Library Management System

Problem Description:

You are tasked with creating a simple Library Management System for a university library using Java. This system should be able to manage books, students, and borrowing transactions. You are required to apply the principles of Class and Object, Encapsulation, Inheritance, and Polymorphism.

Requirements:

1. **Classes and Objects:**

    - Create the following classes: **Book**, **Student**, **Library**, and **BorrowTransaction**.

2. **Encapsulation:**

    - All member variables in each class should be **private** and should be accessed or modified via **getter and setter** methods.
    - The **Book** class should contain the following attributes: **bookID(String), title(String), isAvailable(boolean).**

3. **Inheritance:**

    - Create a **Person** class that has common attributes like **name, email, and ID**.
    - The **Student** class should inherit from the **Person** class. The Student class will also have additional attributes like **yearOfStudy and department**.

4. **Polymorphism:**

    - Create a class **Member** which has a method **borrowBook()**. The Student class should **override the borrowBook()** method with its own implementation. **(Hint: The Student might have a limit on the number of books they can borrow).**

5. **Library Management Functions:**

    - The Library class should contain:
        - A list of **Book objects.**
        - A list of **BorrowTransaction objects.**
        - Methods to:
            - Add a new book to the library.
            - Borrow a book (this creates a BorrowTransaction).
            - Return a book (this updates the transaction).
            - Display available books.

6. **BorrowTransaction Class:**

    - This class will represent the transaction of borrowing a book.
    - It should contain attributes like **studentID, bookID, borrowDate, and returnDate.**

7. **Additional Requirements:**

    - Use constructors to initialize your objects.
    - **Use arrays or ArrayList to store multiple books and transactions in the Library class.**
    - Write a main method where you:
        - **Create a Library object.**
        - **Add some Book objects to the library. After adding a book the method should print the name of the book saying that it has been added to the library.**
        - **Create a Student object.**
        - **Simulate borrowing and returning books.**

Example Output:

Library Management System:
1. Add a new book
2. Borrow a book
3. Return a book
4. Display available books
5. Exit

Enter your choice: 2
Enter student ID: 101
Enter book ID: B1003
Book borrowed successfully!

Enter your choice: 4
Available books:
- Book ID: B1001, Title: "Introduction to Java"
- Book ID: B1002, Title: "Data Structures"