JAVA 编程进阶上机报告

第一次上机作业

Lab 1：计算机销售系统设计

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一、实验要求

1、实验名称

计算机销售系统的设计

2、需求描述

某计算机组装公司主要销售各类组装计算机，计算机一般由CPU、内存、主板、硬盘等组件构成。具体组件信息如下：

组件名	组件品牌	组件属性
CPU	Intel、AMD	Name，coreNum，price
内存	Samsung, Kingston	Name, volume, price
硬盘	Seagate, WestDigitals	Name, volume, price
主板	Asus、Gigabyte	Name，speed, price

3、实现功能

具体要求：

1) 针对每个组件的每个品牌，设计一个类，并画成整体的类图

2) 设计计算机类（Computer.java），由上述四类组件组装而成，包括计算机的名称、计算机的描述（包括各个组件名）以及总价格等

3) 设计计算机销售主类（ComputerStore.java），包括3个由不同组件组装在一起的计算机实例，可实现计算机商品一览表，可展示每台计算机的描述、价格、工作等。

4) 设计时基于抽象类和接口，要尽可能的实现高内聚、低耦合。

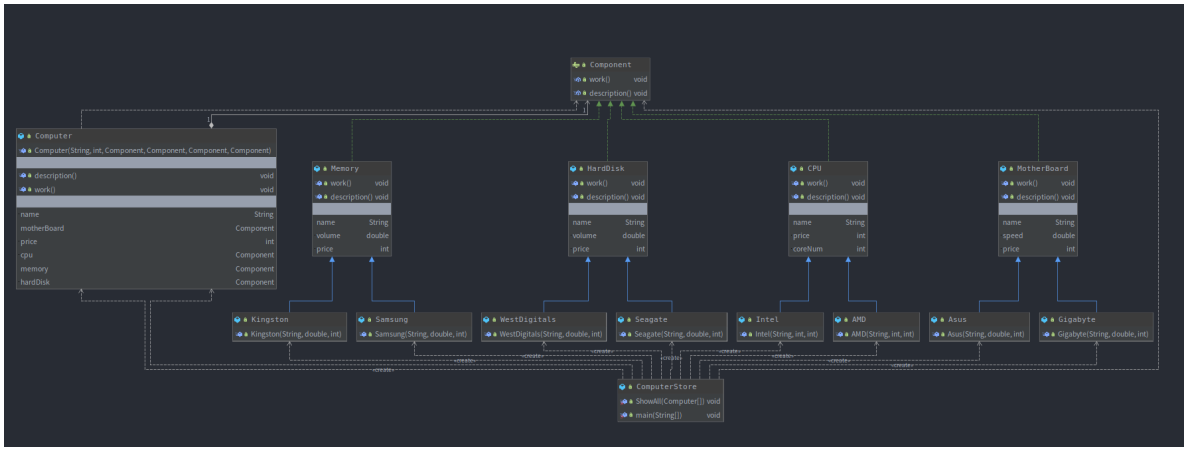
二、源代码

（源码地址：https://github.com/kaixindeken/advjava2020）

1、设计思路

针对每个组件各设计一个类，每个组件的每个品牌各设计一个类，对应品牌对应继承各组件。因为各组件仅需实现工作和描述方法，针对各组件设计一个统一接口`Component`，各组件类对应实现这一接口。设计`Computer`类对各组件描述和工作方法进行整合，在`ComputerStore`进行测试。

2、类图



3、文件结构

- src
  - ComputerStore.java
  - Computer.java
  - Component
    - Component.java
    - entity
      - CPU
        - CPU.java
        - Intel.java
        - AMD.java
      - HardDisk
        - HardDisk.java
        - Seagate.java
        - WestDigitals.java
      - Memory
        - Memory.java
        - Kingston.java
        - Samsung.java
      - MotherBoard
        - MotherBoard.java
        - Asus.java
        - Gigabyte.java

4、源代码

1、`ComputerStore.java`

```
import Component.Component;
import Component.entity.CPU.AMD;
import Component.entity.CPU.Intel;
import Component.entity.HardDisk.Seagate;
import Component.entity.HardDisk.WestDigitals;
import Component.entity.Memory.Kingston;
import Component.entity.Memory.Samsung;
import Component.entity.MotherBoard.Asus;
import Component.entity.MotherBoard.Gigabyte;

public class ComputerStore {
    public static void ShowAll(Computer[] computers){
        for (Computer computer:computers) {
            System.out.println(computer.getName()+": ");
            computer.description();
            System.out.println("Price: "+computer.getPrice());
            computer.work();
            System.out.println();
        }
    }

    public static void main(String []args){
         Component intel = new Intel("i7",8,2000);
         Component amd = new AMD("RYZEN 5",8,1800);

         Component kingston = new Kingston("kingston",16,600);
         Component samsung = new Samsung("samsung",16,700);

         Component seagate = new Seagate("seagate",1024,500);
         Component westDigitals = new WestDigitals("westdigitals",1024,600);

         Component gigabyte = new Gigabyte("gigabyte",100,700);
         Component asus = new Asus("asus",100,800);

         Computer[] computers = new Computer[3];
         computers[0] = new Computer("co1",2000,intel,samsung,seagate,asus);
         computers[1] = new
Computer("co2",2500,amd,kingston,westDigitals,gigabyte);
         computers[2] = new Computer("co3",3000,intel,samsung,seagate,gigabyte);

         ShowAll(computers);
    }
}
```

