LESSON FOUR

1 Statements:

A statement in a computer carries out some action. There are three types of statements used in C++; they are expression statement, compound statement and control statement.

Expression statement	Compound statement	Control statement
x=y; **sum=x+y;**	**{** **a=b+c;** **x=x*x;** **y=a+x;** **}**	**If (a>b) {** **a=I;** **k=a+1;** **}**

2 Getting Started with C++:

The skeleton of a typical C++ program structure is given below:

Program heading

Begin

Type or variable declaration

Statements of operation

Results

end

The keyboard and screen I/O instructions in C++ are:

(a): COUT/ display an object onto the video screen:

Cout<<var.1<<var2<<…<<var.n;

(b): Cin/ It is used to read an object from a standard input device (keyboard):

Cin>>var.1>>var.2>>…>>var.n;

To begin learning C++ lets examine our first C++ Program:

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Example 1

```
#include<iostream.h>
void main( )
{
    // A program to print welcome
    cout << "Welcome";
}
```

Output:

```
Welcome
```

- **#include<iostream.h>** this line is for pre-processor directive. Any begins with # is processed before the program is compiled. C++ programs must be start with #include.

  Every group of related functions is stored in a separate library called (header file).To use the *cin* and *cout*, must include the header file *iostream.*

- **main( )**, is the name of C++ function. Every C++ program must have a function called main.

- **void**, is the return type of the main function. When the return type of a function is void, this function will not passes back any value to the calling function.

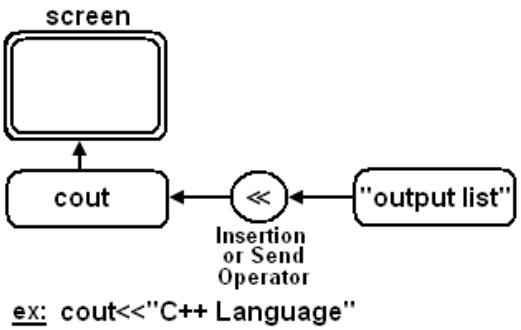
  Some programmers use *int* as a return type for the main function, in this case a ***return(0)*** statement must be written as a last statement of the main function-body.

- **{**, introducing the statements that define the function.

- **}**, indicates the end of the statements in the function.

- **//**, text after these symbols is a comment. It does not affect the program code, and compilers normally ignore it.

- **cout**, the input stream object. It passes the characters quotes (") to the terminal screen.



- **cin**, the input stream object. It reads the input values from the keyboard.

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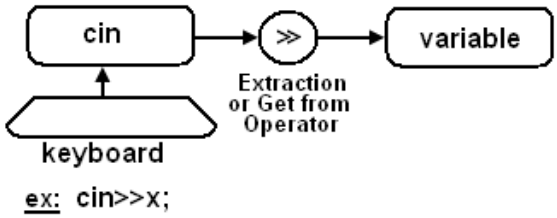

- **<<**, the stream insertion operator (or send operator).
- **>>**, the stream extraction operator (or get from operator).
- **;** , semicolon, the terminator of every C++ statement.

The **endl** is used in c++ to represent a new line, as shown in the following example:

Example 2

```
#include<iostream.h>
void main( )
{
    cout << "hallow" << endl;
    cout << "students";
}
```

Output:

```
hallow
students
```

The **\n** is a special escape code, also used in C++ to represent a new line, as shown in the following example:

Example 3

```
#include<iostream.h>
void main( )
{
    cout << "hallow \n";
    cout << "students";
}
```

Output:

```
hallow
students
```

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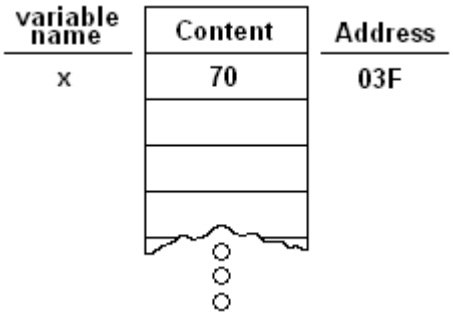
3 Variables Declaration:

A declaration is a process of naming the variables and their statements datatypes in C++. C++ allows declaration of the variables before and after executable statements. A variable ia an object that may be take on values of the specified type.

Also ,a variable is a location in the computer's memory where a value can be stored for later use by the program. Variables are like buckets that hold data. These data buckets are really locations in the computer's memory.



The variable must be declared by specifying the datatype and the identifier.

datatype id.1, id2, …,idn;

A variable defined by stating its type, followed by one or more spaces, followed by the one or more variable names separated by commas, then followed by semicolon. For example:

```
unsigned short Int X;
float Y;
char A, a, c;
```

Note: C++ does distinguish between above *A* and *a* variables (C++ is case-sensitive).

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Example 4

The following program reads three different inputs and outputs it.

```
#include<iostream.h>
void main( )
{
    int num=3;
    cout << "number="<<num<<"\n";
    char ch='a';
    cout << "character="<<ch<<"\n";
    float fa=-34.45;
    cout<<"real number="<<fa<<"\n";
}
```

Output:

Number=3

Character=a

Real number=34.45

Example 5

The following program reads three different inputs and outputs it.

```
#include<iostream.h>
void main( )
{
    int n;   float f;    char c;
    cout << "input integer number:";
    cin>>n;
    cout<<endl;
    cout << "input decimal number:";
    cin>>f;
    cout<<endl;
    cout << "input character:";
    cin>>c;
}
```

Output:

input integer number: 5

input decimal number: 4.2

input character: A

4 Constants:

Like variables, constants are data storage locations. Unlike variables, and as the name implies, constants don't change.

```
const  int myage=23;
const double pi=3.14;
const float salary=20.5;
```

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Example 6

Write a program that reads the radius of a circle, then computes and outputs its area.

```
#include<iostream.h>
void main( )
{
    const float  pi = 3.14;
    int r;  float c;
    cout << "enter the radius of circle:";
    cin>>r;
    cout<<endl;
    c = r * r * pi;
    cout << "the area of circle:" << c;
}
```

Output:

```
enter the radius of circle: 5

the area of circle: 78.5
```

Example 7

The following program computes the arethmatic operators.

```
#include<iostream.h>
void main( )
{
    int a,b,sum,sub,mul,div;
    cout << "enter any two numbers<<endl;
    cin>> a>>b;
    sum=a+b;
    sub=a-b;
   mul=a*b;
   div=a/b;
   cout<<"a="<<a<<"b="<<b<<"sum="<<sum<<endl;
   cout<<"sub="<<sub<<endl;
   cout<<"mul="<<mul<<endl;
   cout<<"div="<<div<<endl;
}
```

Output:

```
Enter any two numbers
10    20
A=10  b=20  sum=30
Sub=-10
Mul=200
Div=0
```

Example 8

The following program computes different division operators.

```
#include<iostream.h>
void main( )
{
        int x,  y, z, r ;
        x= 7 / 2;
        cout << "x=" << x <<endl;
        y=17/(-3);
        cout << "y="<< y <<endl;
        z=-17/3;
        cout << "z="<< z <<endl;
        r=-17/(-3);
        cout << "r="<< r <<endl;
}
```

Output:

```
x= 3
y= -5
z= -5
r= 5
```

The modulus operator "%" is used with integer operands (int, short, long, unsigned). It can't be used with float or double operands.

Example 9

```
#include<iostream.h>
void main( )
{
        int y1, y2;
        y1 = 8 % 3;
        y2 = -17 % 3;
        cout << "y1="<< y1 <<endl;
        cout << "y2="<< y2 <<endl;
}
```

Output:

```
y1=2
y2=-2
```