

Library Management System

Detailed Laboratory Report

Course: Programming Fundamentals (C Language)

Project Type: Console Based Application

Project Title: Library Management System

Institute: Iqra University

Date of Submission: 16- jan-2026

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Abstract:

This report presents a detailed study and implementation of a Library Management System developed using the C programming language. The system is designed as a console-based, menu-driven application that allows users to view, search, and purchase books, while administrators can manage book records. The project focuses on understanding fundamental programming concepts such as structures, arrays, functions, conditional statements, and loops.

1. Introduction

Efficient data management is crucial in today's world. Libraries, with their large number of books, can be hard to manage manually. A Library Management System organizes book records and handles basic operations in a simple, structured way. This project is implemented in C for academic use, focusing on programming logic and problem-solving without databases or graphical interfaces.

2. Problem Statement

Managing books manually can lead to issues such as incorrect records, difficulty in searching books, and poor inventory control. There is a need for a simple system that allows users to view and purchase books easily, while administrators can manage book details efficiently.

3. Objectives of the Project

- To design a simple Library Management System using C.
- To understand and implement structures for storing complex data.
- To apply arrays for managing multiple records.
- To use functions for modular and reusable code.
- To develop a menu-driven program for user interaction.
- To simulate real-world library operations in a console environment.

4. Scope of the System

The scope of this project is limited to a small-scale library system. It supports two types of users: Visitor and Admin. The system allows visitors to interact with available books and make purchases, while the admin manages book inventory. Data is stored temporarily during program execution and is lost once the program ends.

5. Tools and Technologies Used

The following tools and technologies were used in this project:

- Programming Language: C
- Compiler: GCC
- Operating System: Windows
- IDE: Dev-C++

The program uses standard C libraries such as `stdio.h` and `string.h`.

6. System Overview

The Library Management System is a menu-driven application that starts with a main menu. Based on user selection, the program directs the user to either the Visitor Panel or the Admin Panel. Each panel provides specific functionalities related to the user's role.

7. Data Structures Used

The primary data structure used in this system is a structure named Book. This structure stores all essential information related to a book.

Structure Book contains the following members:

- id: Unique identification number for each book
- title: Name of the book
- author: Name of the author
- price: Cost of the book
- quantity: Available stock

An array of Book structures is used to store multiple book records. Additionally, an integer array is used to manage the shopping cart.

8. Functional Description

The system is divided into different functions to improve readability and modularity. Each function performs a specific task such as viewing books, searching books, adding books to cart, and managing admin operations.

9. Visitor Panel

The Visitor Panel allows general users to interact with the library. The following operations are available:

1. View Books: Displays all available books along with their details.
2. Search Book: Allows users to search books by title or author.
3. Add to Cart: Adds a selected book to the cart and updates stock.
4. Remove from Cart: Removes a book from the cart and restores stock.
5. View Cart: Shows all selected books and calculates total price.
6. Confirm Purchase: Finalizes the purchase and clears the cart.
7. Back: Takes back to main menu.

10. Admin Panel

The Admin Panel is protected by a username and password to prevent unauthorized access. After successful login, the admin can perform the following operations:

1. Add Book: Insert a new book record into the system.
2. Delete Book: Remove an existing book using its ID.
3. View Books: Display all available books.
4. Logout: Logs out from the user panel.

11. Advantages

- Simple and easy to understand.
- Beginner-friendly implementation.
- Modular and structured code.
- Demonstrates real-life application of programming concepts.

12. Limitations

- Data is not saved permanently.
- No database connectivity.
- No graphical user interface.
- Limited security.

13. Future Enhancements

The system can be enhanced by adding database support, graphical user interface, user authentication, file handling for permanent storage, and advanced search features.

14. Conclusion

This detailed laboratory report explains the design and implementation of a Library Management System using the C programming language. The project fulfills its objectives and provides a strong foundation for understanding core programming concepts. It is well-suited for academic laboratory submission.