



Al-mustaqbal University collage
Biomedical Engineering Department
Class: First
Subject: Computer Skills & Programming

Lecture 6: LOOP AND OTHER CONTROL STATEMENTS

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LOOP AND OTHER CONTROL STATEMENTS

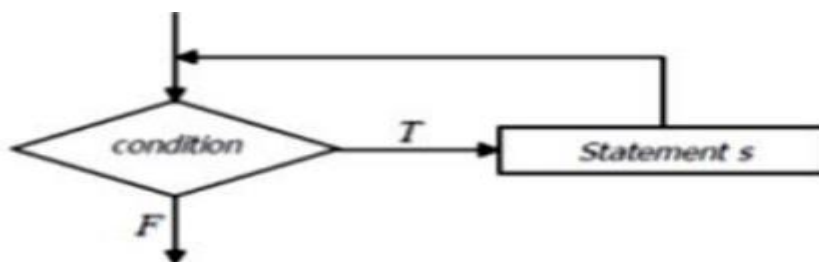
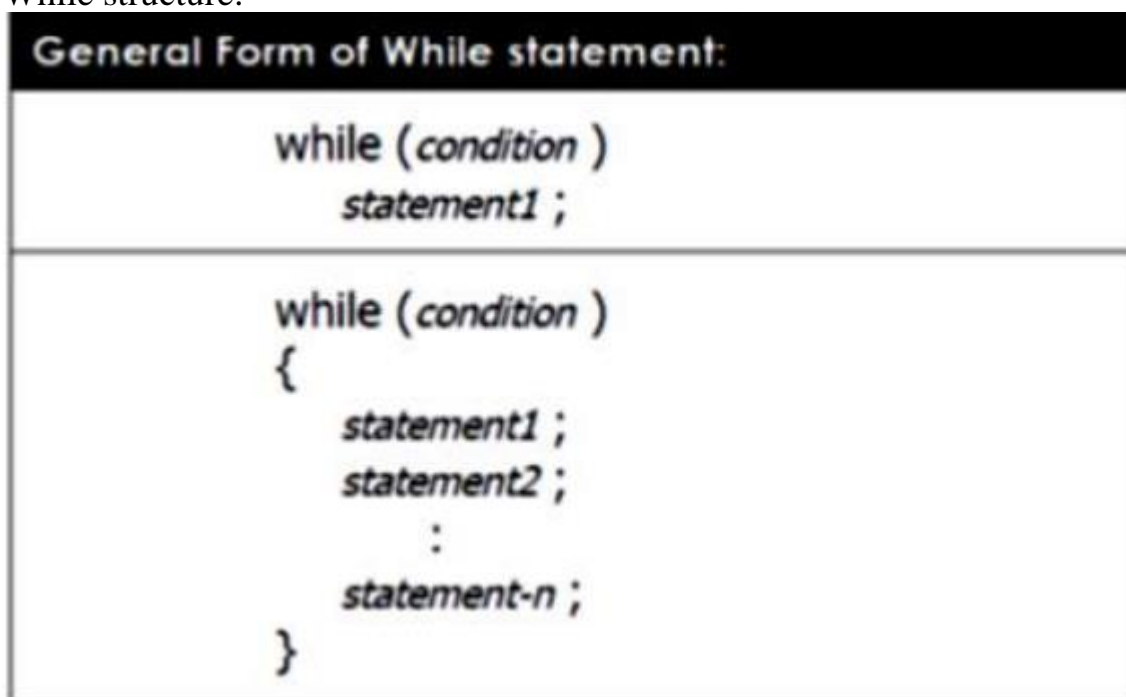
In C++ programming language, there are three loop statements, they are:

1. The while statement (loop) .
2. The do...while statement (loop) .
3. The for statement (loop).

1. THE while STATEMENT.

The while statement or loop is as illustrated below :

While structure:



The condition represents the value of a variable, unary or binary expression, and a value returned by a function.

Example:

```
#include<iostream.h>
#include<conio.h>
int main()
{
int i= 0;
while (i<=10)
{
cout<< i;
++i;
}
getch();

}
```

Output:

C:\BC5\BIN\NONAME00.exe

012345678910

Example:write c++ program prints the word hello 10 times

```
#include<iostream.h>
#include<conio.h>
void main ()
{
int i=0;
while (i<10)
{
i++;
cout<<"hello"<<endl;
}
getch();
}
```

Output:

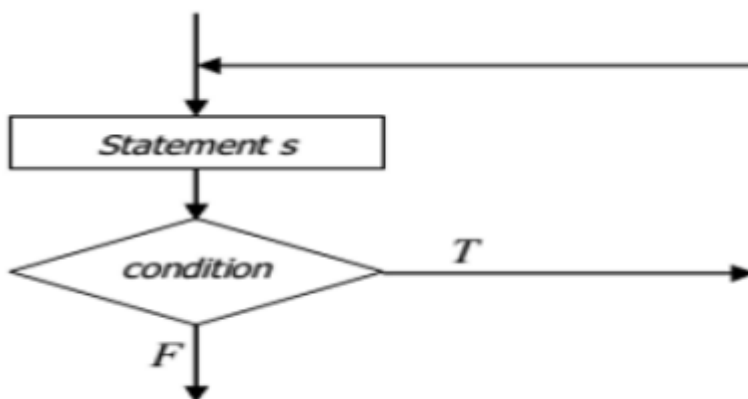
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```
hello
hello
hello
hello
hello
hello
hello
hello
hello
hello
hello
```

2. THE do...while LOOP

The do...while statement is almost the same as the while statement. Its syntax is

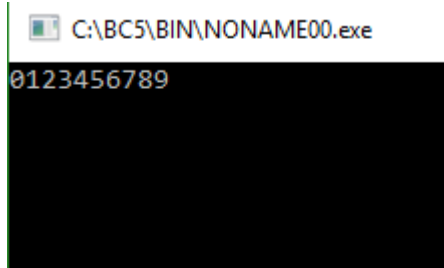
General Form of Do / While statement:
<pre>do <i>statement1</i> ; while (<i>condition</i>);</pre>
<pre>do { <i>statement1</i> ; <i>statement2</i> ; : <i>statement-n</i> ; } while (<i>condition</i>);</pre>



Example:

