

Object Oriented Programming

Introduction

What is object-oriented programming?

- OOP refers to languages that use objects in programming
- OOP combines a group of data attributes with methods into a unit called an object
- OOP languages are class-based, typically
- Class defines the data attributes and methods as a blueprint for creating an object (instances of the class)
- Popular OOP languages are Java, PHP, Python, C++, C#

Why OOPs over procedure-oriented programming?

- OOPs makes development and maintenance easier, in procedure-oriented it's not easy to manage if code grows as project size increases
- OOPs provides data hiding, in procedure-oriented, global data can be accessed from anywhere
- OOPs provides the ability to simulate real-world event effectively

OOP paradigm

- OOP is a programming paradigm based upon objects (having both data and methods) that aims to incorporate the advantages of modularity and reusability
- Objects are used to interact with one another to design applications and computer programs
- The important features of OOP:
 - Bottom-up approach in program design
 - Programs organized around objects, grouped in classes
 - Focus on data with methods to operate upon object's data
 - Interaction between objects through functions
 - Reusability of design through creation of new classes by adding new features to existing classes

OOP concepts

- OOP's concepts are:
 - Class
 - Objects
 - Method (and message passing)
 - Also the other four basic concepts

OOP's basic concepts

- Encapsulation
 - Encapsulate the data
 - Data can only be accessed (read or modify) using the methods provided
- Inheritance
 - Objects are often very similar, they share common logic but they're not entirely the same
 - We can reuse the common logic and extract the unique logic into a separate class
- Abstraction
 - Natural extension of encapsulation
 - Displays only the information needed and hides the unnecessary information
 - Each objects only expose a high level mechanism and hide internal implementation details
 - Only reveal operations relevant for the other objects
- Polymorphism
 - Object behaves differently in different situations
 - There are two types of polymorphism
 - Compile time polymorphism
 - Runtime polymorphism

OOP in Java

- Java is the most sought after programming skill at present
- In Java, everything is based on the object
- Java has a root class called Object from which the entirely functionality of Java is derived