**Practical Assignment One**

**Designing an Object-Oriented Data Model for a University System**

**Objective:**

To apply key concepts of object-oriented data modeling (OODM) to designing and implementing a simplified university system using object-oriented principles and notation.

**Instructions:**

You are required to design an **Object-Oriented Data Model** for a university system that manages Students, Courses, Instructors, and Departments. Your model should incorporate the following key concepts:

**Part 1: Object Definition and Structure**

1. **Define Objects and Classes**

* Identify and define at least four major classes: e.g., Student, Course, Instructor, and Department.
* For each class, specify attributes and methods.

2. **Demonstrate Object Identity and Encapsulation**

* Assign unique identities to objects.
* Show encapsulated attributes and methods within each class.

3. **Define Types and Classes**

* Create abstract types or parent classes (e.g., Person for both Student and Instructor) and specify derived classes.

**Part 2: Advanced Object-Oriented Features**

4. **Apply Inheritance**

* Implement inheritance for shared properties between classes.
* Demonstrate how methods can be overridden in subclasses.

5. **Demonstrate Late Binding**

* Give an example where a method call is resolved at runtime (e.g., getDetails() behaving differently in Student and Instructor classes).

6. **Define Object Methods, Assertions, and Constraints**

* Include at least two constraints (e.g., “A student cannot register for more than 5 courses”) and write them as assertions or method-level checks.

**Part 3: Persistence and Storage Design**

7. **Explain Object Persistence**

* Describe how instances of your classes will be stored in a persistent storage system (e.g., object-relational database).
* Show how composite/complex objects (e.g., Course containing a list of Student objects) will be stored.

8. **Explore ODMG Standards**

* Briefly explain how your model aligns with the Object Data Management Group (ODMG) standards.

**Deliverables:**

* A UML Class Diagram showing object relationships, inheritance, and method signatures.
* A written document (2–4 pages) explaining the above steps with examples and justifications.

**Assessment Criteria:**

* Completeness and correctness of object definitions and structures.
* Proper use of OODM concepts like inheritance, encapsulation, and object identity.
* Clarity and quality of constraints, assertions, and method definitions.
* Quality of UML diagram