Object-Oriented Programming (OOP)

Object-Oriented Programming (OOP) is a method of writing code based on objects. These objects combine data (known as attributes) and the functions that work on that data (called methods). The idea is to organise code in a way that's more natural and easier to manage, especially in large programs.

There are four main concepts in OOP:

1. Encapsulation – This means keeping data and methods together inside a class and hiding the internal details from outside access. It helps prevent unwanted changes and makes code easier to maintain.

2. Inheritance – This allows one class to use or extend the features of another. It avoids duplication and supports code reuse.

3. Polymorphism – This means that different objects can respond to the same method in different ways. For instance, a draw() method can work differently for a Circle and a Square.

4. Abstraction – This is about focusing only on important details while hiding the complex parts. It can be done using abstract classes or interfaces that only show method names, not how they work.