

# LECTURE 9

## 1. For Statement:

### General Form of For statement:

```
for ( initialization ; continuation condition ; update )  
    statement1 ;
```

```
for ( initialization ; continuation condition ; update )  
{  
    statement1 ;  
    statement2 ;  
    :  
}
```

Example 1:     for ( i = 0; i < 10; i++ )  
                  cout << i;

Output:

0 1 2 3 4 5 6 7 8 9

Example 2:     for ( i = 0; i < 10; i += 2 )  
                  cout << i;

Output:

*even numbers only*

0 2 4 6 8

Example 3:     for ( i = 1; i < 10; i += 2 )  
                  cout << i;

Output:

*odd numbers only*

1 3 5 7 9

### Example 1



Write C++ program to add the numbers between 1 and 100:

```
#include<iostream.h>  
void main( )  
{  
    int sum = 0;  
    for ( int i = 1; i <= 100; i ++ )  
        sum = sum + i;  
    cout << "sum is: " << sum;  
}
```

## Example 2



Write C++ program to find the factorial of n (*using for statement*):

$$n! = n * n-1 * n-2 * n-3 * \dots * 2 * 1$$

```
#include<iostream.h>
void main( )
{
    int n, f = 1;
    cout << "enter positive number: ";
    cin >> n;
    for ( int i = 2; i <= n; i ++ )
        f = f * i;
    cout << "factorial is: " << f;
}
```

for ( int i = n; i > 2; i -- )

←

## Example 3



Write C++ program to the result of the following:

$$\sum_{i=1}^{20} a_i^2$$

```
#include<iostream.h>
void main( )
{
    int sum = 0;
    for ( int i = 1; i <= 20; i ++ )
        sum = sum + ( i * i );
    cout << "The sum is: " << sum;
}
```

## Example 4



Write C++ program to read 10 integer numbers, and find the sum of positive number only:


```
#include<iostream.h>
void main( )
{
    int num, sum = 0;
    for ( int i = 1; i <= 10; i ++ )
    {
        cout << "enter your number: ";
        cin >> num;
        if ( num > 0 )    sum = sum + num;
    }
    cout << "The sum is: " << sum;
}
```

### Example 5

 Write C++ program to print the following series: 1, 2, 4, 8, 16, 32, 64

```
#include<iostream.h>
void main( )
{
    int x;
    for ( x = 1; x < 65; x *= 2 )
        cout << x << " ";
}
```

### Example 6

 Write C++ program to print the following:

```
#include<iostream.h>
void main( )
{
    int x;
    for ( x = 1; x < 7; ++ x )
        cout << x << "\t" << 11 - x << endl;
}
```

1	10
2	9
3	8
4	7
5	6
6	5

### Example 7

 Write C++ program to read a line using for loop

```
#include<iostream.h>
void main( )
{
    Char ch;
    cout << "Enter a line\n";
    for (:(ch=cin.get())!='\n'); {
        cout<<"Your character is:"<<endl;
        cout.put(ch);
    }
}
```

## 2. More about For Statement:

We can use more than one control with for statement, as follow:

```
for ( int m = 1, int n = 8 ; m < n ; m ++ , n -- )
```

We can create infinite loop, as follow:

```
for ( ; ; )
```



```

#include<iostream.h>
void main( )
{
    int i, j;
    for ( i = 1; i <= 10; i ++ )
    {
        for ( j = 1; j <= i; j ++ )
            cout << " + ";
        cout << "\n";
    }
}

```

### Example 10

 Write C++ program to read a line using for loop

```

#include<iostream.h>
void main( )
{
    cout << "Explaining the nested for loop\n";
    for (int i=0;i<=2;i++) {
        cout<<i;
        for (int k=0;k<=2;k++) {
            cout<<"computer sciences department \n";
        }
    }
}

```

### Exercise:

*What is the output of the following C++ program ?*

```

#include<iostream.h>
void main( )
{
    int i, j, k;
    for ( i = 1; i <= 2; i ++ )
    {
        for ( j = 1; j <= 3; j ++ )
        {
            for ( k = 1; k <= 4; k ++ )
                cout << " + ";
            cout << "\n";
        }
        cout << "\n";
    }
}

```