**Due Date: 14.04.2022, 23:55**

# CENG 112 - Data Structures

## Assignment 2: Online Packaged Food Store

This homework will cover the topics given below:

- Stacks
- Queues
- Lists
- File I/O
- Generics
- Arrays

You are expected to implement an “Online Packaged Food Store” application using Java.

Assume that there is an online store that sells packaged food, which are tuna, corn, instant noodles and pudding. Tuna and corn are sold in cans and the others are sold in packets. The store ships the products in cargo packets after getting orders.

The information to be written on food product packages is given in the following table. The properties are to be written in bold. Each product should also have an **expiration date** on its package.

| | | | |
|---|---|---|---|
| TUNA CAN | **net weight** | **drained weight** | **ingredients** |
| | 75 GR | 50 GR | tuna, sunflower oil, salt |
| CORN CAN | **net weight** | **drained weight** | **production country** |
| | 220 GR | 132 GR | turkey |
| PUDDING PACKET | **net weight** | **flavor** | |
| | 120 GR | banana | |
| INSTANT NOODLE PACKET | **net weight** | **simmer duration** | |
| | 120 GR | 3 min | |

**Your application is expected to perform the following operations:**

1. For each different category of foods, create **30 items** that have the above field values. The difference between each item in a given food category should be the expiration date. The expiration dates are required to be between **July 2022** and **December 2024** and should increase monthly. This means that the expiration date of the first tuna can is July 2022; the expiration date of the next tuna can is August 2022 and the expiration date of the 30th tuna can is December 2024. Similar approach should hold for corn cans, pudding packets and instant noodle packets as well. Therefore, there will be 120 packaged food products created in total.
2. For each different food category, create **a pile of packaged foods**. In the pile, packages having the **earliest** expiration dates are at the top of the pile. The package put onto the pile last will be first to be out.
3. Create order objects which hold *ID*, *order date* and *names of 3 different food categories*. Please create an array of Strings for the food categories. In order to do so, read the **orders.csv** file, which has the following format:

**order_id, order_date, food category_1, food category_2, food category_3**

4. Create **a waiting line of orders**. The order that is put first in the waiting line, will be the one to come out first. At the front of the waiting line, there will be the order having the **earliest** order date.
5. Create cargo packets by processing the orders. The *ID* and the *process date* of the cargo packet will be equal to the ID and the order date of the corresponding order, respectively. When you process an order, for each food category, find the associated pile and pop the food product at the top. Then place this product into a cargo packet. There should be a **list** to hold these packaged products in cargo packet objects.
6. Create **a list of cargo packets.** The ID of the packet shows the order of the packet in the list. For example, the cargo packet with ID 1, will be on the index 0 (zero) on the list.
7. Print on the console, the **contents** of
    - **four** different piles of food packages (before and after processing the orders)
    - the waiting line of orders
    - the list of cargo packets
8. Print the expiration dates of the packaged products of the cargo packet with ID 25.
9. Remove the cargo packet with ID 20 from the cargo packets list and print the contents of the list again.

Note: A visualization of the piles, waiting line and cargo list are given below as an image which may help to understand the concept of the system.

## Assignment Rules

- This is a 2-person group assignment. However, inter-group collaboration is not allowed!
- All assignments are subject to plagiarism detection and the suspected solutions (derived from or inspired by the solution of other groups) will be graded as zero.
- It is not allowed to use Java Collections Framework.
- Your code should be easy to read and test:
  -Keep your code clean. Avoid duplication and redundancy. Follow Java Naming Conventions. Use relative paths instead of absolute ones. 

## Submission Rules

All submissions must:

- be performed via **Microsoft Teams** by only one of the group members,
- be exported as an Eclipse Project and saved in ZIP format,
- include all necessary data files (if any TXT, CSV, JSON, etc.) in the right directory,
- follow a specific naming convention such that CENG112_HW2_*groupID*.

