

## Homework 1

### CENG431 – Building Software Systems

In this homework you are expected to implement a “**Basket Analysis Application**” in Java. You should fulfill the concepts of:

- Object Orientation Fundamentals,
- Abstract Data Types
- Inheritance, Polymorphism, Abstract Classes, Interfaces, Exceptions
- Collections Generics
- CSV file I/O

In the Basket Analysis Application, there are the **product records** and the **basket records** of an online shopping application which sells **electronic, clothing, and cosmetic products**. The product records show the information of each product. The basket records show the detail of purchases that made in the year 2021. These details are which products are **sold**, the **quantity** and the **price** of the associated products and the **date** of purchases. Due to the inflation and periodic discounts, the product prices are changing in the records.

In this homework, you are expected to implement necessary classes to load the data from the given CSV files and create the desired queries. The given CSV files are listed below.

- In “products.csv”, the information is given for different products. The first entry of each line is the product ID. The product ID consists of the abbreviation of the associated product category and a number. Each abbreviation is given for each different product category below in the table. The common fields of different products are given as bold and other fields are given in the order as in the csv file.

For instance, the csv information is given in the order (as in the table) **product ID, title, RAM capacity, SSD capacity, CPU** for the product PC in the CSV file.

Product Name	Abbreviation	Field(s)
<b>Electronic</b>	<b>EL</b>	<b>title</b>
PC	ELPC	RAM capacity, SSD capacity, CPU
Monitor	ELMO	screen size
Phone	ELPH	memory capacity
Headphone	ELHE	Bluetooth version
<b>Clothing</b>	<b>CL</b>	<b>brand, size</b>
Coat	CLCO	coat type
Skirt	CLSK	hemline
<b>Cosmetic</b>	<b>CO</b>	<b>brand, ML</b>
Perfume	COPE	fragrance type
Lipstick	COLI	lipstick type, color

- In “baskets.csv” the information is given as follows:

***basket ID, product ID, price, quantity, ..., purchase date***

The product ID, price and quantity are repeated for each different product in the basket in the csv file. The last entry of each line in “baskets.csv” shows the date of purchase.

You are expected to implement necessary classes and other helper classes. Please note that, the basket will be a data structure that can store different products (electronic, clothing, and cosmetic), their price and their quantities by considering that the product variations could be improved in the future, e.g., a new product category such as Book could be added.

After creating the product and the basket objects, please display the results of the following queries:

- 1- The revenue from COLI-1 product.
- 2- Top selling product by quantity.
- 3- The most paid basket.
- 4- Basket with the largest number of different products.
- 5- The month in which the ELPC-1 was sold the most expensive.
- 6- Price increase rate of ELHE-2 in July.

If the result of any of the query is more than one, please display all results.

#### 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. An example **imaginary** output is given below:

```
1- 280000
2- COLI-1 Maybelline New York 2 Permanent Pink: 90
3- Basket 1
4- Basket 19
5- August
6- 56%
```

2. You should use relative paths (e.g. Files/sample.csv) instead of absolute paths (e.g. C:\\user\\eclipse-workspace\\MyProject\\Files\\sample.csv).
3. 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.
4. You are expected to write clean, readable, and tester-friendly code. Please try to maximize reusability and prevent from redundancy in your methods.

#### 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 supported by Eclipse. If the project import is not accomplished in Eclipse, you will lose points.

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\_CENG431\_HW1**

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

**G05\_CENG431\_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.