
Detailed Report:

IITJ Library Management System

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1. Introduction:

The IITJ Library Management System is a console-based application designed to manage books, users, and borrowing operations for a library. It allows users to perform various tasks such as adding books, registering users, borrowing and returning books, searching for books by author, sorting books and users, and displaying lists of books and users.

2. Project Structure:

- Main Functionality: The main() function serves as the entry point for the program. It handles user authentication, memory allocation, and menu-based interaction.

- Data Structures: Three main data structures are defined using structures:

  - Book: Represents information about a book, including its ID, title, author, and availability.

  - User: Represents information about a library user, including their ID, name, borrowed books, and borrowing limits.

  - NewBook: Represents information about newly added books.

- Global Variables: Global variables are used to store information about books, users, and newly added books, along with counts of the total number of each.

- Functions: Various functions are defined to perform specific tasks such as adding books, registering users, borrowing and returning books, displaying lists, sorting, and user authentication.

3. Functionality:

- User Authentication: Users can register with a username and password or log in if already registered.

- Book Management: Users can add new books to the library, view available books, and search for books by author.

- User Management: Administrators can add new users to the system, remove existing users, and search for users by name.

- Book Borrowing: Users can borrow books from the library, with restrictions based on the maximum number of books a user can borrow.

- Book Returning: Users can return borrowed books to the library.

- Sorting: The system allows sorting books by title and users by name for better organization.

- Display: Users can view lists of books, users, and newly added books.

4. Potential Improvements:

- Error Handling: Implement more robust error handling mechanisms, especially for file I/O operations and memory allocation.

- User Interface: Enhance the user interface with more descriptive prompts and clearer menu options.

- Input Validation: Implement input validation to prevent unexpected behavior caused by invalid user input.

- Database Integration: Replace file-based storage with a database for better data management and scalability.

- Logging: Implement logging functionality to track user actions and system events for auditing purposes.

- User Roles: Introduce different user roles (e.g., administrator, librarian, regular user) with varying levels of access and privileges.

- Security: Enhance user authentication mechanisms, such as using hashed passwords and secure login protocols.

5. working of code :

The program starts by prompting the user to register or log in.

-If the user chooses to register, they enter a username and password, which are stored in a file named users.txt.

-If the user chooses to log in, they enter their username and password. The program checks if the credentials match those in the users.txt file.

-After successful authentication, the program prompts the user to input the maximum number of books, users, and new books that the system can handle.

-Memory is allocated for arrays to store books, users, and new books based on the user's input.

Example users are added to the system.

-The main menu is displayed, allowing the user to choose from various operations like adding a book, adding a user, borrowing a book, etc.

-The user selects an option, and the corresponding function is executed.

-After each operation, the program asks if the user wants to perform another operation or exit.

-If the user chooses to exit, the program cleans up allocated memory and terminates.

>>>This process continues until the user decides to exit the programme

6. Conclusion:

The IITJ Library Management System provides a basic yet functional solution for managing library operations. With further refinement and enhancements, it has the potential to become a robust and user-friendly tool for libraries to streamline their processes and improve user experience.

>>>contribution:

Vittal:-

Quicksort books

Sortbooks by title

Quicksort users

Sortusers by name

Cleanup

Ajay:-

Display books

Display users

Display newbooks

Find books by author

Find user by name

Shivakumar:-

Add book

Add user

Remove user

Borrow book

Return book

Piyush:-

Authentic user

Register user

Repeat function

Display menu