

Chapter 08: Persistence

Exercise 08 (15 points)

Objectives:

1. Read and write files
2. Parse strings and store the data into objects
3. Implementing and invoking object serialization
4. Store object data into files

Problem Domain:

Music Player Storage

Create a Java program that mimics a music player. A music player has a name, and stores a collection of albums and playlists. An album contains a list of songs, its name, artist, release year, and its total duration. A song contains its track number, title, artist, and duration. A playlist contains a name and a list of songs.

Users can search for songs within the music player. They can choose to display all the songs, or display all songs from a specific album, or a specific artist.

Users can also create a playlist. When a playlist is created, the user will be asked to give the playlist a name. The user can then add or remove songs to/from the playlist.

Users can load plaintext files into the music player to add albums to the player. The player can save all the albums in a single file and all the playlists in a separate file, which will be read when the program is started.

Tasks:

1. Create class definitions

Refer to the problem domain for the classes needed for the problem. There are the **MusicPlayer**, **Album**, **Song**, and **Playlist** classes, and you may add extra classes for utility features such as reading and writing.

2. Create readers for album data

There will be text files available with the starter code for the exercise. These files will be used to populate and add albums to the music player. Utilize file reading techniques and string parsing to convert the strings of text into their appropriate objects.

There will be a text file for each album, and it will contain all the data for that album, including all the songs within the album.

3. Create features for searching through the music player, and for creating playlists.

Refer to the problem domain for features that have to be implemented.

4. Writing and reading the albums and playlists of the music player

The user can opt to save the albums and playlists of the music player to a file. Utilize serialization techniques to store all the albums and playlists of the music player, then utilize deserialization techniques to read them from the files.

Take note that the music player will be maintaining two files for storage, one for all of its albums, and one for all of its playlists. All of the text files will be stored in the storage package.

5. Implement the necessary principles of encapsulation, inheritance, and polymorphism in your classes.

You may refer to the sample run, problem domain, and sample run1 and run2 as guides for lines of code that can be incorporated into this program.

To test the correctness of your code, two files named Run1 and Run2 will be provided. Provided that your application is correctly designed, running these two files should yield a similar result as to your sample run.

Criteria	Weight	Score
Documentation: Comments or docstrings are present, clear, and effectively explain the code.	~3 pts	
Variable Naming and Encapsulation: Variable names are clear, descriptive, follow naming convention, and used consistently throughout the code. These variables also follow proper encapsulation as well	~2 pts	
Class Design and Proper Storage: Good class design such that related data and behavior are grouped into objects; readers and writers are properly designed to ensure proper use of stored data.	~6 pts	
Correctness of the Program: Code runs with no errors, does not crash, and produces the intended result. Object data is read and written correctly, no loss of information happens during the reading and writing of data.	~4 pts	
Total		0/15

Tasks:

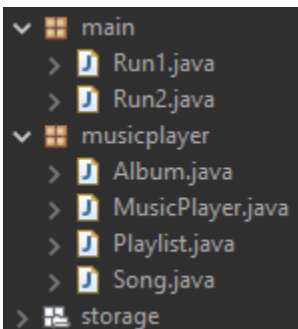
- Create the needed classes as outlined in the problem domain. You may also use the starter code (ask lab instructor)

- Setup the classes' attributes and methods
- Create readers for the provided text files
- Create writers and readers for the music player's data.
- Run the program with both the Run1 and Run2 java files (Run1 first)
- Export the entire project as <Surname>08.zip, with the entire source code. (including the generated files to store the music player's
- Attach a pdf or image file containing the snapshot of the results after running your application (make sure to include all actions). File naming convention is <Surname>08_attachments.pdf (or the image file extension such as .jpg)
- Ensure your code is properly formatted and follows Java naming conventions.

Project setup:

- Java Project Name: Surname08
- Package Name: main, musicplayer, and storage
- Class Name: Run1, Run2, and other identified classes

Sample File Hierarchy:



