CSE212: SOFTWARE DEVELOPMENT METHODOLOGIES

YEDITEPE UNIVERSITY

SPRING 2022

ASSIGNMENT 2 – DUE DATE MARCH 28TH, 2022

This semester, you will be implementing a *Fuel Station Management System* as part of your assignment series. In this context, you are a large corporate fuel company that wants to streamline management on its fuel stations.

For the second assignment, you are asked to use **enumerations**, and **inheritance**.

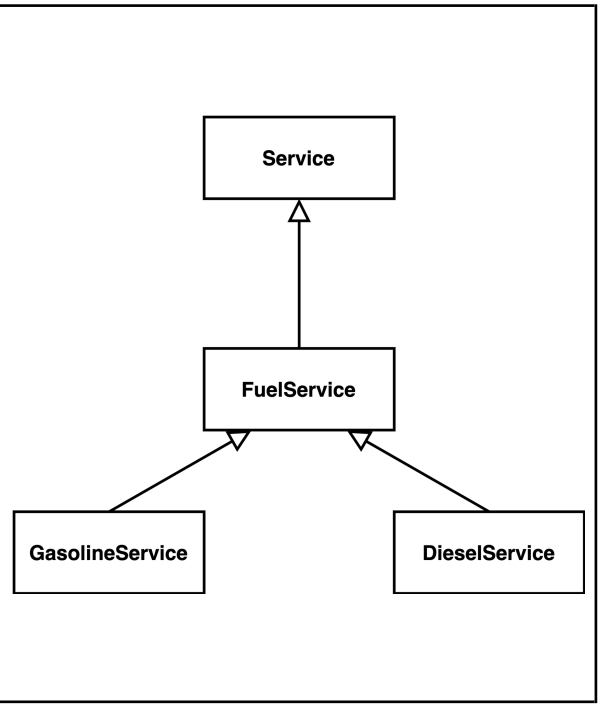
As you know, in the previous assignment, you have implemented `Station`, `Gasoline`, and `Diesel` classes. Now, you should also implement the following additional classes and their respective instance variables/methods:

```
Service:
carPlate (String)
revenue (double)
void displayServiceInfo()
double makeTransaction(price)

FuelService:
litersBought (double)
void displayServiceInfo()
double makeTransaction(price)

GasolineService:
hasCoupon (boolean)
void displayServiceInfo()
double makeTransaction(price)

DieselService:
discountedAntiFreeze (boolean)
discountedAntiFreezeCount (int)
discountedAntiFreezePrice (double)
void displayServiceInfo()
double makeTransaction(price)
```



So, eventually you should have `MainClass`, `Station`, `Gasoline`, `Diesel`, `Service`, `FuelService`, `GasolineService`, and `DieselService` classes.

Station class should have additional `Service[] serviceArray` to hold the `GasolineService` and `DieselService` objects. Also in the `Station` class, you should define `averageGasolinePrice`, `totalGasolineInStation`, `averageDieselPrice`, and `totalDieselInStation` instance variables.

You should follow the best practices in object oriented programming. To this purpose. You should override the `void displayServiceInfo()` and `double makeTransaction(price)` methods in the corresponding classes.

In each class, in the `displayServiceInfo()` method, you should print the variables defined in the class. Furthermore, by using method overriding, you should be able to display the information in the class, as well as the information stored in the super classes.

In each class that defines `makeTransaction()` method, a calculation will be done according to the following table;

Service	Takes the calculated price and sets it to the `revenue` variable in the `Service` class.
FuelService	Takes the calculated price and passes the price to superclass.
GasolineService	Takes average gasoline price of a station as a parameter, and calculates the revenue according to liters bought and coupon information. The formula is; `averagePrice * liters * discountRatio (10 percent)` It should pass the calculated price to superclass.
DieselService	Takes average diesel price of a station as a parameter, and calculates the revenue according to liters bought and optional anti-freeze promotion information. The formula is; `averagePrice * liters + antiFreezePrice (25)* itemcount` It should pass the calculated price to superclass.

