GRADED LABORATORY ACTIVITY 3

Objective

To design and implement a simple library management system using object-oriented programming principles in Java. This exercise will help you practice class design, object interaction, array manipulation, and console-based user interfaces.

Files to Create

You are required to implement the following Java classes:

1. Book.java – Represents a book in the library.
2. Borrower.java – Represents a library user who can borrow and return books.
3. Transaction.java – Records each borrow or return action.
4. LibraryApp.java – The main application that manages books, borrowers, and transactions.

Instructions

1. Book Class

- Fields: bookId, title, authorFirstName, authorLastName, publicationYear
- Auto-generate bookId using a static counter.
- Include a method to display book details in a formatted way.

2. Borrower Class

- Fields: borrowerId, name, an array of borrowed books, and an array of transactions.
- Methods:
    - borrowBook(Book book)
    - returnBook(int bookId)
    - viewBorrowedBooks()
    - viewTransactions()
- Auto-generate borrowerId using a static counter.

3. Transaction Class

- Fields: transactionId, bookId, bookName, date, time, transactionType
- Auto-generate transactionId using a static counter.

- Capture the current date and time when a transaction is created.
- Include a method to display transaction details.

4. LibraryApp Class

- Use arrays to store up to 100 books and 50 borrowers.
- Implement a menu-driven interface with the following options:
    1. Add New Book
    2. View All Books
    3. Search Book
    4. Add New Borrower
    5. View All Borrowers
    6. Delete Borrower
    7. List All Transactions
    8. Exit
- Include logic to:
    - Prevent borrowing of already borrowed books.
    - Track and display all transactions across all borrowers.
    - Allow borrowers to manage their own borrowed books and view their transaction history.