UNIT-1

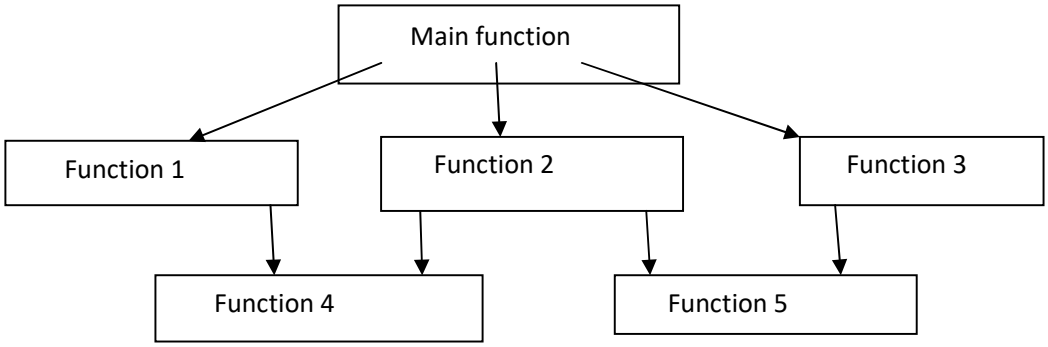
INTRODUCTION TO OBJECT ORIENTED CONCEPT

C++:-

C++ is a high level programming language, which we can insert the oop.

- **Procedure Oriented Programming:-**

High level language such as COBOL, FORTRAN, C etc are known as procedure oriented programming. Procedure oriented program approach is an approach in which a problem is viewed as a sequence of thing to be done such as reading, calculating or manipulating and printing. We can use number of functions to accomplish this task. In procedure oriented programming, the primary focus is function. The structure for procedure oriented programming is given below.



- **Characteristics of procedure oriented programming:-**

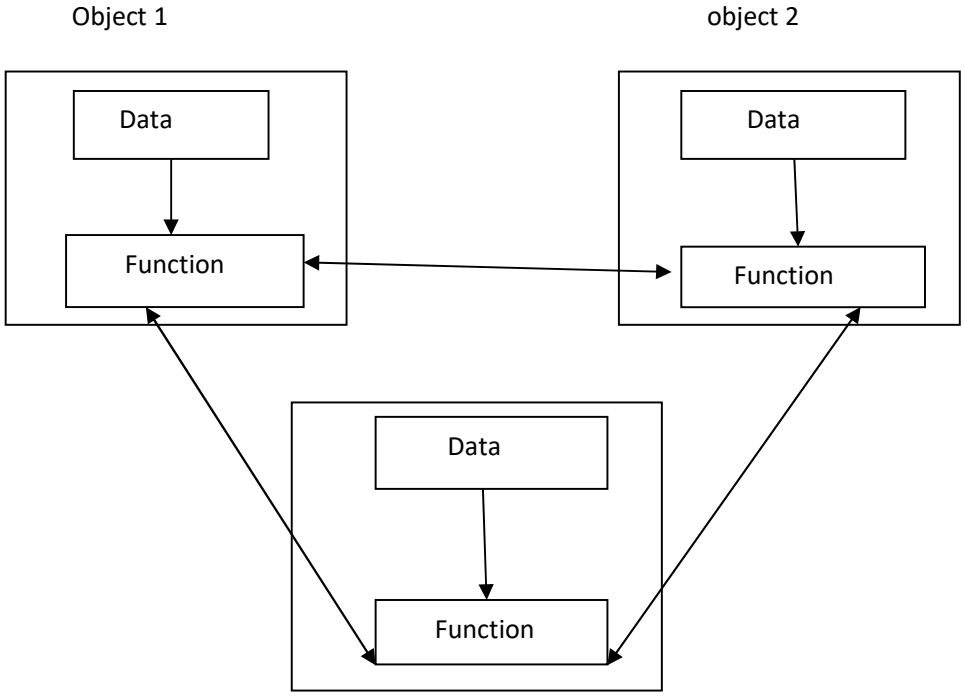
i. In procedure oriented programming stress is given to doing thing (algorithm).
ii. Program is divided into smaller program known as function.
iii. Most of the function shares global data.
iv. Data openly moves around the system from one function to another function.
v. It follows top-down approach.
vi. Function transform data from one function to another.

