Due Date: 20.03.2022, 23:55

CENG 112 - Data Structures

Assignment 1: Spotify Playlist Generator

This homework will cover the topics given below:

- Strings
- Arrays
- File I/O
- ADTs
- Generics
- Bags

You are expected to implement a “Spotify Playlist Generator” using Java.

Assume that, there are 5 types of playlists in this generator, and the minimum duration of a playlist changes according to its type. The types include:

[1] Sleeping → 45 minutes
[2] Workout → 1 hours
[3] Dining → 1.5 hour
[4] Meditation → 2 hours
[5] Road Trip → 3 hours

The playlist duration is set according to the selected type, at the beginning. Then, the playlist is filled with tracks from 6 different genres:

[1] Acoustic
[2] Instrumental
[3] Rock
[4] Rap
[5] Jazz
[6] Pop

Until the playlist is ready, the generator repeatedly selects the most popular track from the most suitable genre. Each category keeps the IDs of suitable genres in a list that is sorted by suitability:

[1] Sleeping → [2, 1, 5]
[2] Workout → [4, 3, 6]
[3] Dining → [5, 1, 2]
[4] Meditation → [2, 1, 5]
[5] Road Trip → [3, 6, 1]

For example, the most suitable genre is 4 (Rap) for a Workout playlist. Then, 3 (Rock) and 6 (Pop). Each track can only be added to a playlist once. Therefore, the tracks added to the playlist should be removed from the genre collection.

The tracks are listed in the "*tracks.txt*" file where each line is formed as:

genre_id, track_id, track_duration, track_popularity

Track duration is given in seconds, and track popularity refers to the number of plays.

Your application is expected to perform the following operations (Read Carefully):

1. **Create collections of genres:** Read all tracks from the "*tracks.txt*" file and keep them in separate collections of items by their genre. Then, print the number of tracks and total duration for each genre. You should create an array of genres and make the size of each genre dynamic. That is, a new track can be added to a genre in the future.

2. **Create the playlist:** Get the type as **1, 2, 3, 4, or 5** from the user and create an empty collection of tracks with the corresponding minimum duration.

3. **Fill the playlist:** Transfer (add and remove) tracks from the genres to the playlist. Genre selection must be based on suitability and track selection must be based on popularity. For equally popular tracks, you can make a random selection. You cannot stay below the minimum playlist duration. However, it is not a problem if you exceed the minimum duration by a few minutes. That is, you should stop adding just after exceeding the minimum duration. You should also stop if all the suitable genres are empty, although it is not likely to happen.

4. **Display results:** When the playlist is ready, print the number of tracks and total duration for each genre and the playlist, plus the average popularity of the playlist (the mean number of plays for the tracks in the playlist). Since some tracks are transferred to the playlist, stats of some genres should be different from step 1.

5. **Repeat steps 1, 2, 3, and 4** until the user inputs **0**.

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_HW1_*groupID*.

  Eclipse Project: CENG112_HW1_*G5*
  Exported Archive File: CENG112_HW1_*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.