Your application should be able to handle the following scenario and requirements:

- You have to create a Menu to display the menu items. Use **enumerations (enum)** to print the menu items. When a user starts your application, it should prompt the following menu:

```
1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
```

- Options 1, 2, 3 and 4 do the same operations as the first assignment. But, in options 2, 3 and 4, the total liters of gasoline and diesel and their respective average prices are calculated. This calculation is done when adding gasoline and diesel in options 2 and 3. Also, in option 4 the current total liters of gasoline and diesel, and also their average prices are displayed on the console.

- When the user selects the 5th option, the program should ask for a station ID to search the `stationArray` and find the `Station` object that has the given ID. When the object is found, then the program should create a `GasolineService` object by requesting the information (car plate, liters, and coupon) from the user. The program should check if there is enough gasoline in the station before initiating the transaction. If there is not enough gasoline, then it should print "Not enough gasoline in the station!". If everything is ok, the program should initiate the transaction by calling the `makeTransaction()` method by passing the average gasoline price in this particular station. The liter of gasoline that the customer bought should be deducted from the total gasoline liter count of the station. Then, this `GasolineService` object should be added to the `serviceArray` of the corresponding `Station` object. If there are no `Stations` in the `stationArray` with the given ID, then the program should print "No station found with the given ID!".
- When the user selects the 6th option, the program should ask for a station ID to search the `stationArray` and find the `Station` object that has the given ID. When the object is found, then the program should create a `DieselService` object by requesting the information (car plate, liters, and anti-freeze) from the user. The program should check if there is enough diesel in the station before initiating the transaction. If there is not enough diesel, then it should print "Not enough diesel in the station!". If everything is ok, the program should initiate the transaction by calling the `makeTransaction()` method by passing the average diesel price in this particular station. The liter of diesel that the customer bought should be deducted from the total diesel liter count of the station. Then, this `DieselService` object should be added to the `serviceArray` of the corresponding `Station` object. If there are no `Stations` in the `stationArray` with the given ID, then the program should print "No station found with the given ID!".
- When the user selects the 7th option, the program should ask for a station ID to search the `stationArray` and find the `Station` object that has the given ID. When the object is found, then the program should print all of the `GasolineService` and `DieselService` records by iterating over the

`serviceArray` of the corresponding `Station` object. If there are no `Stations` in the `stationArray` with the given ID, then the program should print "No station found with the given ID!".

- When a user selects the 8th option, your application should terminate.

Rules that you must follow

1. You are given a MainClass.java file. Here you can find the main method and the general outline of the menu structure. You can also find the necessary method calls that perform the 5th, 6th, and 7th options of the menu.
    a. *public static void sellGasoline(Station[] stationArray)*
    b. *public static void sellDiesel(Station[] stationArray)*
    c. *public static void displayServices(Station[] stationArray)*
2. These methods listed above must be defined in the Station class and should be static such that you can access them from the main method directly. What they do is self explanatory as it can be understood from their name.
3. You are **not allowed** to make any changes to the MainClass.java file.
4. Your class, variable, method, etc. names should be defined as indicated in this PDF file unless stated otherwise.
5. **If your code does not compile you won't get any credit!**
6. Your program output should **match** the example given below. Keep in mind the spaces, empty lines, asking the user input in the same line, etc.
7. Write each class in a separate .java file.

