Book Management System Using Stack (Array)

1. Introduction

This project implements a **Book Management System** using the **Stack data structure**. The system simulates stacking books on a table where the **Last In, First Out (LIFO)** principle is applied. The system allows a librarian to undo actions by removing the most recently added book.

2. Objective

The main objective of this program is to:

- Manage books using a stack implemented with an array
- Allow the user to manually enter book data
- Perform stack operations efficiently
- Demonstrate practical application of stacks in real-world scenarios

3. Data Structure Used

Stack (Array Implementation)

- The stack stores book names as strings
- Fixed maximum size
- Uses an integer top to track the current position

4. Operations Implemented

1. **Push**
    - Adds a new book to the top of the stack
2. **Pop**
    - Removes the top book from the stack
3. **Peek**

- Displays the most recently added book

4. **Display**
    - Shows all books from top to bottom
5. **Is Empty**
    - Checks whether the stack has any books

5. Algorithm Overview

- Initialize stack with top = -1
- User selects operation from menu
- Stack operations are performed based on user input
- Program continues until user selects Exit

6. Test Cases

Test Case	Operation	Input	Expected Output
1	Push	"C++ Programming"	Book added successfully
2	Push	"Data Structures"	Book added successfully
3	Peek	—	Data Structures
4	Display	—	Data Structures, C++ Programming
5	Pop	—	Data Structures removed
6	Peek	—	C++ Programming
7	Is Empty	—	Stack is not empty
8	Pop	—	C++ Programming removed
9	Is Empty	—	Stack is empty

7. Conclusion

This project successfully demonstrates the implementation of a **stack using an array** to manage books in a library system. It fulfills all requirements, supports undo functionality, and applies core Data Structures and Algorithms concepts in a practical way.