Object Oriented Python - Quick Guide

Object Oriented Python - Introduction

Programming languages are emerging constantly, and so are different methodologies.Object-oriented programming is one such methodology that has become quite popular over past few years.

This chapter talks about the features of Python programming language that makes it an object-oriented programming language.

Language Programming Classification Scheme

Python can be characterized under object-oriented programming methodologies. The following image shows the characteristics of various programming languages. Observe the features of Python that makes it object-oriented.

Langauage Classes	Categories	Langauages
Programming Paradigm	Procedural	C, C++, C#, Objective-C, java, Go
	Scripting	CoffeeScript, JavaScript, Python, Perl, Php, Ruby
	Functional	Clojure, Eralang, Haskell, Scala
Compilation Class	Static	C, C++, C#, Objective-C, java, Go, Haskell, Scala
	Dynamic	CoffeeScript, JavaScript, Python, Perl, Php, Ruby, Clojure, Erlang
Type Class	Strong	C#, java, Go, Python, Ruby, Clojure, Erlang, Haskell, Scala

	Weak	C, C++, C#, Objective-C, CoffeeScript, JavaScript, Perl, Php
Memory Class	Managed	Others
	Unmanaged	C, C++, C#, Objective-C

What is Object Oriented Programming?

Object Oriented means directed towards objects. In other words, it means functionally directed towards modelling objects. This is one of the many techniques used for modelling complex systems by describing a collection of interacting objects via their data and behavior.

Python, an Object Oriented programming (OOP), is a way of programming that focuses on using objects and classes to design and build applications.. Major pillars of Object Oriented Programming (OOP) are **Inheritance, Polymorphism, Abstraction,** ad **Encapsulation**.

Object Oriented Analysis(OOA) is the process of examining a problem, system or task and identifying the objects and interactions between them.

Why to Choose Object Oriented Programming?

Python was designed with an object-oriented approach. OOP offers the following advantages −

- Provides a clear program structure, which makes it easy to map real world problems and their solutions.
- Facilitates easy maintenance and modification of existing code.
- Enhances program modularity because each object exists independently and new features can be added easily without disturbing the existing ones.
- Presents a good framework for code libraries where supplied components can be easily adapted and modified by the programmer.
- Imparts code reusability

Procedural vs. Object Oriented Programming

Procedural based programming is derived from structural programming based on the concepts of **functions/procedure/routines**. It is easy to access and change the data in procedural oriented programming. On the other hand, Object Oriented Programming (OOP) allows decomposition of a problem into a number of units called **objects** and then build the data and functions around these objects. It emphasis more on the data than

procedure or functions. Also in OOP, data is hidden and cannot be accessed by external procedure.

The table in the following image shows the major differences between POP and OOP approach.

Difference between Procedural Oriented Programming(POP)vs. Object Oriented Programming(OOP).

	Procedural Oriented Programming	**ObjectOriented Programming**
Based On	In Pop,entire focus is on data and functions	Oops is based on a real world scenario.Whole program is divided into small parts called object
Reusability	Limited Code reuse	Code reuse
Approach	Top down Approach	Object focused Design
Access specifiers	Not any	Public, private and Protected
Data movement	Data can move freely from functions to function in the system	In Oops, data can move and communicate with each other through member functions
Data Access	In pop, most functions uses global data for sharing that can be accessed freely from function to function in the system	In Oops,data cannot move freely from method to method,it can be kept in public or private so we can control the access of data
Data Hiding	In pop, so specific way to hide data, so little bit less secure	It provides data hiding, so much more secure
Overloading	Not possible	Functions and Operator Overloading
Example-Languages	C, VB, Fortran, Pascal	C++, Python, Java, C#
Abstraction	Uses abstraction at procedure level	Uses abstraction at class and object Level

Principles of Object Oriented Programming

Object Oriented Programming (OOP) is based on the concept of **objects** rather than actions, and **data** rather than logic. In order for a programming language to be object-oriented, it should have a mechanism to enable working with classes and objects as well