Project Title: Limited Library Management System (LLMS)
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Course Name: DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING
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1. Project Description

The Limited Library Management System (LLMS) is a small program that works like a simple library system for a school. There are two types of users: **Librarians** and **Students**.

- Librarians can add books, lend books to students, and take them back.
- Students can look up books and borrow or return them.

The program uses object-oriented programming , meaning it is built with reusable and organized classes. We also save the data (like the book list) into text files using Text I/O.

2. Program Features & Screenshots

Object-Oriented Design

- The project uses a User class that is extended by Student and Librarian.
- Each user has their own role and actions.
- The interact() method is different for each user (this is called polymorphism).

Main Features

Librarians can:

- Add books to the catalog
- Lend books to students
- Accept returned books

  Students can:

  - Borrow and return books
  - Search for books by title or author
- The Library class keeps track of all books and borrowed books.

Saving Data

- All books are saved to a file (catalog.txt) using FileWriter.
- Borrowed books are saved in issued.txt with the book number, student ID, and date.

Searching

- The search feature uses modern Java code (stream().filter()) to find books by keyword.

Unit Testing

- Every main method is tested using assertEquals.
- We check that things work correctly, like:
  - Adding a book
  - Issuing a book
  - Returning a book
  - Loading and saving from a file

Screenshots

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===== LIMITED LIBRARY MANAGEMENT SYSTEM DEMO =====

Books added to the catalog:
1 - Harry Potter by Bob the writer (2008)
2 - One Piece by Amine Achik (2017)

Searching for books with keyword 'One':
2 - One Piece by Amine Achik (2017)

Issuing 'One Piece' to Alice: Success
Returning 'One Piece' from Alice: Success

Catalog saved to catalog.txt
Issued books saved to issued.txt
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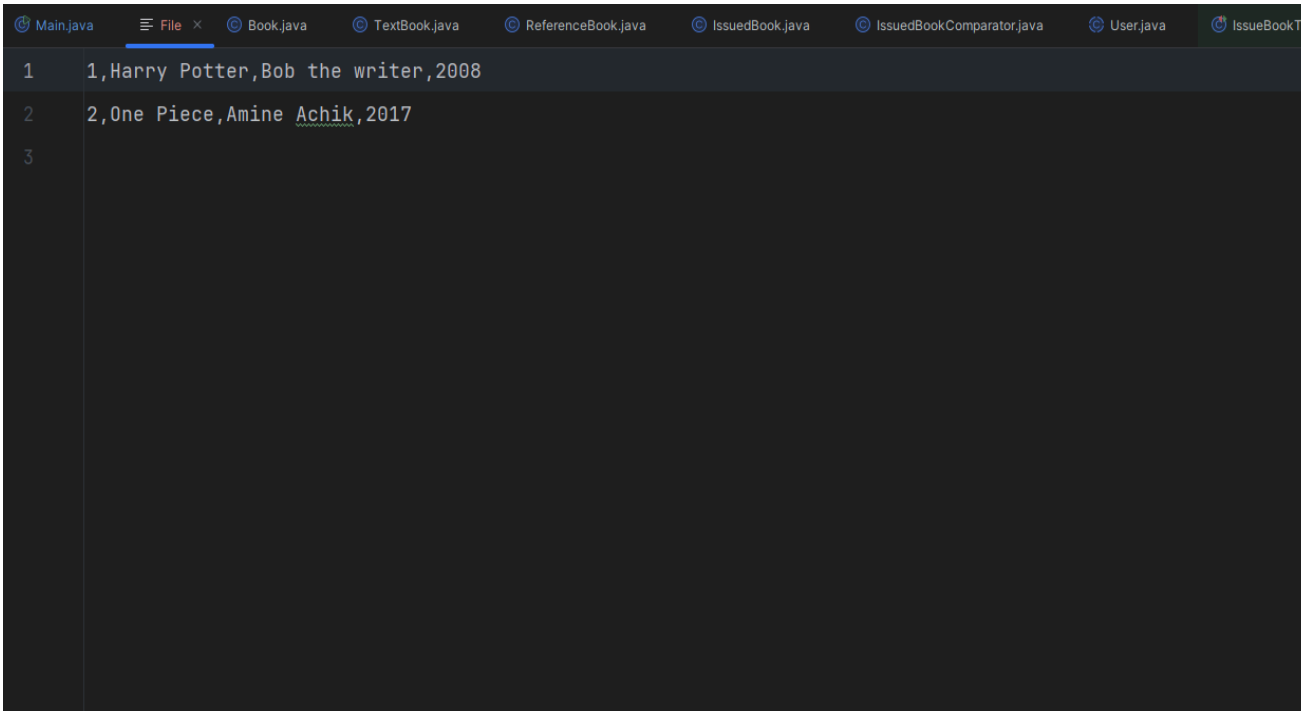