- **Introduction to object oriented programming**:-

Object oriented programming is an approach to program organization and development that attempts to eliminates some of the drawback of convention programming method by incorporating the based of structure programming features with several powerful new concept. It is a new way of organization and developing programs and has nothing to do with any particular organization also all language are not suitable to implement the oop concept easily.

object oriented programming is an approach that provides a way of modularizing problem by decomposing a problem into number of entity called 'data' and 'function' around the objects. The data of the object can be accessed only by the function associated with that object. However, the function of an object can be accessed by other object. OR

In object oriented programming data are critical element in the program development. object oriented programming concept doesn't allow to flow freely around the system. It ties data more closely to the function that operates on it and project it from accidental modification from outside function. object oriented programming allows decomposition of a problem into number of entities called object and then builds data and function around these object. The organization of data function in object oriented programming is given below:-



- **Characteristics of object oriented programming**:-

i. Stress is given on data rather than procedure.
ii. Programs are divided into objects.
iii. Data is hidden and can't be accessed by external function.
iv. Object may communicate with each other through function.
v. New data and function can be easily added whenever necessary.
vi. It follows button-up approach.

- **Important features of oops**:-

The object oriented programming has been developed to overcame the drawback of procedural programming. The object oriented approach based on certain concept that help it to attains its goals of overcoming the drawbacks of procedural programming. The general concept of object oriented programming is given below.

i. Class
ii. Object
iii. Data abstraction
iv. Data Encapsulation
v. Inheritance

vi. Polymorphism
vii. Dynamic Binding
viii. Message passing.

- **Class** :-

A class is user defined data type used to represent a template (format) for several similar type of object. The entire set of data and code of an object can be made a user defined data type with the help of class. Once a class has been defined we can create any number of object belong to that class. For eg:- Mango, apply, orange, grapes etc. are object of the class fruit.

```
Class fruit
{
   char  fname[20];
   char  fcolor[20];
   char ftaste[20];
} f1, f2, f3;
```

- **Object:**-

object is a basic building block for object oriented programming. Object corresponds to real life entities. An object is an unit of software consist of :-

- State/ Attribute:-

  state or Attribute defines the property of an object and current value of each of these properties.
- Behavior / Function:-

  Behavior defines the response of an object reacts in terms of its state changes and message passing.
- Identity:-

  identity defines an unique name.

State
Name address Roll No.
Behaviour
reading () writing () playing ()

- **Data Abstraction**:-

Abstraction refers to an act of representing essential features without including the background details or explanation. For eg:- we are driving a car we only know the essential feature to drive such as:- gear handling, staring handling, uses of clutch, accelerator, breaks etc. but while driving we do not know the interval details of car like waiting or motor working.

- **Data Encapsulation**:-

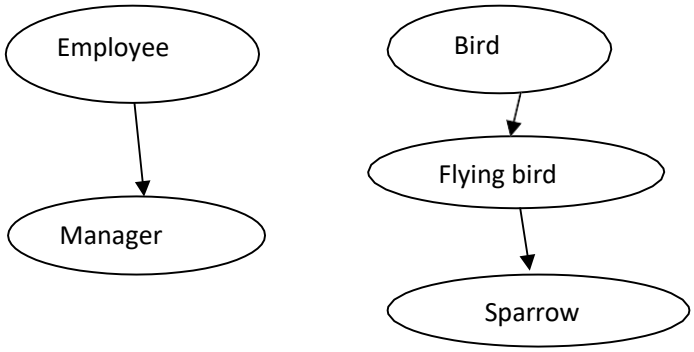
  Encapsulation is the way of combining both data and function that operates an the data under a single unit or we can say that the grouping of data and function into a single unit class) is known as encapsulation.

- **Inheritance**:-

  Inheritance is the process by which object of one class acquires the properties of another class.

  Foe eg:- The bird sparrow is a part of class flying bird. Similarly manager is the part of class 'employee'. Here class manager acquires the characteristics of class employee. Hence, manager is derived class and employee is the base class. The main principle behind inheritance is that a derive class shares common characteristics with the base class from which it derives.

  The graphical representation of above example is given below:-



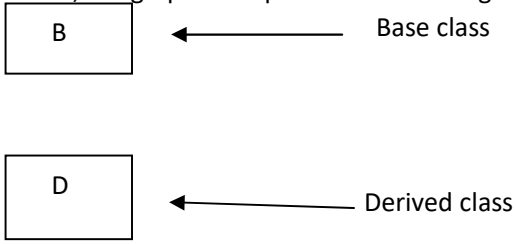
  In object oriented programming the concept of inheritance is the idea of reuse ability. This means that we can add additional features on existing class without modifying it. this is possible by deriving a new class from existing one. The new class will have combined features of both the classes i.e :- 'base ' and 'derived'.

