

Practice_Interface

Instruction

In this assignment you are going to learn how to create an interface, how to implement that interface using a class. You will also learn the benefits of using interface. For this assignment you are given two packages with the starter code which you have to use for two different tasks as described below.

Task 1

- We have a package named `interface1` that includes two simple classes named *Vehicle* and *FixedProperty*.
- Create two classes *Bus* and *House* where, *Bus* specializes (extends) the class *Vehicle* and *House* specializes the class *FixedProperty*.
- *Bus* class needs to have the following:
 - an instance variable *numberOfSeats* that keeps record for number of seats in the bus.
 - a getter function to return the number of seats.
 - a constructor that sets values for all member variables.
- The *House* class should have
 - an instance variable *area* that stores the area of the house.
 - a getter function to return the area.
 - a constructor that sets values for all member variables.
- Now, write an interface *ITaxable* with a parameterless operation *TaxValue* as **`double TaxValue()`**. The operation should return the tax amount as a decimal number .
- Create the variations of class *House* and class *Bus* which implement the interface *ITaxable* as *TaxableHouse* and *TaxableBus*.
 - The tax for a bus is calculated as:

-- Tax=0.01% of the price value for each seat
 - The tax for a house is calculated as

-- If the house is located within the city : Tax=0.005% of the estimated price of the house for each square foot.

-- Else Tax=0.001% of the price for each square foot.

- Use the given *Main* class to show that your program works. You may make changes in *Main* if you want.
- Notice that both class *House* and *Bus* have a superclass, namely *FixedProperty* and *Vehicle*, respectively. Therefore it is essential that taxation is introduced via an interface.

Task 2

- Within the package *interface2* you are given an interface called *Measurable* which contains the single abstract method **double getMeasure()**;
- Create two classes named *Student* and *Item* that implements the interface *Measurable* such that:
 - For *Student* the **getMeasure()** returns the tuition fees for a student.
 - For *Item* the **getMeasure()** returns the price of the item.
- In your *Main* class
 - Create a list of **Student** objects and a list of **Item** objects with different tuition fees and prices.
 - Add necessary constructors, instance variables and setter/getter functions for your classes.
 - Define a method call **public static returnAverage(ArrayList list)** that returns the average of any list of objects that are *Measurable*.
 - Now calculate and print the average tuition fees for a student and the average price of an item.

Grading

- You will get 1 marks for submitting during tutorial class.
- Another 1 marks for completing all tasks.