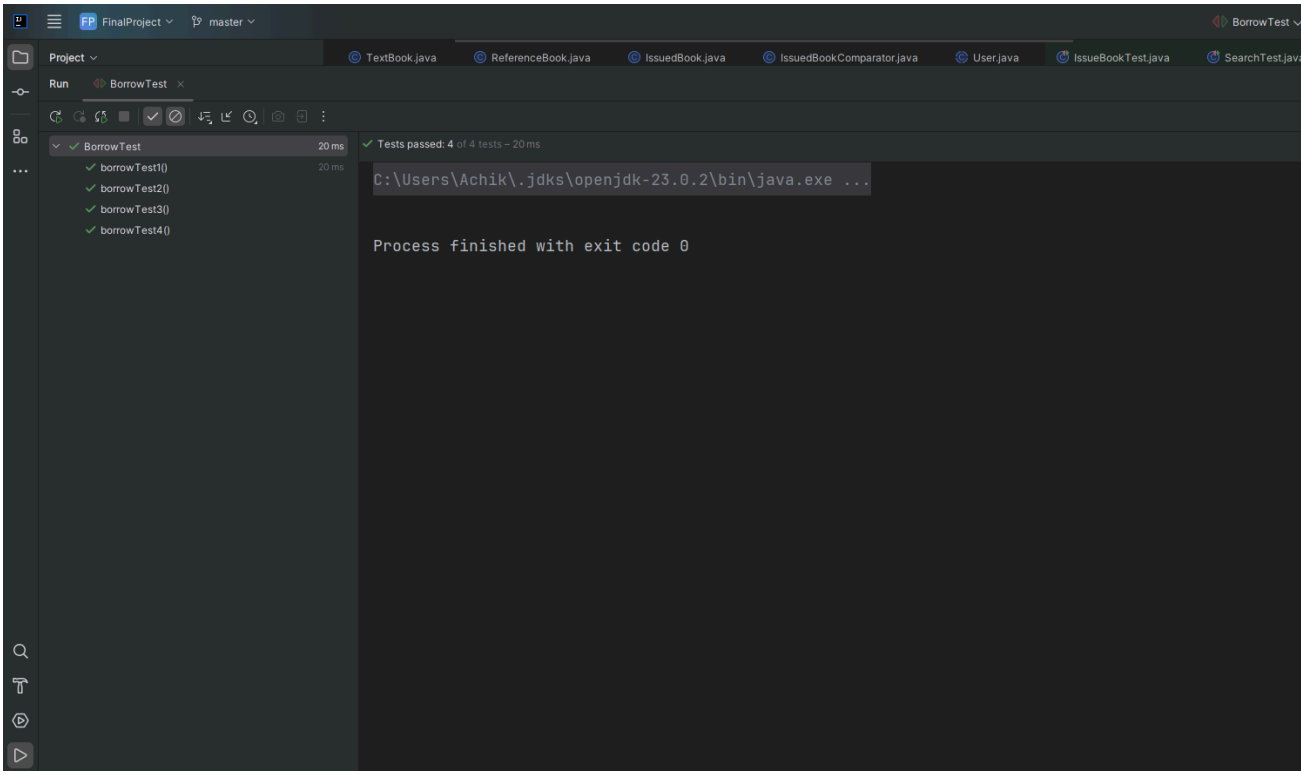

3. Challenges

- Making sure the files were in the right place during testing
- Writing all the unit tests using only assertEquals
- Avoiding errors like null values in file paths
- Keeping all the class names and methods organized
- Managing time between building the code and testing it properly

4. What I Learned

- How to build a project using object-oriented programming
- How to write and read text files in Java
- How to test Java code using JUnit and assertEquals
- How to use Streams in Java to search through lists

- How to organize classes based on a UML diagram
- How to follow project instructions and write clean, readable code