

## Tutorial 11—Adapter Design Pattern

### [Experimental Objective]

Learn how to refactor source code to adapter design pattern and practice how to use multiple adapters.

### [Introduce of source code]

#### 1. Requirement introduction

- The **FileOperateInterfaceV1** (version 1) is an interface that includes three methods (**readStaffFile**, **writeStaffFile**, **printStaffFile**), and there is a concrete class of **FileOperateInterfaceV1** (**FileOperate**) implements those methods.
- How to use it:
  - 1) Enter 1 to read the staff file
  - 2) Enter 2 to print staff information
  - 3) Enter 3 to write file
  - 4) Enter 0 to end

```
Please select operation: 1.readFile 2.listFile 3. writeFile:
1
finish reading

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finish writing
```

#### 2. Update the original interface

If we want to update the original interface to a new version (**FileOperateInterfaceV2**) by rename those methods named “**readStaffFile**”, “**printStaffFile**” to “**readAllStaff**” and “**listAllStaff**” respectively, and adding another two methods including **WriteByName** and **WriteByPeopleId**, how can you accomplish this work?

Solution1: Design a concrete class of the new interface (**FileOperateInterfaceV2**).

Problems:

- It will overwrite the code we had already implemented.

Solution 2: Modify the source code in concrete class of the original interface to match the new interface?

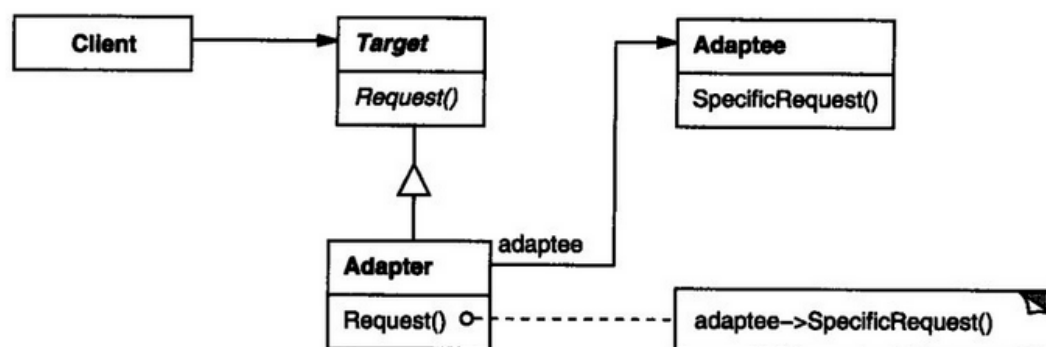
Problems:

- It may cause other applications that rely on version 1 do not work properly.
- Possibly, the programmer couldn't get the source code of version 1.

## Adapter Design Pattern

We can design a new concrete class to implement the interface of Version 2, in which we can not only reuse the implement code of original concrete class (**FileOperate**), but also redesign those new features. The concrete class is adapter, and the original concrete class (**FileOperate**) is adaptee.

Class diagram:



Sample code:

```
public interface InterfaceVersion1 {
    public void function();
}

public interface InterfaceVersion2 {
    public void renamedFunction();
    public void newFunction();
}

public class Adapter implements InterfaceVersion2 {
    private InterfaceVersion1 adaptee;

    public Adapter(InterfaceVersion1 adaptee){
        this.adaptee=adaptee;
    }

    @Override
    public void renamedFunction(){
        adaptee.function();
    }
}
```

```

    }

    @Override
    public void newFunction(){

    }
}

```

**Task 1:** Create a new package named **adapter**, copy the original code in it, and then create a class named **Adapter** to implement **FileOperateInterfaceV2**.

Sample output (sorted by name):

```

Please select operation: 1.readFile 2.listFiles 3.writeFileByName 4.writeFileByPeopleId
finish reading
finish writing

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```

## Multiple adaptees

The adapter can adapt to multiple adaptees, which means when adding a new target method, the adapter needs to reuse the defined code by passing a new instance of corresponding concrete class, and the class is the new adaptee.

**Task 2:** Create a new package named **mutiAdapter**, in which the interface of version 2 (**FileOperateInterfaceV2**) is not only required to adapt the methods in **FileOperateInterfaceV1**, but also required to adapt the methods in **ManageStaffInterface**.

**Hints:** In **Adapter**, you can define two adaptees, the one is an instance of **FileOperateInterfaceV1**, and the other is an instance of **ManageStaffInterface**.

Modify the FileOperateInterfaceV2:

```
public interface FileOperateInterfaceV2 {
    List<StaffModel> readAllStaff();

    void listAllStaff(List<StaffModel> list);

    void writeByName(List<StaffModel> list);

    void writeByPeopleId(List<StaffModel> list);

    void addNewStaff(List<StaffModel> list);

    void removeStaffByMaxPeopleId(List<StaffModel> list);
}
```

Sample output:

```
Please select operation: 1.readFile 2.listFile 3.writeFileByName 4.writeFileByPeopleId 5.addStaff 6.removeStaff
finish reading
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```

```
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Input peopleId:
130
Input name:
Lu, Xiaofen
Input title:
Research Assistant Professor
Input link:
http://cse.sustc.edu.cn/en/people/view/people_id/130/sort_id/9/pid/
success to add
success to remove Lu, Xiaofen
finish writing

Process finished with exit code 0
```

```
1 1; YAO, Xin; Department Head; http://cse.sustc.edu.cn/en/people/view/people_id/1/sort_id/9/pid/
2 2; THEODOROPoulos, Georgios ; Chair Professor; http://cse.sustc.edu.cn/en/people/view/people_id/2/sort_id/9/pid/
3 3; SHI, Yuhui; Chair Professor; http://cse.sustc.edu.cn/en/people/view/people_id/3/sort_id/9/pid/
4 5; HAO, Qi ; A/Prof.; http://cse.sustc.edu.cn/en/people/view/people_id/5/sort_id/9/pid/
5 6; LUO, Zongwei; A/Prof.; http://cse.sustc.edu.cn/en/people/view/people_id/6/sort_id/9/pid/
6 7; WANG, Qi; Ass.Prof.; http://cse.sustc.edu.cn/en/people/view/people_id/7/sort_id/9/pid/
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```

(Source code and document description are designed by Yueming Zhu and Chao Pan, but uml diagrams are referenced)