Object–Oriented Programming

Lab 6: On Chapter Inheritance

ENSIA 2021-2022

Exercise 1

A supermarket chain has asked you to develop an automatic checkout system.

All products are represented by a barcode and a product name. The groceries can either be sold as:

1. Prepacked food, such that food packages have fixed prices.
2. Fresh food, such that the price is calculated by multiplying the weight by the current price/kg.

Develop the classes to represent the products and organize them hierarchically as follows:

- Define the **Product** class, which contains two data members for storing barcodes (long) and the product name (string). Define a constructor with parameters for both data members. Add default values for the parameters to provide a default constructor for the class.
- In addition to the access methods setCode() and getCode(), provide the methods scanner() and printer() to read data from the keyboard or output product data on the screen.
- Define two classes **PrepackedFood** and **FreshFood** that are derived from **Product**. In addition to the product data members, the **PrepackedFood** class should contain the unit price, and the **FreshFood** class should contain the weight and the price/kg.
- In both classes, define a constructor with parameters providing default values for all data members. Define also access methods for the new data members. Finally, redefine the methods scanner() and printer() to take the new data members into consideration.

In the main program, test the various classes as follows:

- Create two objects for each of **Product**, **PrepackedFood**, and **FreshFood**. The first object is initialized in the object definition, and the second is initialized using the default constructor.
- Test the get and set methods, the scanner method, and display the products.

Exercise 2

Create two classes named **Mammals** and **MarineAnimals**. Create another class named **BlueWhale**, which inherits both the above classes.

Now, create a function in each of these classes that respectively prints "I am a mammal", "I am a marine animal", and "I belong to both the categories: Mammals and Marine Animals".

Now, create an object for each of the classes and try calling:

1 - Function of **Mammals** by the object of **Mammal**

2 - Function of **MarineAnimal** by the object of **MarineAnimal**

3 - Function of **BlueWhale** by the object of **BlueWhale**

4 - Function of each of its parents by the object of **BlueWhale**

Exercise 3

We want to store information about different vehicles. Create a class **Vehicle** with two data members named ‘price’ and ‘mileage’ in km. Now, create the following two subclasses:

1- Car with data members to store: ownership cost, warranty (by years), seating capacity, and fuel type (diesel or petrol).

2- Bike with data members to store: number of cylinders, number of gears, cooling type (air, liquid, or oil), wheel type (alloys or spokes), and fuel tank size (in inches).

Make two car subclasses **Audi** and **Ford**, each having a data member to store the model type.

Make two bike subclasses **Scooter** and **SportBike**, each having a data member to store the model type.

Now, store and print the information of an Audi and a Ford car (i.e. model type, ownership cost, warranty, seating capacity, fuel type, mileage, and price). Do the same for a Scooter and a Sports bike.