Object Oriented Programming

Assignment # 03

Note:

- First think about a problem statement and then write/draw your logic on paper.
- After designing the logic on paper, code the problem statement on any editor (VS Code, Gedit, etc).
- Copied tasks will be awarded **zero** marks without any investigation.
- Comment your code properly.
- Assignment After Due Date will not be Accepted.
- Plagiarism of any shape or form will not be tolerated. In case of plagiarism, the particular question will be marked zero and 50% marks from total obtained marks will be deducted.

Problem 1

Problem Statement:

You are tasked with designing a program to manage a library system. The system should handle books, authors, library members, and librarians. Each book has a title, author, ISBN number, and availability status. Each author has a name and a list of books they have written. Each library member has a name, a list of borrowed books, and possibly late fees. A librarian can perform administrative tasks in the library.

Your program should have the following classes:

1. **Book:** Represents a book with attributes title, author, ISBN number, availability status, and due date.
2. **Author:** Represents an author with attributes name and a list of books they have written.
3. **LibraryMember:** Represents a library member with attributes name, a list of borrowed books, and late fees.
4. **Librarian:** Represents a librarian with attributes name and permissions to manage the library system.
5. **Library:** Represents the library itself, containing a collection of books, a list of authors, a list of library members, and a librarian.

Ensure that your implementation uses **composition** and **aggregation** appropriately. Additionally, implement friend functions to allow library members to borrow and return books.

Your program should provide the following functionality:

1. Add a book to the library.
2. Add an author to the library system.
3. Register a new library member.
4. Allow a library member to borrow a book.
5. Allow a library member to return a book.
6. Display the list of books in the library.
7. Display the list of authors in the library.
8. Display the list of library members.
9. Search for books by title.
10. Search for books by author.
11. Allow the librarian to add or remove books from the library.
12. Allow the librarian to add or remove authors from the library.
13. Allow the librarian to register new library members.
14. Allow the librarian to view late fees for library members.

Guidelines:

- Use appropriate access specifiers for member variables and functions.
- Implement necessary constructors, destructors, and member functions.
- Make use of composition and aggregation where necessary.
- Implement the friend function to facilitate book borrowing and returning by library members.
- Implement functions for searching, book and author management, and librarian functionalities.

NOTE: Submit only the <rollno_yourname.cpp> file, 1 mark will be deducted otherwise. **For example 22p-0001_ali-imran.cpp.** 0 marks will be assigned to plagiarized assignments.