Elementary Concept of Object and Classes

# Introduction

## Object-Oriented Programming

Object-Oriented Programming (OOP) is a modular approach which allows the data to be applied within a stipulated programming area. It also gives the reusability feature to develop productive logic, which gives more emphasis on data.

# Features of Object-Oriented Programming

* It gives more emphasis on data rather than procedure.
* It makes the complete program/problem simpler by dividing it into several objects.
* The object may communicate with each other through functions.
* It is easier to add new data and functions whenever necessary.

# Basic Elements of OOP (Principle of OOP)

* Objects
* Encapsulation
* Data Hiding
* Classes
* Inheritance
* Data Abstraction
* Polymorphism

## Object

An object is a unique entity, which contains data and functions (characteristics and behaviour) together in an Object-Oriented Programming (OOP) Language.

An object is a specific class that processes instant variables and functions within it. Hence, it is also called an **instance of a class**.

## Class

Class is a set of objects. Each object of a class processes the same attributes and common behaviours defined within the class. Sinch an object is the product of a class; hence class is also called an ‘Object Factory’.

## Attribute

Every object has its own identity by which they are distinguished from each other. The characteristics, which make them different, are their attributes.

## Data Abstraction

Data Abstraction is the act of representing the essential features without knowing the background details. It is always relative to the purpose or user.

## Encapsulation

The system of wrapping data and function into a single unit (called class) is known as encapsulation.

## Inheritance

The term inheritance means to link and share some common properties of one class with the other class. This can be done by extending the object of one class into another class and using it.

## Polymorphism

Polymorphous is a process of using a function method for more than one purpose.

## Data Hiding

The process of creating logic insulation between data and the outside world is known as Data Hiding.

History and Development of Java

Java is an object-oriented programming language developed primarily by **James Gosling** and colleagues at **Sun Micro Systems**. The language was initially called **Oak** (named after the Oak trees outside Gosling's office).

# Basic Features of Java

* Java is an object-oriented programming language.
* Java programs are both **compiled** and **interpreted**.
* It can access data from a local system as well the as from net.
* Java programming is written within a class. The variables and functions are declared and defined with the class.
* Java programs can create Applets (the programs which run on Web-browsers) and Applications are general programs like any other programming language.
* Java doesn't require any pre-processor (#) or inclusion of header files for creating a Java application program.
* Java is case sensitive. As a programming language, the upper-case and lower-case letters are distinguished by the language.

# Compiler and Interpreter

## Interpreter

The software, by which the conversion of the high-level instructions is performed line by line to machine level language, is known as **Interpreter**. If an error is found on any line, the execution stops till it is corrected. This process of correcting errors is easier but the program takes a long time to execute successfully.

## Compiler

If all the instructions can be converted to machine level language at once and all the errors are listed together, then the software is known as Compiler. This

the process is much faster but sometimes, it becomes difficult to debug (correct) all the errors together in a program.