- **Classification of inheritance**:-

  depending upon how the classes are derived from the base class inheritance can be classified into the following:-

i. Single inheritance :-

  When a class is derived from the base class is known as single inheritance, the graphical representation of single inheritance is given below:-

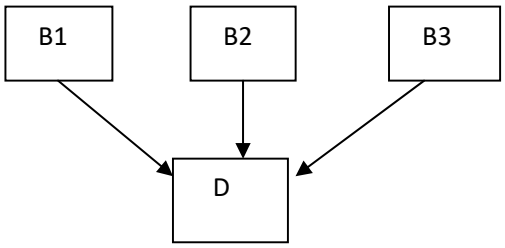


In the above figure 'B' represent6s the 'base class' and 'D ' represents the 'derived'.

ii. Multiple inheritance:-

Inheritance in which a derived class has several base classes is known as multiple inheritance.

The graphical representation of multiple inheritance is given below:-

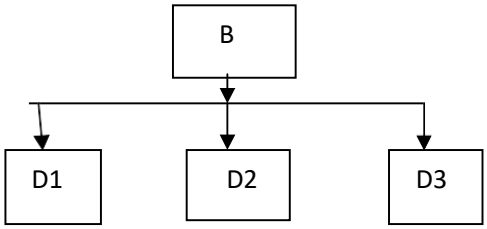


In the above figureB1,B2 and B3 are base classes and D is derived class. Which contains the property of B1, B2 and B3.

iii. Hierarchal inheritance:-

When one class is inherited by more than one classes then it is called hierarchal Inheritance.

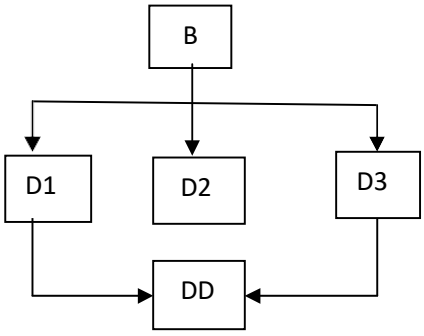
The graphical representation of hierarchal inheritance is given below:-



In the above example, B is the base class and D1, D2 and D3 are derived classes. The properties of base class 'B' can be shared by D1, D2, and D3 classes.

iv. Hybrid inheritance:-

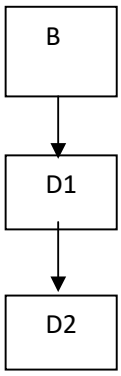
Hybrid Inheritance is a method of inheritance where, a class is derived from several derived classes. The graphical representation of hybrid inheritance is given below.



v. Multi-level inheritance:-

In a multi-level inheritance a class is derived from another derived class.

The graphical representation of multi-level inheritance is given below:-



- **Polymorphism** :-

Polymorphism is the important concept of object oriented programming. Polymorphism is a Greek term means "The ability to take more than one form ". it is the ability for a message or data to be placed in more than one form. It is the property by which several different object response in different ways.

- **Dynamic binding** :-

Binding refers to linking of a called procedure to the code to be executed in response to the call. Dynamic binding means that the code associated with a given procedure is not known until the time of call at run time. It is associated with polymorphism and inheritance.

- **Message Passing:** -

A message for an object is a request for execution of a procedure or a function and therefore it will involved a function in a receiving object that generate the desired results. message passing involves specifying the name of function, name of object and information to be sent.

Eg:-

Employee. Salary (name)

Object procedure or function information or data

- **Advantage of Object Oriented Programming** :-

a. It models real world well.
b. Object oriented program are easy to understand.
c. Object oriented programs offer reusability (means in case of inheritance we can use the data and function of a class into another class without declaring them again).
d. Object oriented programming facilitates quick development of parallel class.
e. Object oriented programs are easy to taste, maintain and manage.

- **Disadvantage of Object Oriented Programming** :-

a. The object oriented programming design is tricky (logic).

b. One need to prepare planning and prepare design for object oriented programming.
c. To program with oop programmers need prepare skill such as :- Design skill, thinking in term of object.

❖ Difference between C and C++:-

C	C++
a. In c file name have .c extension. b. In c only 31 characters are significant. c. In c this facility is not available. d. In c only structure and union. User defined data types are available. e. In c the declaration o variables must be at the beginning of the function. f. In c, global variable and local variable can't have a same name.	a. In C++ file name have .cpp extension. b. In C++ identifiers can have only no. of character. c. Default value for the programmers in the function proto type is possible in C++. d. The user defined data type class is also available along with structure and union. e. The decoration of variable can be placed closed to the statement that uses variable. f. Global variable can be accessed by scope resolution operator (::). In case the program has local variable with the same name.