Chapter 1 : Principles Object Oriented Concepts

What is Object Oriented Programming :

OOP stands for Object-Oriented Programming.

Procedural programming is about writing procedures or functions that perform operations on the data, while object-oriented programming is about creating objects that contain both data and functions.

Basic Concept Of Object Oriented Programming :

Object oriented programming is a type of programming which uses objects and classes its functioning. The object oriented programming is based on real world entities like inheritance, polymorphism, data hiding, etc. It aims at binding together data and function work on these data sets into a single entity to restrict their usage.

Some basic concepts of object oriented programming are :

1.Class

2.Objects

3.Encapsulation

4.Polumorphism

5.Inheritance

6.Abstraction

Class : A class is a data-type that has its own members i.e. data members and member functions. It is the blueprint for an object in object oriented programming language. It is the basic building block of object oriented programming in c++. The members of a class are accessed in programming language by creating an instance of the class.

Some important properties of class are :

1.Class is a user-defined data-type.

2.A class contains members like data members and member functions.

3.Data members are variables of the class.

4.Member functions are the methods that are used to manipulate data members.

5.Data members define the properties of the class whereas the member functions define the behaviour of the class.

Syntax :

```
class class_name { data_type data_name;
   return_type method_name(parameters); }
```

Encapsulation : In object oriented programming, encapsulation is the concept of wrapping together of data and information in a single unit. A formale defination of encapsulation would be: encapsulation is binding togather the data and related function that can manipulate the data.

Polymorphism : The name defines polymorphism is multiple forms. which means polymorphism is the ability of object oriented programming to do some work using multiple forms. The behaviour of the method is dependent on the type or the situation in which the method is called.

Inheritance : It is the capability of a class to inherit or derive properties or characteristics other class. it is very important and object oriented program as it allows reusability i.e. using a method defined in another class by using inheritance. The class that derives properties from other class is known as child class or subclass and the class from which the properties are inherited is base class or parent class.

C plus plus programming language supports the following types of inheritance

1.single inheritance

2.multiple inheritance

3.multi level inheritance

4.Hierarchical inheritance

5.hybrid inheritance

Abstraction : Data abstraction or Data Hiding is the concept of hiding data and showing only relevant data to the final user. It is also an important part object oriented programing.

In C++ programming language write two ways using which we can accomplish data abstraction :

1.Using class

2.Using header file

Benefits Of OOPS

Object-oriented programming has several advantages over procedural programming :

- OOP is faster and easier to execute
- OOP provides a clear structure for the programs
- OOP helps to keep the C++ code DRY "Don't Repeat Yourself", and makes the code easier to maintain, modify and debug
- OOP makes it possible to create full reusable applications with less code and shorter development time

Object Oriented Languages

Object-oriented programming is not the right of any particular languages. Like structured programming, OOP concepts can be implemented using languages such as C and Pascal. However, programming becomes clumsy and may generate confusion when the programs grow large. A language that is specially id designed tosupport the OOP concepts makes it easier to implement them.

The languages should support several of the OOP concepts to claim that they are object-oriented. Depending upon the features they support, they can be classified into the following two categories :

1. Object-based programming languages,
2. Object-oriented programming languages.

Object-based programming is the style of programming that primarily supports encapsulation and object identity. Major feature that are required for object based programming are :

- Data encapsulation
- Data hiding and access mechanisms
- Automatic initialization and clear-up of objects
- Operator overloading