Islamic University of Gaza
Faculty of Engineering
Department of Computer Engineering

Library Application

Overview

Library management system is a simple application to be built using the Balanced Binary Search Tree (TreeMap) in Java. The program will provide some basic book management tasks like, insertion, deletion, sorting regarding specific book information, and searching for books matching specific query. Additionally, the program should have a list of people, each of whom may be interested in one or more books, so there's a mapping between the two entities in this simple program: User & Book.

This project offers you the opportunity to gain valuable hands-on experience. You'll try to ,efficiently, practice all the basic operations and algorithms we have discussed along the term.

Java Classes

1. TreeMap

A Red-Black (balanced BST) tree based NavigableMap implementation. The map is sorted according to the natural ordering of its keys, or by a Comparator provided at map creation time, depending on which constructor is used. This will insure log(n) time complexity for most of the operations.

You can see this class and how to use it here

2. HashMap

This data structure to be used for mapping each user to his list of books. also each user with its personal data (i.e. its Object).

You can see this class and how to use it here

3. Book

This class contains all the required information for a book, you can follow this ADT.

Book	
book_id	int
title	String
author	String
quantity	int
isbn	long
publisher	String
total_pages	int
rating	float
published_date	String

4. User

Following ADT for the user class, later the description of its usage.

User	
id	int
email	String
password	String
first_name	String
last_name	String
age	int

Requirements

- The application provides user **signUp/login** functionality using simple GUI and the suitable data structure: HashMap.
- The application provides a dashboard that contains *all* the books with their information (those have quantity > 0).
- The application provides the following operations on the books: **insert, get, delete, search**. You have to use a data structure that does these operations efficiently, like TreeMap.
- The application provides a way to buy a book by the user that is already logged in.
- The application provides a way to display the books that a user already bought.
- The application provides a way to **logout** and return to the login page, you should keep all the work saved at least in RAM.

Additional (Optional)

Try to use files for permanent data storage **BUT don't use any kind of database.**

Policy & Deadline

- This is a pair project (team of 2 students), you should collaborate and divide the responsibilities very well, but each of you must be aware of the functionality and each line of the code written by the other one, so you have to do knowledge sharing.
- The deadline will be due 28/12/2022 at 11:59 PM, try to submit it *before.* (any late submissions **will not be evaluated**).
- You will submit a .rar file that contains the project and a README file containing information about the 2 students (ID, name) and specify the responsibilities of each one (timeline is optional).
- Just one student should submit the project and we can get the other one from the README file.

Assessment (Grading Policy)

- 3 marks on the GUI.
- 7 marks on the functionality of the project (the requirements).
- 5 marks on the discussion.

***Note:** The team will share the first 2 parts of grading, but in the discussion each one will be evaluated differently, and may affect his score from the other 2 parts.