**Eclipse Project:** CENG112_HW2_*G5*
**Exported Archive File:** CENG112_HW2_*G5*.zip

Submissions that do not comply with the rules above are penalized.
Those who want to change groups can send their requests on Microsoft Teams.

| 31-Mar-22 | 30-Mar-22 | 20-Mar-22 | 19-Mar-22 | 16-Mar-22 | 14-Mar-22 | 10-Mar-22 | 9-Mar-22 | 8-Mar-22 | 5-Mar-22 | 28-Feb-22 | 27-Feb-22 | 26-Feb-22 | 22-Feb-22 | 21-Feb-22 | 16-Feb-22 | 14-Feb-22 | 10-Feb-22 | 2-Feb-22 | 1-Feb-22 | 31-Jan-22 | 30-Jan-22 | 28-Jan-22 | 27-Jan-22 | 26-Jan-22 | 25-Jan-22 | 22-Jan-22 | 21-Jan-22 | 14-Jan-22 | 9-Jan-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 16 | 30 | 27 | 25 | 24 | 19 | 18 | 21 | 29 | 28 | 22 | 9 | 3 | 2 | 23 | 26 | 20 | 5 | 14 | 13 | 12 | 11 | 17 | 6 | 8 | 4 | 1 | 7 | 15 |

| | |
|---|---|
| TUNA | Jul-22 |
| TUNA | Aug-22 |
| TUNA | Sep-22 |
| TUNA | Oct-22 |
| TUNA | Nov-22 |
| TUNA | Dec-22 |
| TUNA | Jan-23 |
| TUNA | Feb-23 |
| TUNA | Mar-23 |
| TUNA | Apr-23 |
| TUNA | May-23 |
| TUNA | Jun-23 |
| TUNA | Jul-23 |
| TUNA | Aug-23 |
| TUNA | Sep-23 |
| TUNA | Oct-23 |
| TUNA | Nov-23 |
| TUNA | Dec-23 |
| TUNA | Jan-24 |
| TUNA | Feb-24 |
| TUNA | Mar-24 |
| TUNA | Apr-24 |
| TUNA | May-24 |
| TUNA | Jun-24 |
| TUNA | Jul-24 |
| TUNA | Aug-24 |
| TUNA | Sep-24 |
| TUNA | Oct-24 |
| TUNA | Nov-24 |
| TUNA | Dec-24 |

| | |
|---|---|
| CORN | Jul-22 |
| CORN | Aug-22 |
| CORN | Sep-22 |
| CORN | Oct-22 |
| CORN | Nov-22 |
| CORN | Dec-22 |
| CORN | Jan-23 |
| CORN | Feb-23 |
| CORN | Mar-23 |
| CORN | Apr-23 |
| CORN | May-23 |
| CORN | Jun-23 |
| CORN | Jul-23 |
| CORN | Aug-23 |
| CORN | Sep-23 |
| CORN | Oct-23 |
| CORN | Nov-23 |
| CORN | Dec-23 |
| CORN | Jan-24 |
| CORN | Feb-24 |
| CORN | Mar-24 |
| CORN | Apr-24 |
| CORN | May-24 |
| CORN | Jun-24 |
| CORN | Jul-24 |
| CORN | Aug-24 |
| CORN | Sep-24 |
| CORN | Oct-24 |
| CORN | Nov-24 |
| CORN | Dec-24 |

