Chapter 2

Element of C++

What is C++ ?

C++ is an Object Oriented Programming Language.(OOPS). It was developed by Bjarne Stroustrup at AT & T's Bell laboratory in USA. C++ was actually introduced in early 80's. Stroustrup combine the features of Simula 67 & C language and developed C++.

The concept of Class was the major feature added to the C language. So Stroustrup called a new language as C with Classes. But in 1983 the name was changed to C++. The idea comes from the increment operator "++". Suggest that C++ is an incremented version of C.

e.g. C++, Java, Vb

Write a Program to Addition of Two Numbers.

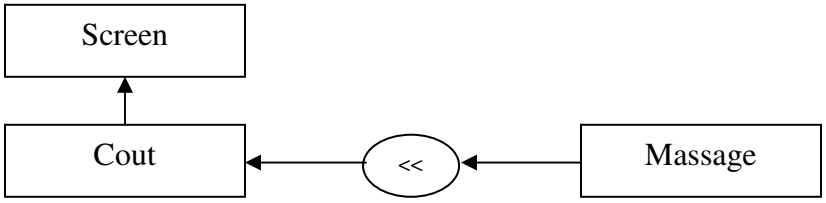
```
// Program for Addition of two Numbers

#include<iostream.h>
#include<conio.h>
main()
{
int a,b;
clrscr();
cout<<"Enter the no = ";
cin>>a;
cout<<"Enter the no = ";
cin>>b;
int c;
c=a+b;
cout<<"Addition = "<<c;
getch();
return(0);
}
```

In the above program the first line is the comment line. C++ introduced a new comment symbol "//" (Double Slash). Comment line starts with a // and terminate at the end of the line. A comment may start anywhere in the program. There is no closing symbol for comment line. For multiple comment line, we can use the symbol provided by C language i.e. /* …… */.

Output Operator

The statement Cout<<"Enter the no = " in the above program causes the string in double quotation mark to be printed on the screen. This statement introduced to new features of C++ as "Cout" & "<<". The identifier "Cout" is a predefined object that represents the standard O/P string in C++. The standard O/P string represents the screen.

The operator "<<" is called the 'Insertion' or 'Put to' operator. It inserts the contents of a variable on its right to the object on its left.



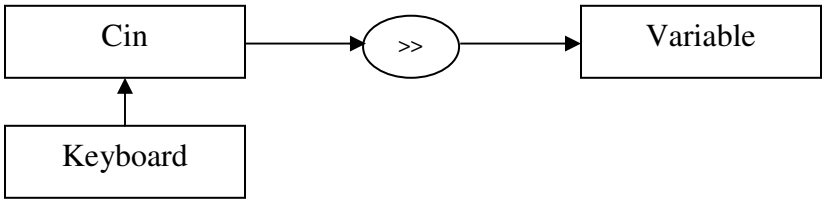
Output using Insertion Operator

Input Operator

The Statement Cin>>a; in the above program is an input statement which causes the program to wait for the user to type a specific value. The identifier "Cin" is predefined object in C++ that corresponds to standard input string. The standard I/P string is nothing but a keyboard of the system.

The operator ">>" is known as 'Extraction' or 'Getfrom' operator. It extracts the value from keyboard & assign to the variable on its right.

The Printf and Scanf functions in C programming are replaced by Cout & Cin objects.



Input using Extraction Operator

Cascading of Operators

The statement Cin>>a>>b; in above program first get the value from keyboard & assign to variable 'a' using getfrom (>>) opertor & then 'b'. The multiple use of "<<" or ">>" in a single line statement is called as cascading of operators.

Iostream.h File

The file iostream.h in the above program by the statement

#include<iostream.h>

This header file must be included at the beginning of all C++ program because this file content the standard format for the input and output statement in C++.

Return Statement

In C++ main() return an integer type value. Therefore every main() in C++ should end with a return(0) statement, otherwise a warning or a error occurs.

Declaration of Variable

In C programming all the variable must be declared before they are used in any executable statement. In C++ also variable declaration is compulsory, but there is a difference between C & C++ with reference to the place of there declaration in the program.

In C Programming all the variable must be declared at the beginning of the program and the actual use of variable appears at the some other location in the program. C++ allows the declaration of a variable anywhere in the program, this means that variable can be declared at the place of its first use. This makes the program much easier to write and to understand. It also reduce the error that may be related with the variable.

