List No 11

Task: Library Management System using Java Collections

Description: Create a simple application for managing a book library using Java collections. The application should allow adding new books, removing books, browsing the list of available books, and searching for books based on different criteria.

Requirements:

1. Create a class called Book that will represent a book. The class should have fields such as title, author, publication year, etc.
2. Create a class called Library to manage the collection of books. Use an appropriate collection (e.g., ArrayList or HashMap) to store books.
3. Implement methods in the Library class to:
    - Add a new book to the library.
    - Remove a book from the library based on the title or other criteria.
    - Display a list of all books in the library.
    - Search for books based on various criteria (e.g., author, publication year).
4. Create a simple console user interface that allows interaction with the application. Users should be able to add, remove, browse, and search for books.
5. Test the application by adding a few books, removing one of them, browsing the list, and conducting some searches.
6. Ensure that collections are correctly utilized for storing and manipulating data in the application.

During implementation, pay attention to handling different scenarios, such as attempting to remove a non-existent book, adding a duplicate, etc.

Subtask: Saving and Loading Data from a File

Requirements:

1. Add methods to the Library class for saving and loading data from a text file.
    - saveToFile(String fileName): The method should save information about all books in the library to a file with the specified fileName. Each line in the file should represent one book, and the data should be separated by appropriate markers or spaces.
    - loadFromFile(String fileName): The method should read data about books from the file with the specified fileName and add them to the existing collection in the library.
2. Test the functionality of saving and loading data.
    - Add several books to the library.

- Call the saveToFile("library_data.txt") method to save the data to a file.
- Create a new Library object and call the loadFromFile("library_data.txt") method to read data from the file.
- Check whether the loaded data matches the data in the original library.

3. Handle exceptions related to file operations, such as IOException, to ensure the program's safe operation even in the case of file-related issues.
4. Verify whether the library state is correct after saving and loading data from a file, and whether the collections are updated as expected.