| | |
|---|---|
| PUDDING | Jul-22 |
| PUDDING | Aug-22 |
| PUDDING | Sep-22 |
| PUDDING | Oct-22 |
| PUDDING | Nov-22 |
| PUDDING | Dec-22 |
| PUDDING | Jan-23 |
| PUDDING | Feb-23 |
| PUDDING | Mar-23 |
| PUDDING | Apr-23 |
| PUDDING | May-23 |
| PUDDING | Jun-23 |
| PUDDING | Jul-23 |
| PUDDING | Aug-23 |
| PUDDING | Sep-23 |
| PUDDING | Oct-23 |
| PUDDING | Nov-23 |
| PUDDING | Dec-23 |
| PUDDING | Jan-24 |
| PUDDING | Feb-24 |
| PUDDING | Mar-24 |
| PUDDING | Apr-24 |
| PUDDING | May-24 |
| PUDDING | Jun-24 |
| PUDDING | Jul-24 |
| PUDDING | Aug-24 |
| PUDDING | Sep-24 |
| PUDDING | Oct-24 |
| PUDDING | Nov-24 |
| PUDDING | Dec-24 |

| | |
|---|---|
| NOODLE | Jul-22 |
| NOODLE | Aug-22 |
| NOODLE | Sep-22 |
| NOODLE | Oct-22 |
| NOODLE | Nov-22 |
| NOODLE | Dec-22 |
| NOODLE | Jan-23 |
| NOODLE | Feb-23 |
| NOODLE | Mar-23 |
| NOODLE | Apr-23 |
| NOODLE | May-23 |
| NOODLE | Jun-23 |
| NOODLE | Jul-23 |
| NOODLE | Aug-23 |
| NOODLE | Sep-23 |
| NOODLE | Oct-23 |
| NOODLE | Nov-23 |
| NOODLE | Dec-23 |
| NOODLE | Jan-24 |
| NOODLE | Feb-24 |
| NOODLE | Mar-24 |
| NOODLE | Apr-24 |
| NOODLE | May-24 |
| NOODLE | Jun-24 |
| NOODLE | Jul-24 |
| NOODLE | Aug-24 |
| NOODLE | Sep-24 |
| NOODLE | Oct-24 |
| NOODLE | Nov-24 |
| NOODLE | Dec-24 |

| Cargo ID | Process Date | Packaged Food Products | | |
|---|---|---|---|---|
| 1 | 21-Jan-22 | tuna | corn | noodle |
| 2 | 21-Feb-22 | tuna | corn | pudding |
| 3 | 22-Feb-22 | tuna | corn | noodle |
| 4 | 22-Jan-22 | corn | pudding | noodle |
| 5 | 2-Feb-22 | tuna | corn | pudding |
| 6 | 26-Jan-22 | corn | pudding | noodle |
| 7 | 14-Jan-22 | corn | pudding | noodle |
| 8 | 25-Jan-22 | tuna | corn | pudding |
| 9 | 26-Feb-22 | corn | pudding | noodle |
| 10 | 31-Mar-22 | tuna | corn | pudding |
| 11 | 28-Jan-22 | tuna | corn | pudding |
| 12 | 30-Jan-22 | tuna | corn | noodle |
| 13 | 31-Jan-22 | corn | pudding | noodle |
| 14 | 1-Feb-22 | tuna | corn | noodle |
| 15 | 9-Jan-22 | tuna | corn | pudding |
| 16 | 30-Mar-22 | tuna | corn | noodle |
| 17 | 27-Jan-22 | tuna | corn | noodle |
| 18 | 9-Mar-22 | corn | pudding | noodle |
| 19 | 10-Mar-22 | tuna | corn | pudding |
| 20 | 10-Feb-22 | tuna | corn | noodle |
| 21 | 8-Mar-22 | tuna | corn | pudding |
| 22 | 27-Feb-22 | tuna | corn | pudding |
| 23 | 16-Feb-22 | tuna | corn | noodle |
| 24 | 14-Mar-22 | corn | pudding | noodle |
| 25 | 16-Mar-22 | tuna | corn | noodle |
| 26 | 14-Feb-22 | corn | pudding | noodle |
| 27 | 19-Mar-22 | tuna | corn | pudding |
| 28 | 28-Feb-22 | corn | pudding | noodle |
| 29 | 5-Mar-22 | tuna | corn | noodle |
| 30 | 20-Mar-22 | corn | pudding | noodle |