Lab 12: Library Management System

Description:

You are tasked with creating a C++ program to manage a library's book inventory using STL vector, list, and deque containers. The program should allow the user to add books, display books, manage borrowed books, save the inventory to a file, and load the inventory from a file. You will need to create a Book and Library class to manage the library's operations.

Tasks:

1. **Create a Book class:**
    - The *Book* class should have the following private attributes:
        - title (string): The title of the book.
        - author (string): The author of the book.
        - ISBN (string): The ISBN of the book.
    - The class should have a constructor to initialize these attributes.
    - The class should have public methods to:
        - Get the title, author, and ISBN of the book.
        - Display the book details.
2. **Create a Library class:**
    - The *Library* class should have the following private attributes:
        - inventory (vector<Book>): A vector to store books in the library.
        - borrowedBooks (deque<Book>): A deque to store the books that are currently borrowed.
        - archivedBooks (list<Book>): A list to store the books that are no longer in circulation.
    - The class should have public methods to:
        - Add a book to the inventory.
        - Borrow a book from the inventory.
        - Return a borrowed book to the inventory.
        - Archive a book (move it from the inventory to the archived books list).

- Display all books in the inventory, borrowed books, and archived books.
- Save the inventory, borrowed books, and archived books to files.
- Load the inventory, borrowed books, and archived books from files.

3. **Add books to the inventory:**
    - Create a function *addBook* that allows the user to add a new book to the inventory. The function should prompt the user to enter the title, author, and ISBN of the book, create a Book object, and store it in the inventory vector.
4. **Manage borrowed and archived books:**
    - Create a function *borrowBook* that allows the user to borrow a book from the inventory. The function should move the book from the inventory vector to the borrowedBooks deque.
    - Create a function *returnBook* that allows the user to return a borrowed book. The function should move the book from the borrowedBooks deque back to the inventory vector.
    - Create a function *archiveBook* that allows the user to archive a book. The function should move the book from the inventory vector to the archivedBooks list.
5. **Save and load the inventory, borrowed books, and archived books to/from files:**
    - Create a function *saveData* that writes the details of each book in the inventory, borrowedBooks, and archivedBooks to separate files (inventory.txt, borrowed.txt, archived.txt). Each line in the files should contain the title, author, and ISBN of a book, separated by commas.
    - Create a function *loadData* that reads the details of each book from the files and populates the inventory, borrowedBooks, and archivedBooks containers.

Requirements:

- Use file streams (ofstream and ifstream) to handle file operations.
- Use the STL vector, list, and deque containers to manage the books.
- Ensure proper error handling for file operations (e.g., check if the file opens successfully).
- Use object-oriented principles to design the Book and Library classes and manage the library's operations.