Due Date: 31.10.2023 23:55

CENG211 – Programming Fundamentals
Homework #1

In this homework, you are expected to implement a "Transaction Management Application" in Java. You should fulfill the concepts of:

- Defining Classes
- CSV file I/O
- Arrays
- 2-dimensional Arrays
- Constructors, Getters & Setters

In the Transaction Management Application, there are the records of the products and the shop assistants of a company in Turkey. In addition to the products and the shop assistants, there are transactions that are performed with the aid of the shop assistants.

The product records of this company are in the attached 'products.CSV' file that has the "ID, product name, price" format.

In this application, there are 1500 transactions. The following are the requirements for the transactions.

- Each transaction has a transaction ID, 3 products that are held in a 1-dimensional array, a total price, and a transaction fee.
- The products of each transaction are randomly determined according to the product ID.
- Multiple transactions could contain the same product.
- The quantity of each product is also determined randomly between 1 and 10 (if the product is uncountable, the quantity could be assumed as kilograms).
- The total price of a transaction is found by multiplying the quantity and the price for each product in the transaction and adding up all the results.
- The transaction fee of each transaction is determined according to the following table.

Total Price (TL)	Percentage
totalPrice <= 499	transactionFee = 1% of totalPrice
500 <= totalPrice <= 799	transactionFee = 3% of totalPrice
800 <= totalPrice <= 999	transactionFee = 5% of totalPrice
totalPrice >= 1000	transactionFee = 9% of totalPrice

In the Transaction Management Application, the shop assistant records are given in 'shopAssistants.csv' file which has the "ID, name, surname,phone number" format. In this app, each shop assistant aids 15 transactions, and they are paid commission-based salaries. If the total revenue of the 15 transactions is more than 7500 TL, the commission is %3, otherwise it is 1%. Also, the weekly salary basis of each shop assistant is according to their seniority. The weekly salary basis table is given below. (It can be assumed that there are 4 weeks in a month.)

Seniority (Years)	Weekly Salary Basis (TL)
seniority < 1	1500
1<= seniority < 3	2000
3 <= seniority < 5	2500
seniority >= 5	3000

In this homework, you are expected to implement the necessary classes to load the data from the given CSV files and create the desired queries. You are expected to implement classes for **Product, ShopAssistant, Transaction, TransactionManagement, SalaryManagement, Query, SalesManagementApp (the class with main method),** and other helper classes (e.g. **FileIO**) with the information given below:

Product:

- ID
- Product Name
- Price

ShopAssistant:

- ID
- Name
- Surname
- Phone Number

Transaction:

- ID
- 1-D Array of 3 Products
- Total Price
- Transaction Fee

SalaryManagement:

- **ShopAssistant**
  - ✓ **Note:** One-dimensional array that holds **ShopAssistant** objects.

TransactionManagement:

- **Transaction**
  - ✓ **Note:** Two-dimensional array that holds **Transaction** objects for each shop assistant.
  - ✓ **Ex:** For 3rd shop assistant 7th Transaction, it is [2][6].

Implement necessary methods to respond to the following queries in **Query** class:

1- The highest-total-price transaction.
2- The most expensive product in the lowest-price transaction.
3- The lowest transaction fee.
4- The highest-salary shop assistant. (Please, include his/her ID, name, seniority, weekly basis salary, commission, and total salary)
5- The total revenue that is earned from 1500 transactions including both total price and transaction fee of each transaction.
6- The total profit that is earned after paying the shop assistant salaries.

If the result of any of the queries is more than one, please display one result. Since almost all data are randomly determined, the results of your projects will differ each time you execute your code and, also from each other. This is completely normal.

Important Notes:

1. Do NOT request inputs in your app. Printing the results of the queries will be enough. You should print names of the results instead of printing IDs or indices.
2. You are NOT allowed to use **List / ArrayList** interfaces in this homework.
3. You can use standard **java.io** packages to read files. Do NOT use other 3rd party libraries.

4. You should use **relative** paths (e.g. Files/sample.csv) instead of **absolute** paths (e.g. C:\\user\\eclipse-workspace\\MyProject\\Files\\sample.csv). Please be sure of it, otherwise there will be **no output** of your application and you certainly will **lose points**.

5. To support **Turkish characters,** you may need to change your project's text file encoding to UTF8: Right click on your project (in package explorer) → Properties → Text file encoding → Other → UTF8 → Apply.

6. You are expected to write clean, readable, and tester-friendly code. Please try to maximize reusability and prevent from redundancy in your methods.

References

Assignment Rules:

1. In this lecture's homework, there are no cheating allowed. If any cheating has been detected, they will be graded as 0 and there will be no further discussion on this.
2. You are expected to submit your homework in groups. Therefore, only one of you will be sufficient to submit your homework.
3. Make sure you export your homework as an Eclipse project. You can use other IDEs as well, however, you must test if it **can be executed** in Eclipse.
4. Submit your homework through Cloud-LMS.
5. Your exported Java Project should have the following naming format with your assigned group ID (which will be announced on MS Teams) as the given below:

   G05_CENG211_HW1

   Also the zip folder that your project in should have the same name

   G05_CENG211_HW1.zip
6. Please beware that if you do not follow the assignment rules for exporting and naming conventions, you will lose points.
7. Please be informed that your submissions may be anonymously used in software testing and maintenance research studies. Your names and student IDs will be replaced with non-identifying strings. If you do not want your submissions to be used in research studies, please inform the instructor (Dr. Tuglular) via e-mail.