BIRZEIT UNIVERSITY

FINAL PROJECT : (**YOU CAN USE ALL CONCEPTS YOU LEARNED IN THIS COURSE**)

Objectives:

In this assignment, you will apply the following concepts you learned in java (abstract class, interfaces, Polymorphism, exception handling, Files manipulation and encapsulation) .

Palestinian Vehicle Agency: A vehicle of three types (car, minivan, and truck) has many attributes.

[Question] Designing Vehicle class and Its Sub-classes There are several Vehicles for transportation such as Car, MiniVan, and Truck. Details of the classes for the vehicles are shown in the Figure1
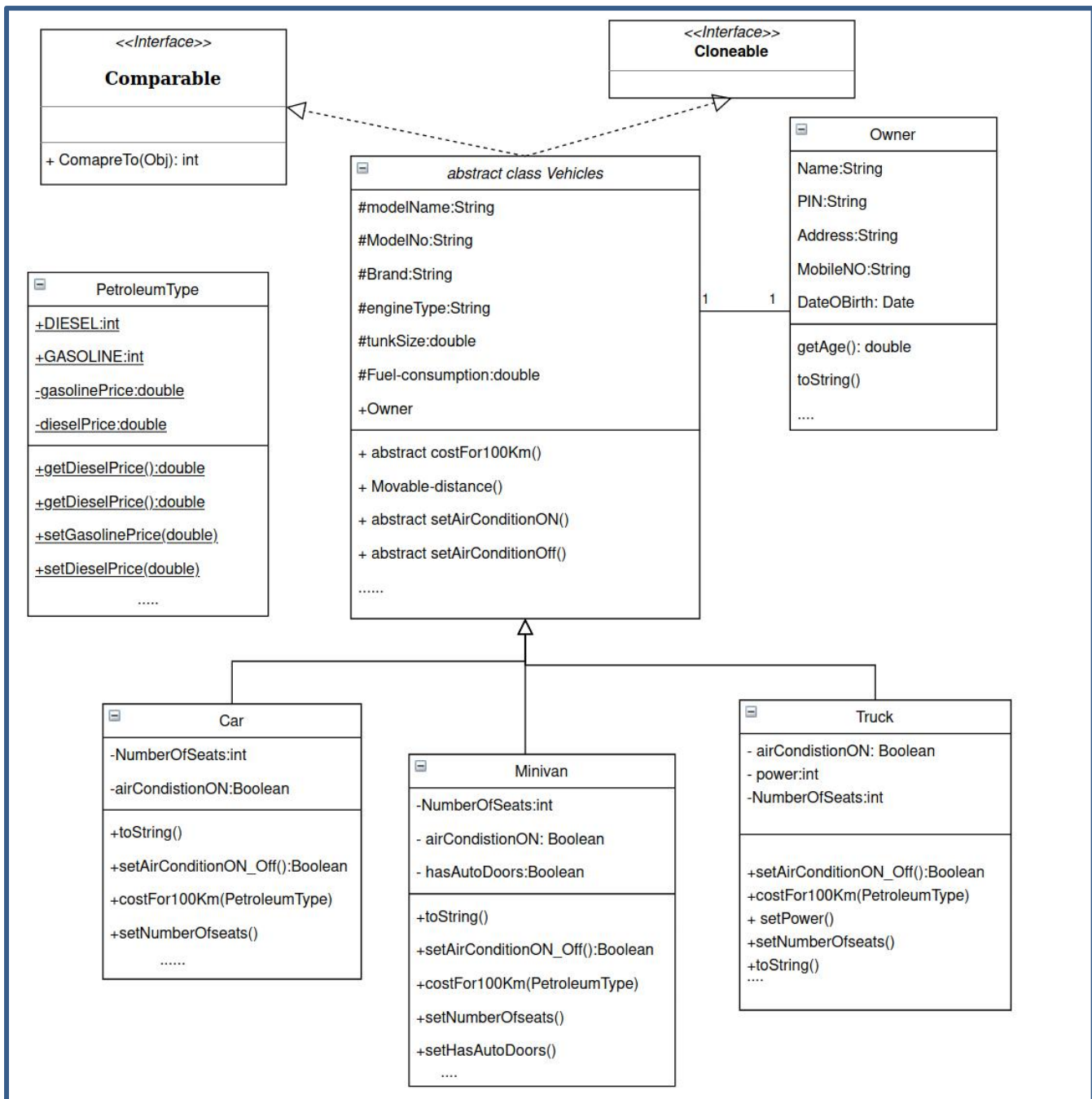
Request of the question:
Write Java program code to realize the Figure .1

Description of the fields and methods of the classes as follows:

1. For Fields

- *Model-name:* Model name of a vehicle
- *Brand:* Company to produce the model
- *Owner:* Owner of the vehicle (as object)
- *Engine-type:* Type of the engine. Classified by fuel type to be used such as gasoline, diesel, or hybrid
- *Tank-size:* Size of fuel tank. Unit is liter.
- *Fuel-consumption:* Fuel consumption. Unit is km/liter.
- *numberOfSeats:* Integer number of seats in a vehicle.
- *airConditionOn:* Boolean status of air-condition's working: ON/OFF.
- *hasAutoDoor:* Boolean status of a vehicle's having auto door.
- power: Horse Power of a vehicle's engine.
- Diesel is `public static final int=1`, and gasoline is `public static final int =2`