Application Walkthrough

```
1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
1
Please enter the name of the Station: JavaPetrol
Please enter the Station ID: 1234

1. Create a new station
```

```
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
2
Please enter the ID of the Station you want to search: 1234

Please enter the origin of gasoline: A
Please enter the price per liter: 1.2
Please enter the total shipment volume in liter: 2000

The total gasoline liters in Station #1234 is 2000.0
The average gasoline price in Station #1234 is 1.2

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
2
Please enter the ID of the Station you want to search: 1234

Please enter the origin of gasoline: B
Please enter the price per liter: 1.4
Please enter the total shipment volume in liter: 500

The total gasoline liters in Station #1234 is 2500.0
The average gasoline price in Station #1234 is 1.24

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
3
Please enter the ID of the Station you want to search: 1234
```

```
Please enter the origin of Diesel: C
Please enter the price per liter: 1.5
Please enter the total shipment volume in liter: 2000

The total diesel liters in Station #1234 is 2000.0
The average diesel price in Station #1234 is 1.5

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
4
Please enter the ID of the Station you want to display: 1234

Displaying the inventory of Station #1234

Gasoline...
The origin is: A
Price per liter is: 1.2
Total liters of this gasoline is: 2000.0

Gasoline...
The origin is: B
Price per liter is: 1.4
Total liters of this gasoline is: 500.0

The total gasoline liters in Station #1234 is 2500.0
The average gasoline price in Station #1234 is 1.24

Diesel...
The origin is: C
Price per liter is: 1.5
Total liters of this Diesel is: 2000.0

The total diesel liters in Station #1234 is 2000.0
The average diesel price in Station #1234 is 1.5

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
```

```
6. Sell diesel to customer
7. Display sold services so far
8. Exit
5
Please enter the ID of the Station you want to sell Gasoline: 1234

Please enter the car plate: 34ASD123
Please enter the gasoline liter: 4000
Not enough gasoline in the station!

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
5
Please enter the ID of the Station you want to sell Gasoline: 1234

Please enter the car plate: 34ASD123
Please enter the gasoline liter: 50
Please enter if you have a coupon (y/n): y

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
4
Please enter the ID of the Station you want to display: 1234

Displaying the inventory of Station #1234

Gasoline...
The origin is: A
Price per liter is: 1.2
Total liters of this gasoline is: 2000.0

Gasoline...
The origin is: B
Price per liter is: 1.4
```

```
Total liters of this gasoline is: 500.0

The total gasoline liters in Station #1234 is 2450.0
The average gasoline price in Station #1234 is 1.24

Diesel...
The origin is: C
Price per liter is: 1.5
Total liters of this Diesel is: 2000.0

The total diesel liters in Station #1234 is 2000.0
The average diesel price in Station #1234 is 1.5

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
6
Please enter the ID of the Station you want to sell Diesel: 1234

Please enter the car plate: 34QWE123
Please enter the diesel liter: 75
Please enter if you want discounted anti-freeze (y/n): y
Please enter how many anti-freeze you want: 2

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
4
Please enter the ID of the Station you want to display: 1234

Displaying the inventory of Station #1234

Gasoline...
The origin is: A
Price per liter is: 1.2
Total liters of this gasoline is: 2000.0
```

```
Gasoline...
The origin is: B
Price per liter is: 1.4
Total liters of this gasoline is: 500.0

The total gasoline liters in Station #1234 is 2450.0
The average gasoline price in Station #1234 is 1.24

Diesel...
The origin is: C
Price per liter is: 1.5
Total liters of this Diesel is: 2000.0

The total diesel liters in Station #1234 is 1925.0
The average diesel price in Station #1234 is 1.5

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
7
Please enter the ID of the Station you want to display: 1234

Displaying the sold services of Station #1234

Gasoline Service...
Bought 50.0 liters.
Car Plate is 34ASD123.
The revenue from this service is 55.800000000000004.
Has 10% discount coupon

Diesel Service...
Bought 75.0 liters.
Car Plate is 34QWE123.
The revenue from this service is 162.5.
Bought 2 discounted anti-freeze.

1. Create a new station
2. Add gasoline to a station inventory
3. Add diesel to a station inventory
4. Display a station inventory
```

```
5. Sell gasoline to customer
6. Sell diesel to customer
7. Display sold services so far
8. Exit
8
```

Submit your assignments in a zip file, which has your student number as name, through the YULEARN (https://yulearn.yeditepe.edu.tr) latest by the end of Monday, March 28th, 2022.