Java Assignment – Vehicle Hierarchy

Due Date: 3ʳᵈ November 2023, Friday 11:59 PM

Assignment Overview:

In this assignment, you will be working with a **Vehicle** class that will serve as the base class. This class will have properties common to all vehicles. You will then create two subclasses, **Motorcycle** and **Car**, each with their own unique properties and methods.

Vehicle.java

Create a class **Vehicle.java** that contains private data members:

- **make** (String)
- **model** (String)
- **year** (int)
- **fuelType** (String)
- **price** (double)

Public Methods:

- **printInfo()**: This method should print out the information about the vehicle.

Motorcycle.java

Create a class **Motorcycle.java** that inherits from the **Vehicle** class. It should have the following additional properties:

- **engineDisplacement** (int)
- **isOffRoad** (boolean)

Public Methods:

- **calculateTax()**: This method should calculate the tax based on engine displacement and whether it's an off-road motorcycle. The tax is calculated as:

  o If the engine displacement is less than 500 cc, the tax is set to $50.
  o If the engine displacement is 500 cc or more, the tax is set to $100.
  o If the motorcycle is off-road, the tax is discounted by 50%.

Note: Override the **printInfo()** method in **Motorcycle.java** to include the additional properties.

Car.java

Create a class **Car.java** that inherits from the **Vehicle** class. It should have the following additional properties:

- **numDoors** (int)

- **trunkCapacity** (double)

Public Methods:

- **calculateInsurance()**: This method should calculate the insurance premium based on the number of doors and trunk capacity. The insurance premium is calculated as:

  - Each door contributes $100 to the premium.

  - Each cubic foot of trunk capacity contributes $10 to the premium.

  - insurancePremium= Doors * 100 + trunkCapacity * 10

Note: Override the **printInfo()** method in **Car.java** to include the additional properties.

LastNameFirstNameA5.java

Create a class **LastNameFirstNameA5.java** in the same package which contains the main method to demonstrate the functionality of the classes.

In the **main()** method:

1. Create instances of **Motorcycle** and **Car**. You can choose your favorite vehicles!
2. Call relevant methods to set properties and calculate tax/insurance.
3. Print the information of both vehicles using the **printInfo()** method.

Additional Instructions:

1. The program should always print "Program Completed" before exiting.
2. Pay close attention to indentation, punctuation, and spelling of the required output.
3. Make sure your code runs on Terminal with command line inputs.
4. Provide comments in your code to enhance code readability.
5. Mention the sources used to complete the assignment.
6. Submit **.java** files only.

Sample Output:

```
C:\Users\tanya\.jdks\openjdk-19.0.2\bin\java.exe
Enter Motorcycle Details:
Make: Honda
Model: CBX500
Year: 2023
Fuel Type: Petrol
Price: 8000
Engine Displacement: 650
Is Off Road (true/false): false

Enter Car Details:
Make: Toyota
Model: Camry
Year: 2020
Fuel Type: Hybrid
Price: 33000
Number of Doors: 4
Trunk Capacity (cu ft): 15.1

Motorcycle Information:
Vehicle Information:
Make: Honda
Model: CBX500
Year: 2023
Fuel Type: Petrol
Price: $8000.0
Engine Displacement: 650 cc
Is Off Road: false
Tax: $100.0

Car Information:
Vehicle Information:
Make: Toyota
Model: Camry
Year: 2020
Fuel Type: Hybrid
Price: $33000.0
Number of Doors: 4
Trunk Capacity: 15.1 cu ft
Insurance Premium: $551.0

Program Completed
```

```
C:\Users\tanya\.jdks\openjdk-19.0.2\bin\java.exe
Enter Motorcycle Details:
Make: Bajaj
Model: Dominar
Year: 2017
Fuel Type: Petrol
Price: 2500
Engine Displacement: 452
Is Off Road (true/false): true

Enter Car Details:
Make: Ford
Model: Mustang
Year: 2013
Fuel Type: Diesel
Price: 100000
Number of Doors: 2
Trunk Capacity (cu ft): 9.2

Motorcycle Information:
Vehicle Information:
Make: Bajaj
Model: Dominar
Year: 2017
Fuel Type: Petrol
Price: $2500.0
Engine Displacement: 452 cc
Is Off Road: true
Tax: $25.0

Car Information:
Vehicle Information:
Make: Ford
Model: Mustang
Year: 2013
Fuel Type: Diesel
Price: $100000.0
Number of Doors: 2
Trunk Capacity: 9.2 cu ft
Insurance Premium: $292.0

Program Completed
```