Due Date: 14.12.2022 23:59

CENG211 – Programming Fundamentals

Homework #3

In this homework you are expected to implement a "**Furniture Factory Simulation**" and simulate it in Java. You should fulfill the concepts of:

- Interfaces
- Abstract Classes
- Abstract Data Types
- CSV File I/O

In the program, you are expected to build a 3-day simulation where 2 furniture manufacturers buy raw materials from a vendor and produce furniture.

- Vendor has raw materials, and these materials are given in the VendorPossessions.csv file with the given format:

  Material Code, Quality

- The properties of the materials are given in the RawMaterialProperties.csv file with the given format:

  Material Code, Length, Width, Height, Cost

- Manufacturers are going to buy raw materials each day according to Manufacurer1Materials.csv and Manufacurer2Materials.csv files with the given format:

  Day, Material1 Code, Material1 Count, Material2 Code, Material2 Count, …

- Manufacturers are going to produce furniture each day according to Manufacurer1Furnitures.csv and Manufacurer2Furnitures.csv files with the given format:

  Day, Furniture1 Code, Furniture1 Count, Furniture2 Code, Furniture2 Count, …

- For each furniture, necessary materials are given in the FurnitureParts.csv file with the given format:

  Furniture Code, Material1 Code, Material1 Count, Material2 Code, Material2 Count, …

- Manufacturers are going to produce furniture according to given information, but material may not be enough. In that case, the furniture that cannot be produced will be tried to produce next day.

- Manufacturer1 will produce furniture in **LIFO** and they will use raw materials in **FIFO**, Manufacturer2 will produce furniture in **FIFO** and they will use raw materials in **LIFO**.

- Name of the materials and furnitures are as follows:

TB1401:	Obsidian	(Table)
TB1402:	Pearl	(Table)
TB1501:	Elegant	(Table)
TB1502:	Walnut	(Table)
TB1503:	Garden	(Table)
WD2201:	Lavinia	(Wardrobe)
WD2202:	Loki	(Wardrobe)
WD2203:	Atlas	(Wardrobe)
SH5001:	Corner	(Shelf)
SH5002:	Harmony	(Shelf)
SH5003:	Luna	(Shelf)
SH5101:	Hittite	(Shelf)

PL011:	Plank011
PL012:	Plank012
PL013:	Plank013
WB121:	WoodenBoard121
WB122:	WoodenBoard122
WB123:	WoodenBoard123
WB131:	WoodenBoard131
WB132:	WoodenBoard132
WP401:	WoodenPlank401
WP402:	WoodenPlank402
WP403:	WoodenPlank403
WP404:	WoodenPlank404
HD501:	Handle501
HD502:	Handle502

- For each furniture a quality metric should be calculated according to the given material qualities. Calculation should be as follows:

  Furniture Quality = (material1 quality * material1 volume + material2 quality * material2 volume + …) / total volume of materials

  Quality Ranges:

Bad Qlt:	q < 92%
Normal Qlt:	92% ≤ q ≤ 94%
Good Qlt:	94% ≤ q ≤ 96%
Very Good Qlt:	96% ≤ q ≤ 98%
Perfect Qlt:	98% ≤ q

- For each furniture a cost should be calculated according to the given cost values of the materials.

- Also, for each furniture an income should be calculated according to the calculated cost of furniture with given specific percentages:

Table:	300%
Wardrobe:	320%
Shelf:	280%

  (For example: for a table the cost = 2300₺ -> the income = (2300*300)/100 = 6,900₺

- According to the obtained cost and income values, a total cost and income should be calculated

Expected Output Sample:

```
Day1:

Manufacturer1:

Obsidian:     Bad Qlt: 0, Normal Qlt: 1, Good Qlt: 0, Very Good Qlt: 2, Perfect Qlt: 0, Earning:2050₺

Pearl:        Bad Qlt: 1, Normal Qlt: 0, Good Qlt: 1, Very Good Qlt: 1, Perfect Qlt:1, Earning:2750₺

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Total Expense: 32300₺

Total Income: 55600₺

Unproduced Furnitures:

2 Luna, 1 Lavinia, …

Manufacturer2:

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Total Expense: 29700₺

Total Income: 62340₺

Unproduced Furnitures:

All orders are produced

Day2:

Manufacturer1:

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```

Important Notes:

1. You can use standard **java.io** packages to read files. Do NOT use other 3rd party libraries.
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 **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_HW3

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

   G05_CENG211_HW3.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.