Python Advanced (OPP)

Session 1: Introduction to Python and OOP Concepts

In this introductory session, participants will explore the fundamentals of Python programming and Object-Oriented Programming (OOP) concepts. The session will cover:

- **Definition and significance of Object-Oriented Programming in Python.**
- **Comparison between Procedural Programming and Object-Oriented Programming.**
- **Basic OOP concepts such as classes, objects, inheritance, and polymorphism will be explained using straightforward examples.**
- **Participants will create a simple class, instance objects, and demonstrate basic interactions between objects.**

Session 2: Building Blocks of OOP: Classes and Objects

Building upon the previous session, participants will delve deeper into OOP concepts focusing on:

- **Detailed exploration of classes including their structure, attributes, methods, and constructors.**
- **Classes vs Data Structures**
- **Practical exercises like animals, vehicle, or people.**

Session 3: Encapsulation and Inheritance

This session will cover advanced OOP concepts:

- **Class and instance attributes.**
- **Class methods and instance methods.**
- **Explanation of encapsulation and its role in hiding implementation details.**
- **Introduction to inheritance and how classes can inherit attributes and methods from other classes.**
- **Discussion on multiple inheritance.**
- **Demonstration of encapsulation using static methods, getters, and setter methods in Python.**

Session 4: Abstraction and Polymorphism

Participants will delve into inheritance and polymorphism:

- **Understanding abstraction and its significance in focusing on essential features while concealing unnecessary details.**
- **Definition of polymorphism and its role in treating different objects interchangeably.**
- **Hands-on activity implementing inheritance and polymorphism in a project where different types of vehicles share common functionalities.**
- **Overview of method overloading.**
- **Practical exercises abstraction , Create classes with private attributes and methods.**

Session 5: Advanced OOP Concepts

Participants will explore more advanced OOP concepts:

- **Comparison between composition and inheritance, discussing their appropriate usage scenarios.**
- **Explanation of method overriding and its implementation in subclasses.**
- **Hands-on activity where students design a project and decide between composition and inheritance.**

Session 6: Project Showcase and Review

The final session will include:

- **Project presentations where participants showcase their projects developed throughout the course.**
- **Recap of key concepts covered in the course.**
- **Question and answer session to address any remaining queries or concerns.**

By the end of the course, participants will have a solid understanding of advanced OOP concepts in Python, enabling them to design and implement complex software systems efficiently and effectively.

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