2. For Methods

- ***Movable-distance():*** Getting information of movable distance of a vehicle when the tank of the vehicle is filled fully.
- ***costFor100Km(Petroleum-Price):*** Calculating cost for running 100Kms with the engine type and the petroleum type passed by as parameter. It will be different according to fuel and air-condition's status.
- ***setAirConditionON***: Setting the air-condition of the vehicle to ON.
- ***You can guess other methods.***
- ***You have to add your owns methods, at least one additional method for each class, other than mentioned above.***
- Create appropriate setters and ***getters for classes.***

3. Some conditions to write methods

- The Car uses only gasoline engine.
- The Minivan can use engine of both gasoline and diesel. But the fuel consumption is same for both gasoline and diesel.
- The Truck uses only diesel engine.
- The engine type Hybrid uses only gasoline.
- Default air-condition status is OFF, and the air-condition can be ON/OFF after instances being created by *setAirConON/setAirConOFF* methods.
- Default fuel consumption is considered when air-condition is OFF.
- Fuel consumption of the Car increased by 10% when air-condition of the Car is ON.
- Fuel consumption of the Minivan and the Truck increased by 20% when air-condition of the Car is ON.
- For Petroleum Price: Gasoline(get price from console NIS/liter , for instance 5.23 NIS/liter)), Diesel(get price from console NIS/liter, for instance 4.02 NIS/liter)
- Use **Exception Handling** to handle errors caused by mismatch filling type of Petroleum , throw an illegal argument exception
- Date: you have to use Calender class (Gregorian calender).
- Use *StringBuilder class* to deal with string manipulations when read from file. (splitting, uppercase,lowercase,....etc)

Appropriately implement the above hierarchy and stick to the following

All Vehicle objects are comparable based on the **costFor100Km .** **Clone an instance of** Vehicle object, without cloning the owner of this Vehicle (*set the owner to null for cloned object*) Using deep cloning. toString() method should be implemented in appropriate way in all Vehicle sub classes displaying all the information including the *costFor100Km*.

Create a **menu** that allow user to select from them as the following:

1. Read the data about objects from the file "`inputdata.txt`" and store them in *Arraylist.*
2. *Set prices of petroleum.*
3. Print sorted order Vehicles in an ascending order based on costFor100Km.
4. (**_Bonus_**) Print sorted order Vehicles in an ascending order based on *owner name* .
5. (**_Bonus_**) Print sorted order Vehicles in an descending order based on vehicle brand.
6. Clone Vehicle without owner. (Ask user to choice one object for cloning from Arraylist, after Listing them to user)
7. Turn air-condition on
8. Write Output on the "`output.txt`" file after sort them.
9. Exit from System

Note: when turn air-condition is on, you can again select one of steps 3-6, the output should be print on file.

The file input format is:

```
Car, Camley, E100, Toyota, Ahmad, Gasoline, 70.0, 15.15, 5
Car, Aqua, ES500, Toyota, Nader, Hybrid,  36.0,  40.0,  5
MiniVan, Sienna, A4, Toyota, Malik,  Gasoline, 75.0, 9.0, 8, true
MiniVan, Odyssey, S500, Honda, Khaled,  Diesel,  56.0, 11.0,  8, false
MiniVan, Presage, BX5000, Nissan, Shaher,  Gasoline, 60.0, 7.0, 7, false
Truck, Tundra, EDGE500, Toyota, Sami, Diesel, 100., 6.76, 5, 310
Truck, Ridgeline, DUG700, Honda, Waleed, Diesel, 83.279, 7.23, 5, 250
```

Sample of printed line on out file:

```
 ModelName: Camley,  Brand: Toyota,  Owner: Ahmad,  EngineType: Gasoline,  TankSize: 70.0,
FuelConsumption: 15.15,  NumberOfSeat: 5,  Movable distance: 1060.5 Km,  Cost for 100 Km: 943.90 NIS
```

Set of instructions:

1.Create folder at your desktop with your Assignment#, ID, and your name
Example: A2_1190100_Ali Mohammad

2. Create a new project using Eclipse IDE and store your project inside this folder.
3.**Zipped** this folder and submit it by your ITC account [under meta course].

Grading policy and general notes on the Assignment:

1. Your application should have all functionalities working properly. Twenty percent of marks will be graded for the functionality of the assignment.
2. The following notes will make up the remaining 10 marks of the grade:
   a. There has to be adequate documentation and comments in the code(i.e., methods, loops, etc.);
   b. Your code should follow the code convention (i.e., spaces, indentations,etc.); and
3. Any plagiarized code will not be marked.
4. ANY LATE Assignment will never be accepted for any excuse.

Types of cheating:

Types of cheating:
1. Getting codes form outsource, like books, internet.
2. Cheating from any classmate.
3. Trying to get answers from any website.
4. Trying to get answers from the Facebook groups or from any social media.

5. Trying to get answer from Chegg website.

Deadline: Saturday 16/01/2021 before 23:59