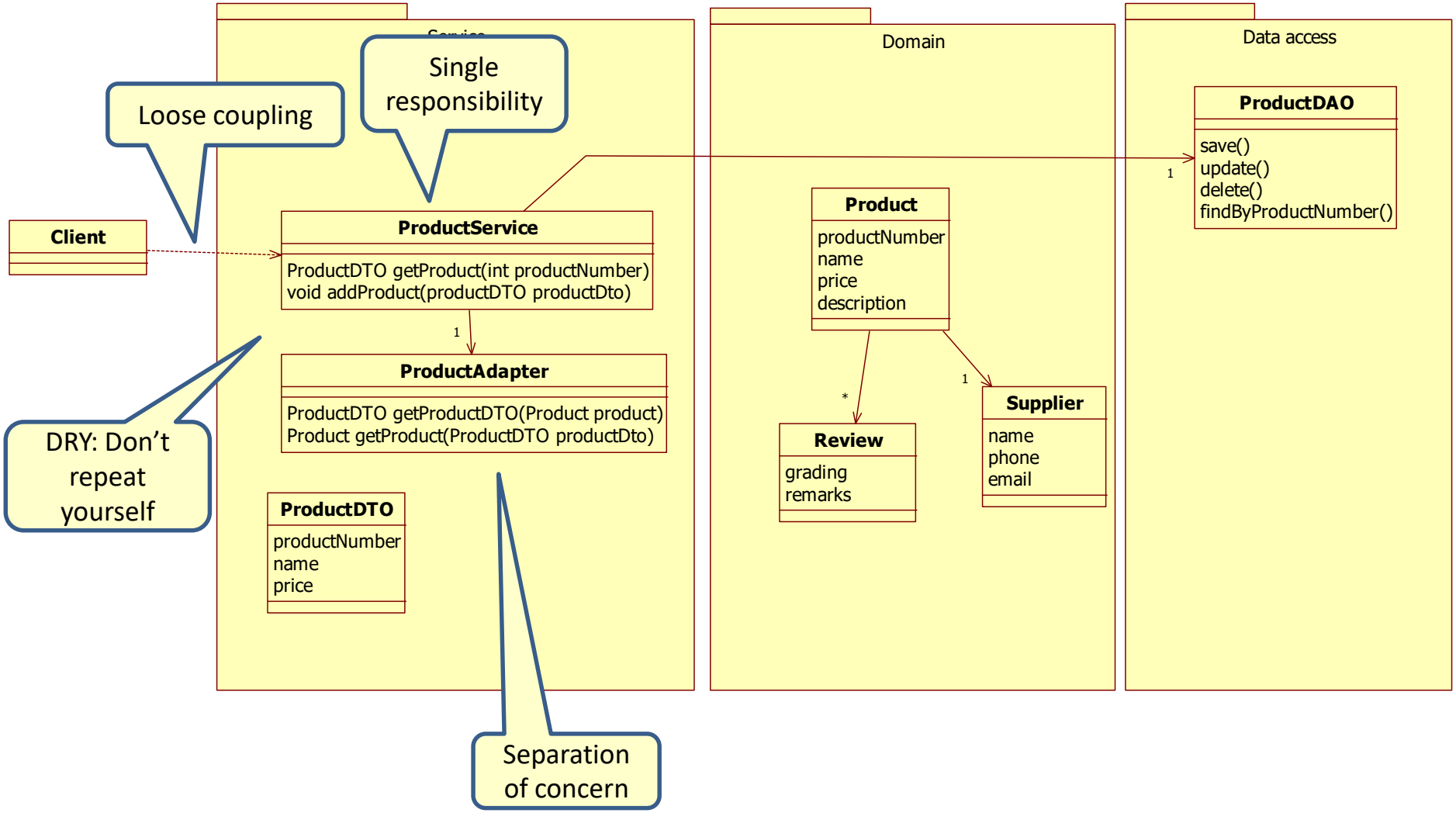
Where are adapters used



Where are adapters used

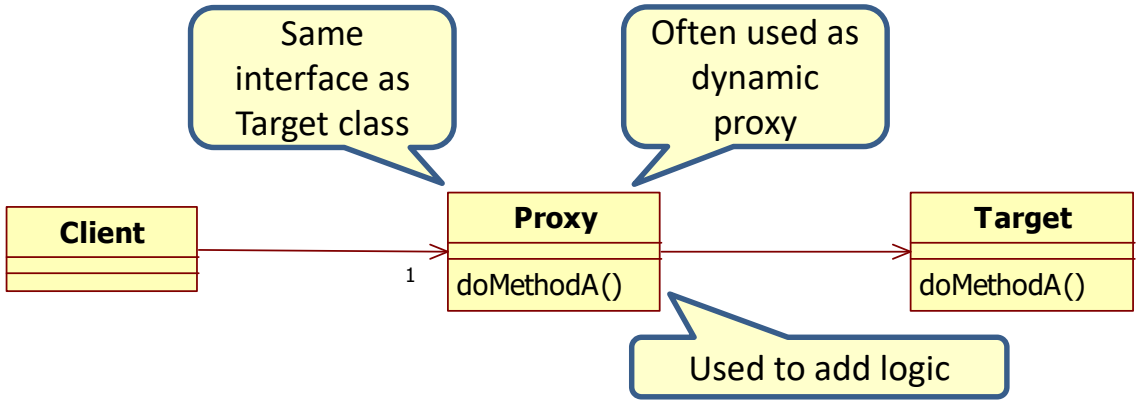


Where are adapters used

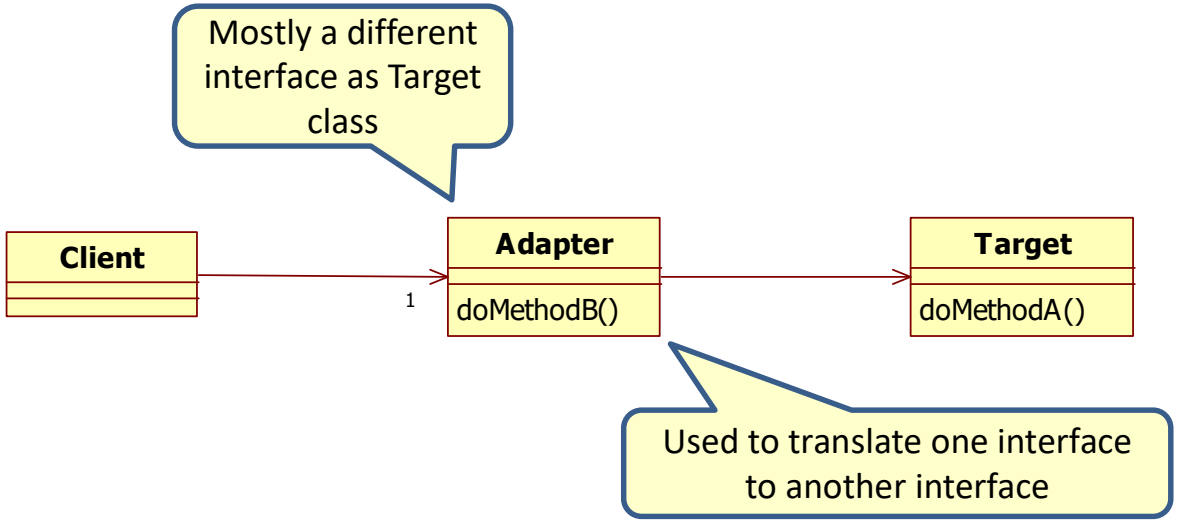


Adapter and Proxy: wrapper

- Proxy



- Adapter



Main point

- The Adapter translates an existing interface to a required interface.
- Life is found in layers, from the most abstract transcendental layer (Unified Field) to the most concrete layer.