Procedure Oriented Programming Language

- In the procedure oriented approach, the problem is viewed as sequence of things to be done such as reading , calculation and printing.
- Procedure oriented programming basically consist of writing a list of instruction or actions for the computer to follow and organizing these instruction into groups known as functions.

Structure of Procedure Oriented Programming

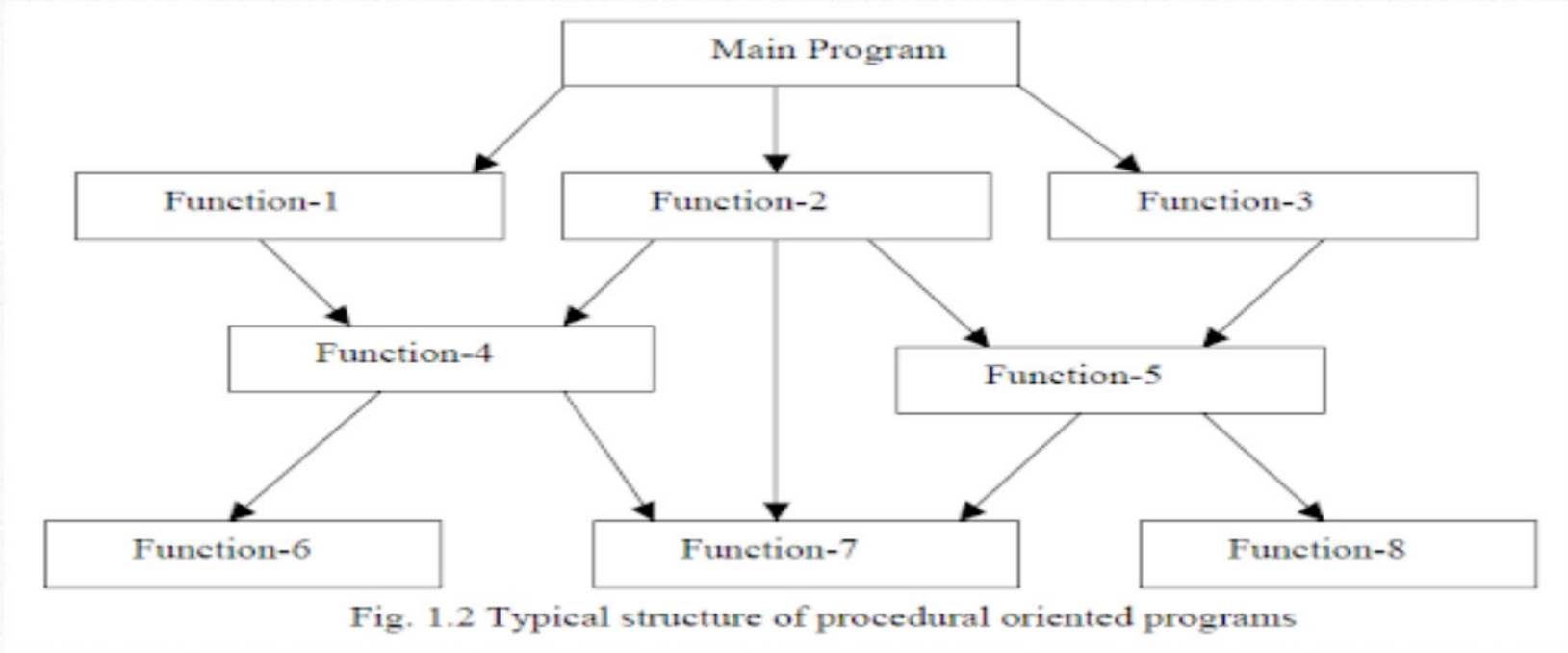


Fig. 1.2 Typical structure of procedural oriented programs

The disadvantage of the Procedure Oriented programming languages is:

1. Inability to reuse code.
2. It does not model real word problem very well
3. No data hiding

Characteristics of Procedure Oriented Programming:

1. Emphasis is on doing things(algorithm)
2. Large programs are divided into smaller programs known as functions.
3. Most of the functions share global data
4. Data move openly around the system from function to function
5. Function transforms data from one form to another.
6. Employs top-down approach in program design

Object Oriented Programing

- Object oriented programming is an approach that provides a way of modularizing programs by creating partitioned memory area for both data and functions that can be used as templates for creating copies of such modules on demand.

Features of the Object Oriented programming

1. Emphasis is on doing rather than procedure.
2. Programs are divided into what are known as objects.
3. Data structures are designed such that they characterize the objects.
4. Functions that operate on the data of an object are tied together in the data structure.
5. Data is hidden and can't be accessed by external functions.
6. Objects may communicate with each other through functions.
7. New data and functions can be easily added.
8. Follows bottom-up approach in program design.

