

Library Management System using Object-Oriented Programming (OOP)

1 System Overview

- Operates as a **Command-Line Interface (CLI)**, requiring users to input commands as per the displayed prompts.
- **Data files are only updated at the end of a session** (i.e., when the program terminates).
- **Different User Roles:**
 - **Librarian** – Has administrative access but no personal account (only an access key).
 - **Faculty** – Must have an account (ID and password) to use borrowing facilities.
 - **Students** – Some are registered, while others may create an account during the session.
 - **Visitors** – Can **read books** but must register to **borrow books**.

2 User Registration & Authentication

- **Students** must have a **5-digit roll number**.
- **Faculty** must have a **3-digit roll number**.
- **Librarians** do **not** have an ID/password but instead use an **access key**.
- **Students can register an account**, while faculty members are **registered by default**.

3 Borrowing & Returning Rules

3.1 General Borrowing Rules

- **Students & faculty can borrow books** based on their role's borrowing limit.
- If a user has **unpaid fines**, they **cannot borrow** new books until the fine is cleared.
- **Returned books become available immediately** for borrowing in the same session.

3.2 Borrowing Limits & Overdue Policies

User Role	Borrowing Limit	Borrowing Period	Fine for Overdue	Borrowing Restrictions
Student	3 books	15 days	10 per day	Cannot borrow more than 3 books
Faculty	5 books	30 days	No fine	Cannot borrow if (a) 5 books already borrowed

3.3 Returning & Fine Payment

- Users must return overdue books before borrowing new ones.
- Fines must be paid at the time of book return (if applicable).
- Users can **view total outstanding fines** and mark them as **paid** through a dedicated option.
- Once a fine is cleared, borrowing restrictions are lifted.

4 Librarian-Specific Rules

4.1 Managing Users & Books

- A librarian cannot remove a book until it is **returned**.
- A librarian can reserve a book which will be not **available** then further.
- A librarian cannot remove a user until all borrowed books are returned.
- If adding a **faculty member**, the librarian must **create an account** for them.
- If adding a **new librarian**, the librarian must **create an access key** for them.

4.2 Adding Books to the Library

- Before adding a book, the librarian must **search the system** to ensure:
 - **ISBN is unique**
 - **Title is unique**
- If adding a book manually to the **data file**, ensure **the full title is written correctly**.

5 System Constraints & Rules

- **Data Persistence:**
 - The system **saves data using files** so that user records, borrowed books, and fines persist between sessions.
 - **Data files will only be updated after the session ends.**
- **User Input Constraints:**
 - Roll numbers must be within the range of a signed integer.
 - Passwords should not contain whitespace.
 - Books and publications should not contain commas (‘,’)—replace them with hyphens (‘-’).
- Books must be returned before removing a user or a book from the system.
- A librarian cannot override system constraints (e.g., deleting overdue books).

6 File Handling & Data Updates

- Check data files (`students.csv`, `faculties.csv`, `books.csv`) for reference on inputs.
- Ensure the session completes to update files properly.

7 Additional Features

- Borrowing history is maintained for users.
- Users can borrow books that were returned and vice-versa in the same session.
- Error handling is only applied to invalid terminal input.