📄 CASE STUDY (Book Management System in C)

1. Project Title

Book Management System using C Programming

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2. Introduction

The Book Management System is a menu-driven console application developed in C programming.
It is designed to manage book records efficiently in a library.
This system allows the user to store book details such as Book ID, Name, Author, Category, Price, and Rating.

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3. Problem Statement

In a library, managing book records manually is time-consuming and error-prone.
A system is required that can store, search, update, and delete book details quickly.
Also, the system must ensure that duplicate book IDs are not allowed.

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4. Objectives

- To create a simple library management system using C
- To allow adding, deleting, updating, and searching book records
- To prevent duplicate Book IDs
- To provide sorting features for top books
- To improve understanding of structures, pointers, and dynamic memory allocation

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5. Scope of Project

This project is useful for:

- Students learning C programming
- Small libraries for basic record handling
- Practice of data management operations

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6. Features of the System

- Add new book records
- Duplicate ID validation
- Remove books using ID
- Search books by ID and Name
- Show books by Author
- Show books by Category
- Update book Price or Rating
- Display top 3 books by Price
- Display top 3 books by Rating
- Display all books in library

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7. Modules

7.1 Add Book Module

Allows user to add book details and checks duplicate Book ID.

7.2 Remove Book Module

Removes a book record using Book ID.

7.3 Search Module

Search books using:

- Book ID
- Book Name

7.4 Filter Module

Displays books based on:

- Author
- Category

7.5 Update Module

Updates:

- Price
- Rating

7.6 Sorting Module

Shows top 3 books based on:

- Highest Price
- Highest Rating

7.7 Display Module

Displays all books stored in the system.

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8. Technologies Used

- Language: **C**

- Concepts: Structures, Functions, Loops, Pointers, Dynamic Memory Allocation
- IDE: CodeBlocks / VS Code

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9. System Requirements

Hardware Requirements:

- Minimum 2GB RAM
- Basic Computer / Laptop

Software Requirements:

- Windows 10/11
- C Compiler (GCC)
- CodeBlocks / VS Code

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10. Algorithm / Working

1. Allocate memory for book records using `malloc()`
2. Display menu options
3. User selects an option
4. Perform operations like add, delete, update, search, sort
5. Continue until user chooses Exit
6. Free allocated memory using `free()`

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11. Conclusion

The Book Management System is a useful project for learning C programming concepts.
It provides a complete understanding of structures, dynamic memory allocation, searching, sorting, and record management.
This system reduces manual work and improves efficiency in managing book records.

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12. Future Enhancements

- Add File Handling to save records permanently
- Add Login system for admin/user
- Add sorting by author and category
- Add GUI interface in future

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