OBJECT-ORIENTED PROGRAMMING CONCEPT

Basic Concepts of Object Oriented Programming

1. Objects
2. Classes
3. Data abstraction
4. Encapsulation
5. Inheritance
6. Polymorphism
7. Dynamic binding
8. Message passing

OBJECTS

Objects are the basic run-time entities in an object-oriented system. They may represent a person, a place, a bank account, a table of data or any item that the program must handle. The fundamental idea behind object oriented approach is to combine both data and function into a single unit and these units are called objects. The term objects means a combination of data and program that represent some real word entity.

CLASS

- A group of objects that share common properties for data part and some program part are collectively called as class.
- In C ++ a class is a new data type that contains member variables and member functions that operate on the variables.

DATA ABSTRACTION

Abstraction refers to the act of representing essential features without including the back ground details or explanations. Classes use the concept of abstraction and are defined as size, width and cost and functions to operate on the attributes.

DATA ENCAPSALATION

The wrapping up of data and function into a single unit (called class) is known as encapsulation. The data is not accessible to the outside world and only those functions which are wrapped in the class can access it. These functions provide the interface between the objects data and the program.

INHERITENCE

Inheritance is the process by which objects of one class acquire the properties of another class. The concept of inheritance provides the idea of reusability. This mean that we can add additional features to an existing class with out modifying it. This is possible by designing a new class which will have the combined features of both the classes.

POLYMORPHISM

Polymorphism means the ability to take more than one form. An operation may exhibit different instance. A language feature that allows a function or operator to be given more than one definition. The types of the arguments with which the function or operator is called determines which definition will be used.

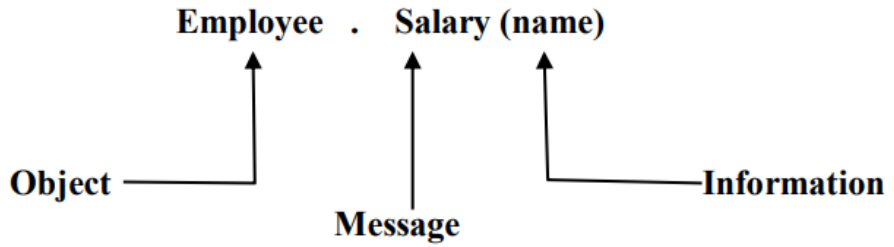
Overloading may be operator overloading or function overloading. It is able to express the operation of addition by a single operator say ‘+’. When this is possible you use the expression x + y to denote the sum of x and y, for many different types of x and y; integers , float and complex no. You can even define the + operation for two strings to mean the concatenation of the strings.

DYNAMIC BINDING

- Binding refers to the linking of a procedure call to the code to the executed in response to the call.
- Dynamic binding means the code associated with a given procedure call is not known until the time of the call at run-time.
- It is associated with a polymorphic reference depends upon the dynamic type of that reference.

MESSAGE PASSING

- An object oriented program consists of a set of objects that communicate with each other.
- A message for an object is a request for execution of a procedure and therefore will invoke a function (procedure) in the receiving object that generates the desired result. Message passing involves specifying the name of the object, the name of the function (message) and information to be sent.



BASIS FOR COMPARISON	POP	OOP
Basic	Procedure/Structure oriented .	Object oriented.
Approach	Top-down.	Bottom-up.
Basis	Main focus is on "how to get the task done" i.e. on the procedure or structure of a program .	Main focus is on 'data security'. Hence, only objects are permitted to access the entities of a class.
Division	Large program is divided into units called functions.	Entire program is divided into objects.
Entity accessing mode	No access specifier observed.	Access specifier are "public", "private", "protected".
Overloading or Polymorphism	Neither it overload functions nor operators.	It overloads functions, constructors, and operators.
Inheritance	Their is no provision of inheritance.	Inheritance achieved in three modes public private and protected.

Data hiding & security	There is no proper way of hiding the data, so data is insecure	Data is hidden in three modes public, private, and protected. hence data security increases.
Data sharing	Global data is shared among the functions in the program.	Data is shared among the objects through the member functions.
Friend functions or friend classes	No concept of friend function.	Classes or function can become a friend of another class with the keyword "friend". Note: "friend" keyword is used only in c++
Virtual classes or virtual function	No concept of virtual classes .	Concept of virtual function appear during inheritance.
Example	C, VB, FORTRAN, Pascal	C++, JAVA, VB.NET, C#.NET.

APPLICATIONS OF OOP:

- Real – Time systems.
- Simulation and modeling
- Object-oriented databases.
- Hypertext, hypermedia.
- Al and expert systems.
- Neural networks and parallel programming.
- Decision support and office automation systems.
- CIM / CAM / CAD system