SSN College of Engineering

Department of Information Technology

UIT2312 – Programming and Design Patterns Laboratory

2023 – 2024

Mid-Semester Assessment

November 20, 2023

Time: 12:45 am to 03:40 pm **Marks:** 100

Read the following instructions carefully:

1. Demonstrate the OOPs paradigm to solve the problem.
2. Draw the class diagram for the given problem in the paper and submit during the end of the session.
3. Upload all the python files and the digital diary with relevant output/ error screenshots in the LMS page.
4. Marks split-up:

Design (class diagram, class relation diagram, description of member variables & methods)	Coding (Coding standards, Coding process)	Execution and Testing (test-driven coding, Quality of test cases, Correctness of results)	Viva-Voce	Total
15	45	30	10	100

Design and implement a comprehensive online University Management System using Python. Apply object-oriented principles such as classes, inheritance, and polymorphism to model different entities like Person, Student, Professor, and their relationships. Address the diamond problem by demonstrating how multiple inheritance is managed effectively in your design.

Utilize serialization techniques to persistently store and retrieve student and professor data, ensuring data integrity across sessions. Implement string operations and regular expressions for efficient data manipulation, facilitating tasks like searching, filtering, and categorizing students based on their attributes. Organize your code into modular packages, including classes for Courses, Departments, and a central University Management System.

List of tasks to be accomplished:

Classes, Inheritance, and Polymorphism:

- Define a base class Person with attributes like name, age, and methods like display_info.
- Utilize inheritance to create subclasses like Student and Professor, inheriting from the Person class.
- Implement polymorphism by overriding methods like display_info in the subclasses to provide specific information.

Diamond Problem:

- Create a scenario where multiple inheritance leads to the diamond problem, such as having a class TeachingAssistant inheriting from both Student and Professor.

Serialization:

- Implement serialization for storing and retrieving student and professor data.

Use a module like pickle or json for serialization.

Ensure that serialized data retains the object's structure and state.

String Operations and Regular Expressions:

- Implement string operations for tasks like searching and filtering students based on their attributes.

Use string methods for operations like searching by name or filtering by age.

Apply regular expressions for more complex pattern matching tasks.

Packages:

- Organize code into modular packages, including classes for Courses, Departments, and a central University Management System.

You can then proceed to create classes and functions to fulfil these tasks, following similar patterns as demonstrated in the inventory management system example.

Rubrics for coding and testing	Remarks
Classes and objects created	
Demonstration of inheritance, abstract methods, RegEx, MRO	
Implementation of serializability	
Package creation and installation	