

CS-212 Object Oriented Programming

Lab 0: Procedural Programming

Lab Objective:

Objective of this lab is to create understanding of procedural language , its limitations and why we are going to study object oriented program course.

What is Procedural Programming?

Procedural Programming may be the first programming paradigm that a new developer will learn. Fundamentally, the procedural code is the one that directly instructs a device on how to finish a task in logical steps. This paradigm uses a linear top-down approach and treats data and procedures as two different entities.

Based on the concept of a procedure call, Procedural Programming divides the program into procedures, which are also known as routines or functions, simply containing a series of steps to be carried out.

Procedural Programming involves writing down a list of instructions to tell the computer what it should do step-by-step to finish the task at hand

Key Features of Procedural Programming

The key features of procedural programming are given below:

- **Predefined functions:** A predefined function is typically an instruction identified by a name. Usually, the predefined functions are built into higher-level programming languages, but they are derived from the library or the registry, rather than the program. One example of a pre-defined function is 'charAt()', which searches for a character position in a string.
- **Local Variable:** A local variable is a variable that is declared in the main structure of a method and is limited to the local scope it is given. The local variable can only be used in the method it is defined in, and if it were to be used outside the defined method, the code will cease to work.
- **Global Variable:** A global variable is a variable which is declared outside every other function defined in the code. Due to this, global variables can be used in all functions, unlike a local variable.
- **Modularity:** Modularity is when two dissimilar systems have two different tasks at hand but are grouped together to conclude a larger task first. Every group of systems then would have its own tasks finished one after the other until all tasks are complete.
- **Parameter Passing:** Parameter Passing is a mechanism used to pass parameters to functions, subroutines or procedures. Parameter Passing can be done through 'pass by value', 'pass by reference' and 'pass by the name'.

Advantages and Disadvantages of Procedural Programming.

Advantages

- Procedural Programming is excellent for general-purpose programming
- The coded simplicity along with ease of implementation of compilers and interpreters
- A large variety of books and online course material available on tested algorithms, making it easier to learn along the way
- Through Procedural Programming technique, the memory requirement also slashes
- The program flow can be tracked easily

Disadvantages

- The program code is harder to write when Procedural Programming is employed
- The Procedural code is often not reusable, which may pose the need to recreate the code if is needed to use in another application
- Difficult to relate with real-world objects
- The importance is given to the operation rather than the data, which might pose issues in some data-sensitive cases
- The data is exposed to the whole program, making it not so much security friendly.

Limitations

- Procedural code is difficult to relate with real-world objects, this may make it difficult to design.
- As the data is exposed to the whole program there is no security for your data. This could mean that a new programmer could corrupt the data accidentally by creating functions.

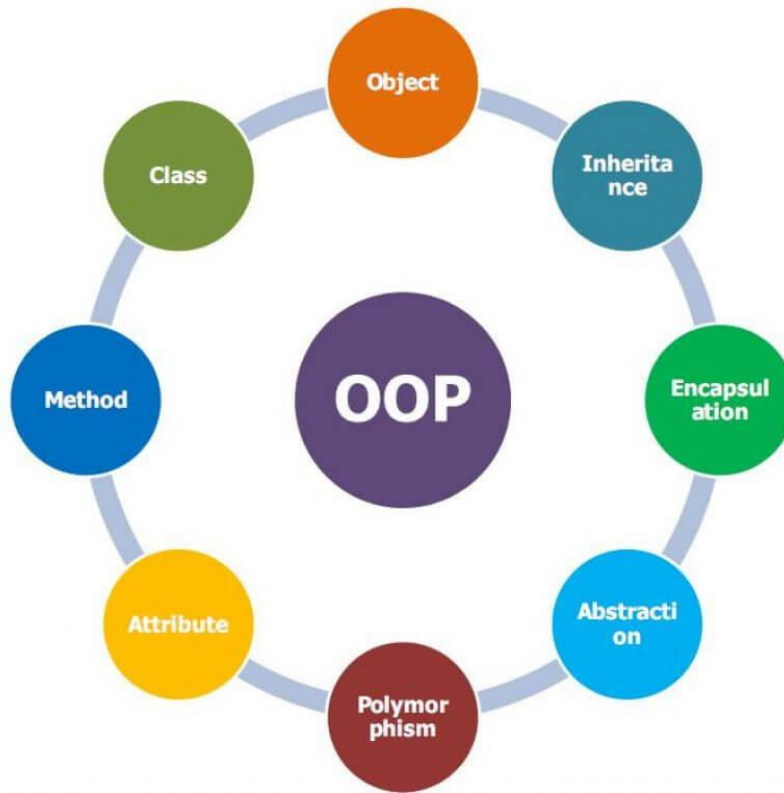
What Is Object-Oriented Programming (OOP)

OOP is an approach to programming which recognizes life as we know it as a collection of objects, which work in tandem with each other to solve a particular problem at hand. The primary thing to know about OOP is encapsulation, which is the idea that each object which holds the program is self-sustainable, which means that all the components that make up the object are within the object itself. Now since each module within this paradigm is self-sustainable, objects can be taken from one program and used to resolve another problem at hand with little or no alterations.

Advantages

- 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

Main Concepts in OOP:



Lab Task:

- Write a function named “ForeCast” in C++ that takes temperature and value of humidity as input argument and return related forecast.

Temperature	Humidity	Forecast
Greater than 35	50 to 60%	Hot Day
Between 25 and 35	35 to 50%	Pleasant Day
Less than 25	Less than 35%	Cool Day

- Write a function named “Product” that takes a number as argument calculate and return the product of its digits of number

- Write a program in C++ to maintain a record of 20 students. You are required to save the attributes of each student for example name, father's name, Roll No, Department and Degree.

Provide following functionalities to maintain student record-

- ✓ To search record of student by passing its roll number. Display all information on console.
- ✓ To insert record of student.
- ✓ To delete record of student by passing its roll number replace all its data by '0'.
- ✓ To display record of each student

Think!!!!

What will be the disadvantages of handling huge record using such programming technique?

Is this good technique to pass each array of data as arguments in functions?