Project Title: Binary Tree Based Search and Recommendation System

In this project I will implement a binary tree data structure in C++ to build a simple search and recommendation system for a library of books. Each node in the binary tree will represent a book, containing attributes such as title, author, and genre. To create functionalities to search or books based on different criteria and retrieve book recommendations by traversing the binary tree based on user preferences.

1 Objectives

• Develop an understanding of binary tree operations including insertion, searching, and traversal.

• Implement functions to search for books based on title, author, and genre.

• Create a recommendation algorithm based on user-defined literary preferences using tree traversal techniques.

• Practice dynamic memory management in C++ with proper implementation of data structures.

2 Deliverables

1. C++ Source Code:

• A C++ program that implements a binary tree for a book collection.

• Functions for inserting new books, searching for books, and generating recommendations based on user queries.

2. Sample Input and Output:

• A demonstration of the system's functionality through a set of user commands.

• Detailed output representing the results of the operations performed.

3. Test Cases:

• A collection of test cases illustrating the program's response to various queries and edge cases (e.g., searching for a non-existing book or recommending books when no matches are found).

3 Sample Input

The following is an example of the sequence of commands a user might input during a session:

Add Book: "The Great Gatsby", "F. Scott Fitzgerald", "Fiction"

Add Book: "1984", "George Orwell", "Dystopian"

Add Book: "To Kill a Mockingbird", "Harper Lee", "Fiction"

Search by Title: "1984"

Search by Author: "Harper Lee"

Recommend Books by Genre: "Fiction"

Display All Books

4 Output Example

Console Output After Running the Program:

Welcome to the Library Search and Recommendation System

1. Adding book: "The Great Gatsby", "F. Scott Fitzgerald", "Fiction"

Book added successfully.

2. Adding book: "1984", "George Orwell", "Dystopian"

Book added successfully.

3. Adding book: "To Kill a Mockingbird", "Harper Lee", "Fiction"

Book added successfully.

4. Searching for: Title "1984"

Found: "1984" by George Orwell

5. Searching for: Author "Harper Lee"

Found: "To Kill a Mockingbird" by Harper Lee

6. Recommending books in the genre "Fiction":

Recommendations:

- "The Great Gatsby" by F. Scott Fitzgerald

- "To Kill a Mockingbird" by Harper Lee

7. Displaying all books:

- "The Great Gatsby" by F. Scott Fitzgerald (Genre: Fiction)

- "1984" by George Orwell (Genre: Dystopian)

- "To Kill a Mockingbird" by Harper Lee (Genre: Fiction)