2、`Computer.java`

```
import Component.Component;
import org.omg.CORBA.COMM_FAILURE;

public class Computer{

    private String name;
    private int price;
    private Component cpu;
    private Component memory;
    private Component hardDisk;
    private Component motherBoard;
```

```
    public Computer(String name, int price, Component cpu, Component memory,
Component hardDisk, Component motherBoard) {
        this.name = name;
        this.price = price;
        this.cpu = cpu;
        this.memory = memory;
        this.hardDisk = hardDisk;
        this.motherBoard = motherBoard;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public int getPrice() {
        return price;
    }

    public void setPrice(int price) {
        this.price = price;
    }

    public Component getCpu() {
        return cpu;
    }

    public Component getMemory() {
        return memory;
    }

    public Component getHardDisk() {
        return hardDisk;
    }

    public Component getMotherBoard() {
        return motherBoard;
    }

    public void description(){
        cpu.description();
        memory.description();
        hardDisk.description();
        motherBoard.description();
    }

    public void work(){
        cpu.work();
        memory.work();
        hardDisk.work();
        motherBoard.work();
    }
}
```

3、`Component.java`

```
package Component;

public interface Component {
    public void work();
    public void description();
}
```

4、`CPU.java`

```
package Component.entity.CPU;

import Component.Component;

public class CPU implements Component {

    private String name;
    private int coreNum;
    private int price;

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public int getCoreNum() {
        return coreNum;
    }

    public void setCoreNum(int coreNum) {
        this.coreNum = coreNum;
    }

    public int getPrice() {
        return price;
    }

    public void setPrice(int price) {
        this.price = price;
    }

    @Override
    public void work() {
        System.out.println("CPU Work");
    }

    @Override
    public void description() {
        System.out.println("CPU: "+this.getName()+" "+this.getCoreNum());
    }
}
```

5、`HardDisk.java`

```
package Component.entity.HardDisk;

import Component.Component;

public class HardDisk implements Component {

    private String name;
    private double volume;
    private int price;

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public double getVolume() {
        return volume;
    }

    public void setVolume(double volume) {
        this.volume = volume;
    }

    public int getPrice() {
        return price;
    }

    public void setPrice(int price) {
        this.price = price;
    }

    @Override
    public void work() {
        System.out.println("Hard Disk Work");
    }

    @Override
    public void description() {
        System.out.println("Hard Disk: "+this.getName()+" "+this.getVolume());
    }
}
```

6、`Memory.java`

```
package Component.entity.Memory;

import Component.Component;

public class Memory implements Component {

    private String name;
    private double volume;
```

```
    private int price;

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public double getVolume() {
        return volume;
    }

    public void setVolume(double volume) {
        this.volume = volume;
    }

    public int getPrice() {
        return price;
    }

    public void setPrice(int price) {
        this.price = price;
    }

    @Override
    public void work() {
        System.out.println("Memory Work");
    }

    @Override
    public void description() {
        System.out.println("Memory: "+this.getName()+" "+this.getVolume());
    }
}
```

6、MotherBoard.java

```
package Component.entity.MotherBoard;

import Component.Component;

public class MotherBoard implements Component {

    private String name;
    private double speed;
    private int price;

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }
```

```
    public double getSpeed() {
        return speed;
    }

    public void setSpeed(double speed) {
        this.speed = speed;
    }

    public int getPrice() {
        return price;
    }

    public void setPrice(int price) {
        this.price = price;
    }

    @Override
    public void work() {
        System.out.println("Mother Board Work");
    }

    @Override
    public void description() {
        System.out.println("Mother Board: "+this.getName()+" "+this.getSpeed());
    }
}
```

7、各组件品牌类

实现各类的含有所有对应属性参数的构造函数。

三、运行结果

（第一行和最后一行防伪）

```
/usr/lib/jvm/jdk-11.0.6/bin/java -javaagent:/home/ken/.local/share/JetBrains/Toolbox/apps/IDEA-U/ch-0/193.6494.35/
co1:
CPU: i7 8
Memory: samsung 16.0
Hard Disk: seagate 1024.0
Mother Board: asus 100.0
Price: 2000
CPU Work
Memory Work
Hard Disk Work
Mother Board Work

co2:
CPU: RYZEN 5 8
Memory: kingston 16.0
Hard Disk: westdigitals 1024.0
Mother Board: gigabyte 100.0
Price: 2500
CPU Work
Memory Work
Hard Disk Work
Mother Board Work

co3:
CPU: i7 8
Memory: samsung 16.0
Hard Disk: seagate 1024.0
Mother Board: gigabyte 100.0
Price: 3000
CPU Work
Memory Work
Hard Disk Work
Mother Board Work


Process finished with exit code 0
```