CENG 1004 Spring 2020 Resit Homework

CODE

Automobile manufacturer Sonda requires an application which calculates the price of its models in its inventory. The company has two car models one of which is Sivic and the other is Sity and their base prices are 50000 TL and 40000 TL, respectively. If requested the following optionals can be added to the cars. Each optional has a cost as listed below. If an optional is selected its cost is added to the Car's price and multiple optionals may be selected.

Optional	**Cost**
Airbag	3000 TL
Music System	1000 TL
Automatic Breaking System (ABS)	5000 TL
Sunroof	2000 TL

In addition Sonda has also motorbike models: Racer and Scooter and their base prices are 60000 TL and 20000 TL respectiely. Motorbikes have also the following optionals that may be selected additionally.

Optional	**Cost**
Automatic Breaking System (ABS)	5000 TL
Seat Heating	2000 TL

A Test class is given in the Appendix Part. Create the required classes and implement the necessary functionalities to make make the test class compilable so that it can generate the intended output. Your classes should reflect the design shown in the class diagram.

Documentation

Give answers to the following questions in your documentation.

A. What the differences between an abstract class and a concrete class? Which class(es) can be defined as abstract classes which of them should be concrete in your code?

B. What is Encapsulation? Have you applied encapsulation in your implementation? Explain where and how you applied.

C. What are the advantages of Inheritance in Object Oriented Programming? Have you used inheritance in your implementation? Which super class(es) have you used and what did you benefit from these super classes.

D. Explain the usage of final keyword in java. Can you use final keyword in any part of your implementation? Explain why or why not?

E. Have you benefited from polymorphism in your implementation. If yes, copy the code segment where you use polymorphism to your report and give the name of the polymorphic variable.

Grading Policy

Code

A. Defining Classes, Attributes & Methods : **40 Points** (Objective - 3)
B. Printing the order output : **20 Points** (Objective - 1)

Documentation

A. **5 Points** (Objective - 4)
B. **5 Points** (Objective - 4)
C. **10 Points** (Objective - 4)
D. **10 Points** (Objective - 3)
E. **10 Points** (Objective - 4)

Submission

Zip your source folder as yourid.rar. Also save your documentation as yourid.pdf. If your id is "12345678" you will submit the following files:

- ✓ 12345678.rar : archive file containing your source code
- ✓ 12345678.pdf: documentation file containing explanations request in the Documentation Section

Submit your file through DYS system. You should be able to upload files in the homework announcement page.

Important Note: All work should be your own work.

Students will get ZERO (0) if they use others' work in their homework or if they share their work with others .

Students will get ZERO (0) if their code cannot compile or generates error during runtime.

Appendix (Test Class)

```
public class TestInventory {

    public static void main(String[] args){
        Inventory inventory = new Inventory();

        Car car = new Sivic(); //50000
        car.setAbs(true);      // 5000
        car.setMusicSystem(true); //1000
        car.setAirBag(true); //3000
        inventory.add(car);

        car = new Sivic(); //50000
        car.setAbs(true); //5000
        car.setSunRoof(true); //2000
        inventory.add(car);

        car = new Sity(); //40000
        car.setMusicSystem(true); //1000
        car.setSunRoof(true); //2000
        inventory.add(car);

        Motorbike mBike = new Racer(); //60000
        mBike.setAbs(true); //5000
        mBike.setSeatHeating(true);//2000
        inventory.add(mBike);


        mBike = new Scooter();//20000
        mBike.setSeatHeating(true);//2000
        inventory.add(mBike);

        //print the inventory
        System.out.println(inventory);
        //Expected output :
        // Sivic with ABS, Music System, Air Bag optional having a total
price of 59000 TL
        // Sivic with ABS, Sunroof  having a total price of 57000 TL
        // Sity with Music System, Sunroof  having a total price of 43000
TL
        // Racer with ABS, Seat Heating having a total price of 67000 TL
        // Scooter with Seat Heating having a total price of 22000 TL
        // TOTAL : 5 Vehicles including 3 Cars and 2 Motorbikes having a
total price of 248000 TL

    }
}
```