Middle East Technical University | Department of Computer Engineering

CENG 443

Introduction to Object-Oriented Programming Languages and Systems

Spring 2023-2024

Preliminary 3 - Market Research

(Ver 1.0)

Due date: May 21, 2024, Tuesday, 18:00

1 Introduction

Keywords: *Streams, File Operations*

In the assignment, your task is to write a program to analyze the data collected for market research on various dates.

2 Overview

The data is collected under a csv file whose its 13 fields are separated by commas. The file contains information about:

- Anonymized name of the customer
- Age of the customer on the purchase date
- The purchase date
- Unit prices of 5 different products with their quantity on that date and their number of purchases:
  - Bread
  - Milk (1lt)
  - Egg (1 pack)
  - Potatoes (1kg)
  - Tomatoes (1kg)

Empty field means the customer did not buy the product on that date.

So the header of the CSV file will be:

```
name,age,date,price of bread, quantity of bought bread,...price of tomatoes,quantity of bought tomatoes
```

Your task is to write a program that answers the questions in the following section. The CSV file will be given as an argument to your program:

```
java YourProgramName csv_file_name question_no
```

And it should print the answer of the given question. You can find an example file on ODTUClass.

To learn how to read from a file, you can check **08d Streams - 4.pdf** on ODTUClass.

3 Questions

You can find the questions your program should answer below:

1. What is the total quantity of products purchased by the customers whose their names start with 'A'?
2. What was the price of the most expensive product sold?
3. What was the date of the highest paid purchase by a customer?
4. What was the most popular product before 2000, in terms of total number of purchases whose include that item?
5. What was the least popular product after and including 2000, in terms of total number of items purchased?
6. What was the most popular product among teens considering number of purchases including that item? (Hint: find the product with the smallest average customer age)
7. What was the most inflated product on the data? When calculating only consider the oldest and the newest purchase and not the purchases between. As an exercise try to solve this question by reading the stream only once.

4 Some Remarks

Although your code will not be graded, and you have freedom in your design, you must solve the questions using streams since the upcoming lab will be graded accordingly.

- Since streams are lazy, you should utilize that and avoid any unnecessary memory usage.

  You should not collect the whole stream into a container before operating on it.

- You can assume that there will be no purchase older than 1970 and newer than 2020.
- Make sure that your program outputs the results without any additional text.
- Use Java 8 or a newer version.