```
#include<iostream.h>
#include<conio.h>
int main ()
{
int i=0;
do{
cout<<i;
i++;
}
while(i<10);
    getch();
}
```

Output:



3. THE for LOOP

The for loop is written as given below: -

General Form of For statement:
<pre>for (<i>initialization</i> ; <i>continuation condition</i> ; <i>update</i>) <i>statement1</i> ;</pre>
<pre>for (<i>initialization</i> ; <i>continuation condition</i> ; <i>update</i>) { <i>statement1</i> ; <i>statement2</i> ; : }</pre>

FOR Example:

- for (i = 0; i < 10; i++)
 cout << i; Output:
 0 1 2 3 4 5 6 7 8 9
- for (i = 0; i < 10; i += 2)
 cout << i; Output: even numbers only
 0 2 4 6 8
- for (i = 1; i < 10; i += 2)
 cout << i; Output: odd numbers only
 1 3 5 7 9

Example:

Write c++ program to add the numbers between 1 and 10:

```
#include<iostream.h>
#include<conio.h>
int main(){
int sum =0;
int i;
for (i = 1; i <= 10; i++)
    {
        cout << i << " ";

sum=sum+i;
    }
    cout << "\n The sum of first 10 natural numbers: " << sum << endl;
getch();
}
```

Output:

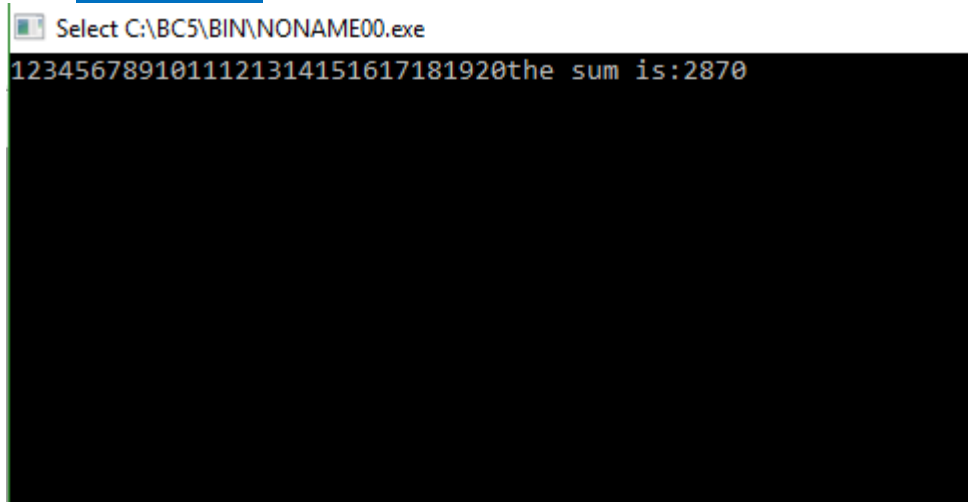
```
1 2 3 4 5 6 7 8 9 10
The sum of first 10 natural numbers: 55
```


Example: write C++ program to the result of the following:

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

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

output:



```
Select C:\BC5\BIN\NONAME00.exe
1234567891011121314151617181920the sum is:2870
```

❖ NOTS

| 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 ( ; ; )
```

NESTED for LOOPS

If a function involves more than one variable and we want to evaluate it for different values of all the variables, we will have to use a nested for loop, as illustrated below:

```
for ( int n=0; n<= A; n++)  
{  
for ( int m=0; m<= B ; m++)  
{  
Statements;  
}  
}
```

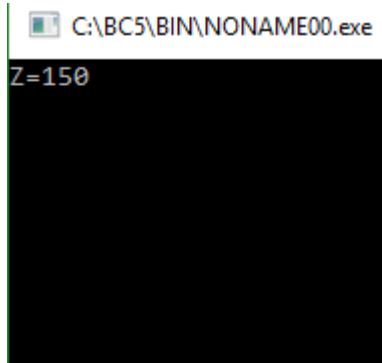
Ex : Write a program finds the value of Z form the following formula:

$$Z = \sum_{i=0}^5 \sum_{j=0}^4 i * j$$

```
#include<iostream.h>  
#include<conio.h>  
int main()  
{  
int i, j, sum=0;  
for(i=0;i<=5;++i)  
{  
for(j=0;j<=4;++j)  
z+=(i*j); }  
}
```

```
cout<<"Z="<<z;  
}
```

Output:



A screenshot of a Windows command prompt window. The title bar at the top reads "C:\BC5\BIN\NONAME00.exe". The main area of the window is black, with the text "Z=150" displayed in white at the top left.

Thank you