EASTERN INTERNATIONAL UNIVERSITY
SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

Practice Assignment – Quarter 2, 2024-2025
Course Name: Coding Practice
Course Code: CSE 422
Student's Full Name:
Student ID:

Practice Assignment 4

Build a Library Management System Following SOLID Principles

A library needs a simple management system to handle basic functions like adding books, searching for books, and lending books. The system must be designed according to SOLID principles to ensure ease of maintenance and future extensibility.

Requirements:

1. **Core functionalities of the system:**
   - **Add new books:** Administrators can add books to the library with the following details: Title, Author, Category, and Quantity.
   - **Search for books:** Users can search for books by Title or Category.
   - **Lend books:** The system allows readers to borrow books if the stock is available. Each reader is allowed to borrow up to 3 books.
   - **Return books:** Readers return books, and the system updates the stock quantity.
   - **Generate reports:** The system generates a report of readers and the books they have borrowed.
2. **System requirements:**
   - Each book is managed with a **unique ID**.
   - Each reader also has a **unique ID**.
   - The system must allow the addition of new book types (e.g., eBooks, magazines) without modifying the existing code.
3. **Technical requirements:**
   - Fully apply SOLID principles in the design.
   - Separate the system into distinct components:
     - Book management.
     - Reader management.
     - Report generation service.
   - Use interfaces to ensure extensibility.
4. **Implementation guidelines:**

- **Sample data:** The system should include sample data for books and readers for testing purposes.
- **Class design:**
  - Each class must have a specific role.
  - Classes should communicate via interfaces.
- **Extensibility:**
  - Propose a way to extend the system if new requirements arise, such as managing eBooks or enabling book reservations.

Tasks:

1. **Analyze and design the system:**
   - Draw a UML class diagram to illustrate the system design.
   - Clearly define the classes, interfaces, and their relationships.
2. **Develop the system:**
   - Implement the functionalities for book management, reader management, and report generation as per the requirements.
   - Use sample data to test the functionalities.
3. **Report the results:**
   - Explain how SOLID principles are applied in the design.
   - Propose ways to extend the system in the future.

Evaluation Criteria:

1. Design adheres to SOLID principles.
2. All functionalities are implemented as specified.
3. System is extensible and maintainable.
4. Clear and detailed explanation in the report.

Submission Format:

- A **.zip file** containing source code and documentation.
- A **.pdf report** describing the design and implementation.