Object Oriented Programming using C++

- **C++ Variable –** A variable is a name of memory location. It is used to store data. Its value can be changed and it can be reused many times. It is a way to represent memory location through symbol so that it can be easily identified.

- **Syntax -** **type variable_list;**

- **Rules for defining variables -**
  - A variable can have alphabets, digits and underscore.
  - A variable name can start with alphabet and underscore only. It can't start with digit.
  - No white space is allowed within variable name.
  - A variable name must not be any reserved word or keywords e.g. char, float etc.

- **Scope of Variables –** All the variables have their area of functioning, and out of that boundary they don't hold their value, this boundary is called scope of the variable. We can broadly divide variables into two main types –
  - Global Variable
  - Local Variable

- **Global variables -** Global variables are those, which are once declared and can be used throughout the lifetime of the program by any class or any function.

- They must be declared outside the main() function. If only declared, they can be assigned different values at different time in program lifetime.

- But even if they are declared and initialized at the same time outside the main() function, then also they can be assigned any value at any point in the program.

```
#include<iostream.h>
int x;                          // Global variable declared
void main()
{
      x=10;
      cout <<"first value of x = "<< x;
      x=20;
   cout <<"Initialized again with value = "<< x;
}
```

- Local variables are the variables which exist only between the curly braces, in which its declared. Outside that they are unavailable and lead to compile time error.

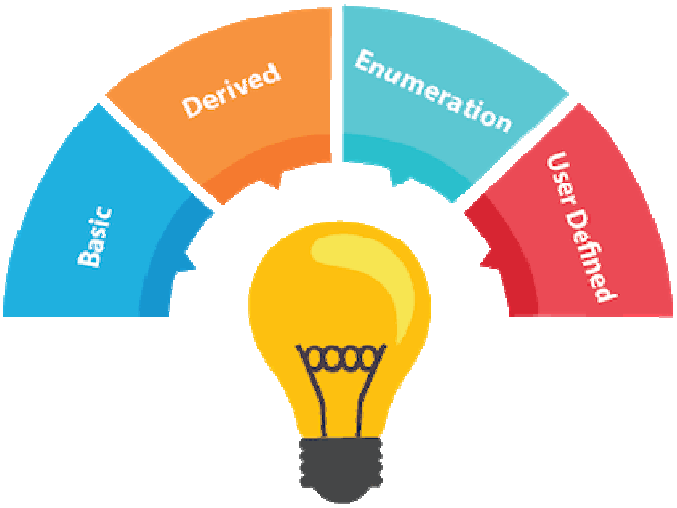
```
#include<iostream.h>
void main()
{
      int a = 10;
      if( a < 20)
      {
      int n=100;                    // Local variable declared and initialized
      }
      cout << n;                    // Compile time error, n not available here
}
```

- There are also some special keywords, to impart unique characteristics to the variables in the program.

1. **Final** - Once initialized, its value cant be changed.
2. **Static** - These variables holds their value between function calls.

```
#include <iostream.h>
void main()
{
   final int i=10;
   static int y=20;
}
```

- A data type specifies the type of data that a variable can store such as integer, floating, character etc.



Types	Data Types
Basic Data Type	int, char, float, double etc.
Derived Data Type	array, pointer etc.
Enumeration Data Type	enum
User Defined Data Type	Structure, union etc.

- The basic data types are integer-based and floating-point based. C++ language supports both signed and unsigned literals. The memory size of basic data types may change according to 32 or 64 bit operating system.

Data Types	Memory Size	Range
char	1 byte	-128 to 127
signed char	1 byte	-128 to 127
unsigned char	1 byte	0 to 127
short	2 byte	-32,768 to 32,767
signed short	2 byte	-32,768 to 32,767
unsigned short	2 byte	0 to 32,767
int	2 byte	-32,768 to 32,767
signed int	2 byte	-32,768 to 32,767
Data Types	Memory Size	Range
unsigned int	2 byte	0 to 32,767
short int	2 byte	-32,768 to 32,767
signed short int	2 byte	-32,768 to 32,767
unsigned short int	2 byte	0 to 32,767
long int	4 byte	
signed long int	4 byte	

unsigned long int	4 byte	
float	4 byte	
double	8 byte	
long double	10 byte	

- **Modifiers in C++ program –**
- In C++, special words(called modifiers) can be used to modify the meaning of the predefined built-in data types and expand them to a much larger set.
- There are four data types modifiers in C++, they are -
  a) long
  b) short
  c) signed
  d) unsigned
- ***Important points -***
  1. long and short modify the maximum and minimum values that a data type will hold.
  2. A plain int must have a minimum size of short.
  3. Size hierarchy : short int < int < long int
  4. Size hierarchy for floating point numbers is : float < double < long double
  5. Long float is not a legal type and there are no short floating point numbers.
  6. Signed types include both positive and negative numbers and is the default type.
  7. Unsigned, numbers are always without any sign that is always positive.

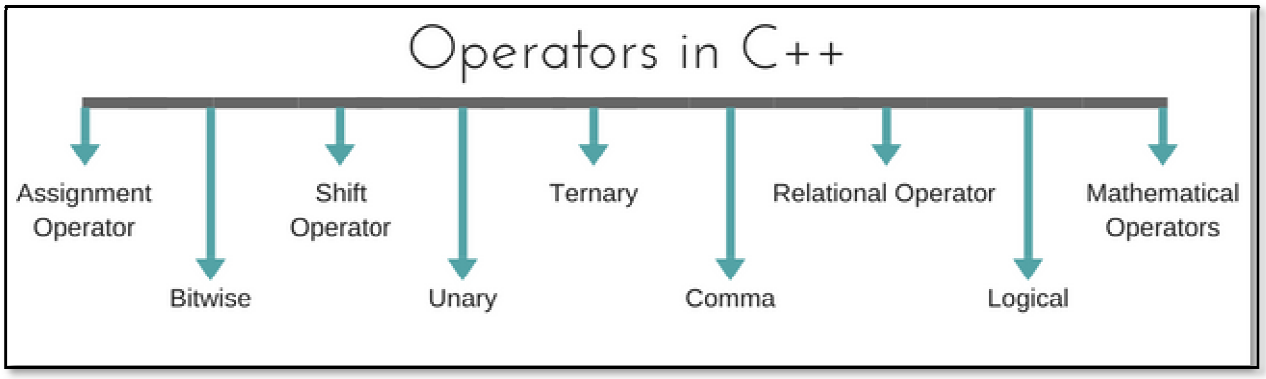
- **C++ Keywords –**
  1. A keyword is a reserved word. A list of 32 Keywords in C++ Language which are also available in C language are given below.
  2. A list of 30 Keywords in C++ Language which are not available in C language are given below.
- **Comments in C++ Program –**
  a) For single line comments, use // before mentioning comment, like –

```
cout<<"single line";          // This is single line comment
```

  b) For multiple line comment, enclose the comment between /* and */ -

```
/*this is a multiple line comment */
```

- **Operators -** An operator is simply a symbol that is used to perform operations. There can be many types of operations like arithmetic, logical, bitwise etc.
- **Types of Operator –**



==========