Sample Run 1:

```

~||=====|~
All songs currently in player barfoo:
RePrologue           - Sakuzyo           | 3:23
First Dance          - Sakuzyo           | 3:13
Sabbat                - Sakuzyo           | 3:11
ShadyShady           - Sakuzyo           | 4:07
Frontier             - Sakuzyo           | 3:15
Harpyia              - Sakuzyo           | 2:27
Stoicism             - Sakuzyo           | 3:24
Transportation        - Sakuzyo           | 3:33
Fafnir               - Sakuzyo           | 3:52
Nein                 - Sakuzyo           | 3:11
Last Dance           - Sakuzyo           | 4:22
Endrole              - Sakuzyo           | 3:46
Metaphor             - Ichika Nito & Feryquitous | 3:50
VOID                 - Ichika Nito       | 2:12
Silver Water         - Ichika Nito & Pierre Danel | 2:44
Freak                - Ichika Nito       | 2:32
  
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Take Me	- Casiopea	4:49
Asayake	- Casiopea	4:58
Midnight Rendezvous	- Casiopea	4:57
Time Limit	- Casiopea	2:37
Domino Line	- Casiopea	7:20
Tears Of The Star	- Casiopea	4:28
Swear	- Casiopea	6:47
Feather	- Nujabes & Cise Starr & Akin	2:55
Ordinary Joe	- Nujabes & Terry Callier	5:07
Reflection Eternal	- Nujabes	4:17
Luv (sic.) Pt3	- Nujabes & Shing02	5:36
Music Is Mine	- Nujabes	4:20
Eclipse	- Nujabes & Substantial	3:34
The Sign	- Nujabes & Pase Rock	4:49
Thank You	- Nujabes & Apani B	4:09
World's End Rhapsody	- Nujabes	5:41
Modal Soul	- Nujabes & Uyama Hiroto	4:41
Flowers	- Nujabes	3:59
Sea Of Cloud	- Nujabes	3:01
Light On The Land	- Nujabes	3:55
Horizon	- Nujabes	7:20
Ice	- Ichika Nito	2:30
Homesick	- Ichika Nito	2:24
Ethereal Feel	- Ichika Nito	1:22
Orb	- Ichika Nito	3:24

~|=====|~
~|=====|~

All albums currently in player barfoo:

- 1 Last Dance
- 2 Metaphor
- 3 Mint Jams
- 4 Modal Soul
- 5 N I T O

~|=====|~
~|=====|~

Last Dance - Sakuzyo (2015)

1	RePrologue	- Sakuzyo	3:23
2	First Dance	- Sakuzyo	3:13
3	Sabbat	- Sakuzyo	3:11
4	ShadyShady	- Sakuzyo	4:07
5	Frontier	- Sakuzyo	3:15
6	Harpyia	- Sakuzyo	2:27
7	Stoicism	- Sakuzyo	3:24
8	Transportation	- Sakuzyo	3:33
9	Fafnir	- Sakuzyo	3:52
10	Nein	- Sakuzyo	3:11
11	Last Dance	- Sakuzyo	4:22
12	Endrole	- Sakuzyo	3:46

~|=====|~

Album Glitched Universe does not exist.

~|=====|~
~|=====|~

Songs by Ichika Nito :

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Metaphor          - Ichika Nito & Feryquitous    | 3:50
VOID              - Ichika Nito                  | 2:12
Silver Water      - Ichika Nito & Pierre Danel    | 2:44
Freak             - Ichika Nito                  | 2:32
Ice               - Ichika Nito                  | 2:30
Homesick          - Ichika Nito                  | 2:24
Ethereal Feel     - Ichika Nito                  | 1:22
Orb               - Ichika Nito                  | 3:24
~||=====||~
Song Reprologue does not exist in Last Dance.
~||=====||~
All playlists currently in player barfoo:
1 Test list
~||=====||~
Playlist name: Test list
Tracks:
1 | Orb          - Ichika Nito                  | 3:24
2 | Metaphor     - Ichika Nito & Feryquitous    | 3:50
3 | Ethereal Feel - Ichika Nito                  | 1:22
4 | RePrologue   - Sakuzyo                  | 3:23
Saving.....
Saving complete.

```

Sample Run 2:

```

Loading.....
Loading complete.
~||=====|~
All songs currently in player barfoo:
RePrologue           - Sakuzyo           | 3:23
First Dance           - Sakuzyo           | 3:13
Sabbat                - Sakuzyo           | 3:11
ShadyShady            - Sakuzyo           | 4:07
Frontier              - Sakuzyo           | 3:15
Harpyia               - Sakuzyo           | 2:27
Stoicism              - Sakuzyo           | 3:24
Transportation        - Sakuzyo           | 3:33
Fafnir                - Sakuzyo           | 3:52
Nein                  - Sakuzyo           | 3:11
Last Dance            - Sakuzyo           | 4:22
Endrole               - Sakuzyo           | 3:46
Metaphor              - Ichika Nito & Feryquitous | 3:50
VOID                  - Ichika Nito       | 2:12
Silver Water          - Ichika Nito & Pierre Danel | 2:44
Freak                 - Ichika Nito       | 2:32
Take Me               - Casiopea          | 4:49
Asayake               - Casiopea          | 4:58
Midnight Rendezvous   - Casiopea          | 4:57
Time Limit            - Casiopea          | 2:37
Domino Line           - Casiopea          | 7:20
Tears Of The Star     - Casiopea          | 4:28
Swear                 - Casiopea          | 6:47
Feather               - Nujabes & Cise Starr & Akin | 2:55
Ordinary Joe          - Nujabes & Terry Callier   | 5:07
Reflection Eternal    - Nujabes           | 4:17
Luv (sic.) Pt3        - Nujabes & Shing02        | 5:36
Music Is Mine         - Nujabes           | 4:20
Eclipse               - Nujabes & Substantial    | 3:34
The Sign              - Nujabes & Pase Rock      | 4:49
Thank You             - Nujabes & Apani B        | 4:09
World's End Rhapsody  - Nujabes           | 5:41
Modal Soul            - Nujabes & Uyama Hiroto    | 4:41
Flowers               - Nujabes           | 3:59
Sea Of Cloud          - Nujabes           | 3:01
Light On The Land     - Nujabes           | 3:55
Horizon               - Nujabes           | 7:20
Ice                   - Ichika Nito       | 2:30
Homesick              - Ichika Nito       | 2:24
Ethereal Feel         - Ichika Nito       | 1:22
Orb                   - Ichika Nito       | 3:24
~||=====|~
~||=====|~
All albums currently in player barfoo:
1 Last Dance
2 Metaphor
3 Mint Jams
4 Modal Soul
5 N I T O

```

```
~|=====|~  
~|=====|~  
All playlists currently in player barfoo:  
1 Test list  
~|=====|~
```