



In the name of God

Basics of Programming – Final Project (1403-1)

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Library Management System

Develop a console-based Library Management System that allows users (librarians) to manage books and members. This project introduces students to real-world problem-solving using basic programming concepts, including conditionals, loops, functions, classes, and file handling .

The program should simulate a library's basic operations. It should allow the librarian to :

- Add new books to the library .
- View all available books .
- Register new members .
- Issue a book to a member .
- Return a book .
- Save all data to a file and reload it on program restart .

Core Features:

1. Add Books

- **Input:** Book title, author, and unique book ID .
- Store the book data in a class .
- Ensure no duplicate book IDs are allowed .

2. View Books

- Display a list of all books, including their title, author, ID, and status (Available/Issued) .

3. Register Members

- **Input:** Member name, unique member ID .
- Store member data in a class .
- Ensure no duplicate member IDs .

4. Issue Book

- **Input:** Member ID and Book ID .

5. Validate :

- Member must exist in the system .
- Book must be available for issuance .
- Update the book status to "Issued" and associate it with the member .

6. Return Book

- **Input:** Book ID .
- The book must be issued to a member .
- Update the book status to "Available" and remove the association with the member

7. Save and Load Data

- Save all book and member data to a file when the program exits .
- Load the data back into memory when the program starts .

8. Optional Enhancements:

- Allow members to view their issued books .
- Implement a search feature to find books by title or author .
- Add a feature to track overdue books based on an issue date .
- Create a simple admin authentication system (username and password) .
- Add support for multiple file formats (e.g., JSON or CSV) .

Program Structure

Main Menu

1. Add Book
2. View Books
3. Register Member
4. Issue Book
5. Return Book
6. Exit

Necessary Functions should be used in the project

add_book(): Add book details to the collection.

view_books(): Display all books with their status.

register_member(): Add member details to the collection .

issue_book(): Issue a book to a member .

return_book(): Return a book .

save_data(): Write data to a file .

load_data(): Read data from a file .

Grading Policy

1. Core Functionality (60 points) :

- a. Add books: 10 points .
- b. View books: 10 points .
- c. Register members: 10 points .
- d. Issue books: 15 points .
- e. Return books: 15 points .

2. Data Persistence (20 points) :

- a. Save and load functionality works correctly .

3. Code Quality and Structure (10 points) :

- a. Clear function usage .
- b. Readable and maintainable code .

4. Error Handling (5 points) :

- a. Handles invalid inputs gracefully .

5. Optional Enhancements (5 points) :

- a. Additional features implemented effectively .

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Sample Execution of the Program

Menu Example :

Welcome to the Library Management System !

- 1 .Add Book
- 2 .View Books
- 3 .Register Member
- 4 .Issue Book
- 5 .Return Book
- 6 .Exit Enter your choice: 1

Adding a Book :

Enter Book Title: Introduction to Programming

Enter Author Name: Amir Hoseinpour

Enter Book ID: B101

Book added successfully !

Viewing Books :

Book ID	Title	Author	Status
101----	Introduction to Programming---	Amir Hoseinpour---	Available

Register Member:

Enter Member Name: Amir Dehkordi

Enter Member ID: A001 Member registered successfully !

If the member ID already exists :

Enter Member Name: Amir Dehkordi

Enter Member ID: A001

Error: Member ID already exists. Please try again.

4. Issue Book

Enter Member ID: A001

Enter Book ID: B101

Book issued successfully to Amir Dehkordi!

If the book is already issued:

Enter Member ID: A002

Enter Book ID: B101

Error: The book is already issued to another member.

If the member ID is invalid:

Enter Member ID: A999

Enter Book ID: B101

Error: Member ID not found. Please try again.

5. Return Book

Enter Book ID: B101

Book returned
successfully!

If the book is not issued:

Enter Book ID: B102

Error: This book was not issued.