Dynamic Initialization of Variables

C++ permits initialization of the variable at runtime. This is called as dynamic initialization. Observe that declaration and initialization of variable can be done simultaneously at a place where the variable is used for the first time. Dynamic initialization is extensively used in Object Oriented Programming.

e.g. float area = 3.14 * red *red;
float avg = sum/i;

Rules for Variable Declaration

1. A variable name should be a combination of alphabets, digits or underscores.
2. The first character in a variable name must be an alphabet.
3. No commas or blank spaces are allowed within the variable name.
4. A declared keyword can not be used as a variable name.
5. Upper case & lower case letters are distinct.

In C++ any program executing starts from main() followed by "{" and ending with "}". Save this program with valid file name and extension as .cpp by pressing F2 key or select File-Save option. To run C++ program following key combinations are used

Compile – Alt + F9
Execute – Ctrl + F9
Output – Alt + F5

Reference Variable

C++ introduce a new kind of variable known as reference variable. The reference variable concept provides an alternative name for a previously defined variable. The concept of reference variable introduced in C++ just to avoid concept of pointers.

Syntax :

Data type & Reference Variable = Old variable

Write a Program to Interchange Value of Two nos. using Reference Variable.

```
#include<iostream.h>
#include<conio.h>

void swap(int &,int &);
main()
{
int a,b;
clrscr();
cout<<"Enter two nos. = ";
cin>>a>>b;
swap(a,b);
cout<<"Interchange Value = "
    <<a<<" "<<b;
getch();
return(0);
}

void swap(int &p,int &q)
{
int r;
r=p;
p=q;
q=r;
}
```

Write a Program to Calculate Simple Interest.

```
#include<iostream.h>
#include<conio.h>

main()
{
float p;
clrscr();
cout<<"Enter the Principle Amount = ";
cin>>p;
float n;
cout<<"Enter the No. of year = ";
cin>>n;
float r;
cout<<"Enter the rate = ";
cin>>r;
float si;
si=p*n*r/100;
cout<<"Simple Intrest = "<<si;
getch();
return(0);
}
```

Write a Program to Addition, Subtraction, Multiplication, Division of Two nos.

```
#include<iostream.h>
#include<conio.h>

main()
{
int a,b;
clrscr();
cout<<"Enter two nos. = ";
cin>>a>>b;
int c;
c=a+b;
cout<<"Addition = "<<c;
int d;
d=a-b;
cout<<"Subtraction = "<<d;
int e;
e=a*b;
cout<<"Multiplication = "<<e;
float f;
f=a/b;
cout<<"Division = "<<f;
getch();
return(0);
}
```

Write a Program to Read 3 Sub Marks & Calculate Total Marks & Percentage.

```
#include<iostream.h>
#include<conio.h>

main()
{
int m1,m2,m3;
clrscr();
cout<<"Enter the Marks of Sub1 = ";
cin>>m1;
cout<<"Enter the Marks of Sub2 = ";
cin>>m2;
cout<<"Enter the Marks of Sub3 = ";
cin>>m3;
int t;
t=m1+m2+m3;
float p;
p=t/3;
cout<<"Total Marks = "<<t;
cout<<"Percentage = "<<p;
getch();
return(0);
}
```

Write a Program to Calculate Gross Salary of an Employee.

Da = 20 % of Salary
Hra = 30 % of Salary
Gs = Salary + Hra + Da

```
#include<iostream.h>
#include<conio.h>

main()
{
int s;
clrscr();
cout<<"Enter the Salary = ";
cin>>s;
float da,hra,gs;
da=0.20*s;
hra=0.30*s;
gs=s+da+hra;
cout<<"Da = "<<da;
cout<<"Hra = "<<hra;
cout<<"Gross Salary = "<<gs;
getch();
return(0);
}
```

Write a Program to Interchange the 2 Values.

```
#include<iostream.h>
#include<conio.h>

main()
{
int a,b,c;
clrscr();
cout<<"Enter the 2 Value = ";
cin>>a>>b;
c=a;
a=b;
b=c;
cout<<"Interchange Value = "<<a<<" "<<b;
getch();
return(0);
}
```

Write a Program to Calculate Area of Circle.

```
#include<iostream.h>
#include<conio.h>

main()
{
```

```
int r;
clrscr();
cout<<"Enter the radius = ";
cin>>r;
float a;
a=3.14*r*r;
cout<<"Area of Circle = "<<a;
getch();
return(0);
}
```