# Lecture 4 - 实物类: Vending Machine & Juke Box - Factory & Adaptor Pattern

* 实物类OOD题型
  + Vending machine
  + Jukebox
  + CD Player
  + Coffee maker
  + ATM
* 实物类
  + 考虑对于实物的输入输出

Graphical user interface, diagram

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* 技巧
  + State pattern
  + Decorate pattern
  + Factory pattern

## Vending Machine & ATM MachineDiagram Description automatically generated with medium confidence

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Graphical user interface, text, application, email

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Table

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如果用上面的方式定义vendingmachine存在的问题是map里是用静态的数据“比如A1，B4”来对应一个动态的Item，那如果当客户拿到了Item的信息就可以对它进行修改。解决方法是可以加一个静态的class ItemInfo

Diagram

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上图漏了一个点，Item class下面应该包括itemInfo信息

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Graphical user interface, text, application, email

Description automatically generated

Diagram

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pair就相当于是可以实现几返回item也返回需要的找零

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Diagram

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Text

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直接把add method放到stock这个class里，nested class把常用的借口封装起来

Diagram

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小错误：item中的iteminfo info应该是protected，这样的话spirit，coke继承的时候可以自己贴商标

### State Design Pattern

* States
  + HAS\_SELECTION - NO\_SELECTION
  + COINS\_INSERTED - NO\_COIN
  + SOLD
  + SOLD\_OUT
* State related actions:
  + select item
  + insert coin
  + execute transaction
  + cancel transaction
* what will happen if some item has been selected?

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Graphical user interface, text, application

Description automatically generated

Text

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Graphical user interface, text, application

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Graphical user interface, text, application

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Diagram

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Graphical user interface, text, application

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右图第一行要有vendingMachine的目的是因为你要改变这个machine的state所以就必须要有这个变量

public interface State {

public oid selectItem(String selection);

public void insertMoney(int value);

public void executeTransaction();

pulic int cancelTransaction();

}

public class NoSelectionState implements State {

VendingMachine vendingMachine;

public NoSectionsState(VendingMachine vendingMachine) {

this.vendingMachine = vendingMachine;

}

//Implement, and change state

@Override

public void selectItem(String selection) {

vendingMachine.setSelectedItem(selection);

vendingMachine.changeToHasSelectionState();

}

}

public class VendingMachine {

private State state;

private NoSelectionState noSelectionState;

privte HasSelectionState hasSelectionState

//Constructor: init all state, and set inital state

public VendingMachine() {

noSelectionState = new NoSelectionState(this);

hasSelectionState = new hasSelectionState(this);

state = noSelectonState;

}

//Expose to other State class for changing

public void changeToHasSelectionState() {

state = hasSelectionState();

}

//API, use different state to implement

public void selectItem(String selection) {

state.selectItem(selection);

}

}

## Coffee Machine

## 

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## 做法一：利用继承，缺点是如果后面有很多不同种的coffee那就必须再加新的类，

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## 解决办法是可以直接在coffee这个类上加hasMilk， hasMocha这些属性

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## 这个缺点是首先如果加很多份mocha或者milk价格不会adjust，而且cost（）可能会很长，

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## coffeeDecorator是Coffee的一个子类

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### Decorator Design Pattern

public interface Coffee {

public double getCost();

public String getDescripton();

}

public class Expresso implements Coffee {

public Expresso() {

description = "Expresso";

}

public float getCost() {

return 1.99;

}

public String getDecription() {

return description;

}

}

public abstract class CoffeeDecorator implements Coffee {

protected final Coffe decoratedCoffee;

public CoffeeDecorator(Coffee c) {

this.decoratedCoffee = c;

}

public double getCost() {

return decoratedCoffee.getCost();

}

public double getDescription() {

return decoratedCoffee.getDescription();

}

}

public class WithMocha extends CoffeeDecorator {

public WithMocha(Coffee coffee) {

super(c);

}

public String getDescription() {

return super.getDescription() + ", Mocha";

}

public float getCost() {

return super.getCost() + 0.5;

}

}

public void test() {

Coffee c = new Expresso();

c = new WithMocha(c);

c = new WithMocha(c);

// Expresso, Mocha, Mocha $2.99

System.out.println(c.getDescription() + "$ " + c.getCost());

}

## Kindle

### Factory Design Pattern

* Simple Factory: 将if-else放入一个单独的factory里面
* Factory method
* Abstract Factory

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Graphical user interface, application, Teams

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Text

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Graphical user interface, application

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不好的方案：

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