Assignment 1: Object-Oriented System Analysis and Design

Deadline: April 12, 2026

Design a system in a realistic scenario using object-oriented thinking. Possible examples include a Course Management System, Library Management System, Hotel Booking System, Online Shopping System, Hospital Registration System, etc.

For example, for designing a Course Management System, you should decide the entities (i.e., classes) and functionalities (i.e., methods) in such a system. Possible functionalities include *course registration, course search, grade analysis, etc.*

Requirements:
1. Choose one concrete application scenario.
2. Design at least **8 classes** in your system.
3. Your design must demonstrate the following OOP features:
   a) encapsulation
   b) abstraction
   c) inheritance
   d) polymorphism
4. Include at least **one abstract class or interface**.
5. Describe at least **3 use cases** of your system.
6. Insert a **UML class diagram** showing class relationships clearly.
7. Provide **method signatures** for at least **3 key classes**.
8. No need to implement the system for this assignment.

To complete this task, you should provide a report (fewer than 5 pages) describing your system design and related functions. More importantly, you **MUST** insert the UML class diagram as mentioned in the above requirements. You can use the Violet UML Editor, diagrams.net, or other UML tools.

What you need to submit: Submit one PDF report and name it with your ID and name, e.g., "123456-Harry-asg1.pdf".

Submission guidelines: You should submit the files via email to our TA, **Mr. Baiqing Wang (** *wbq@mail.nwpu.edu.cn* **),** before the deadline.

Note: You can find a suggested template for your report as follows.

System title: XXX System
Author:
Student ID:

1. **System Overview**
2. **Entities** (describe their attributes and functionalities)
3. **Class Design** (clarify the relationship between entities, and show some use cases)
4. **UML Class Diagram** (insert your UML class diagram)
5. **Conclusion**