Topic 4:- Looping Statements.

Looping Statement:- *A loop is used for executing a block of statements repeatedly until a particular condition is satisfied.*

I. *while*
II. *do while*
III. *for*
IV. *nested for*

I. ***While Statement:-*** **while loop has one control condition, and executes as long the condition is true. The condition of the loop is tested before the body of the loop is executed, hence it is called an *entry-controlled* loop.**

Syntax:-

```
while(condition)
{
    statement 1;
    statement 2;
    .....
    statement n;
}
```

Example 1:- ***Write a program to put any one number and print table using while.***

Solution:-

```
#include<iostream>
using namespace std;
```

```
int main()
{
    int a,i=1,b;
    cout<<"enter one number=";
    cin>>a;
    while(i<=10)
    {
        b=a*i;
        cout<<"b="<<b<<"\n";
        i++;
    }
    return 0;
}
```

Output:-

```
Enter one number=4      // first time run you enter 4
4
8
12
16
20
24
28
```

```
32
36
40
Enter one number=19        // second time run you enter 19
19
38
57
76
95
114
133
152
171
190
```

II. ***do while:-*** **It is a variant of while loop where the condition isn't checked at the top but at the end of the loop, known as exit controlled loop. This means statements inside do-while loop are executed at least once and exits the loop when the condition becomes false or break statement is used. The condition to be checked can be changed inside the loop as well.**

Syntax:-

```
do
{
   Statement 1;
    ... ... ...
   Statement n;
}while (condition);
```

Example 1:- ***Write a program to put any one number and find factorial using do while.***

Solution:-

```
#include<iostream>
using namespace std;
int main()
{
    int a,i=1;
    cout<<"enter one number=";
    cin>>a;
    do
    {
        i=a*i;
        cout<<"i="<<i<<"\n";
        a--;
    }while(a>=1);
    return 0;
}
```

Output:- enter one number= 5

i=5

i=20
i=60
i=120
i=120.

III. for statement:- **When you know exactly how many times you want to loop through a block of code, use the for loop instead of a while loop.**

Syntax:-

```
for(variable; condition; increment/decrement)
    {
    statement 1;
    statement 2;
    ....
    statement n;
    }
```

Example 1:- ***Write a program to print 1 to 10 series.***

Solution:-

```
#include<iostream>
using namespace std;
int main()
{
for(int i=1;i<=10;i++)
{
```

```
        cout<<i<<"\n";
    }
    return 0;
    }
```

Output:-

1
2
3
4
5
6
7
8
9
10.

IV. nested for:- Nested loop means a loop statement inside another loop statement. That is why nested loops are also called as ***loop inside loop***.

Syntax:-

```
    for(variable; condition; increment/decrement)
        {
        for(variable; condition; increment/decrement)
            {
                statement 1;
                statement 2;
```

```
        ....
        statement n;
    }

    statement 1;
    statement 2;
    ....
    statement n;
    }
```

Example 1:-Write a program to print a 2D matrix of 3×3 using *nested for loop.*

Solution:-

```
#include<iostream>
using namespace std;
int main()
{
for(int i=1;i<=3;i++)
{
    for(int j=1;j<=2;j++)
    {
    cout<<j;
    }
    cout<<i<<"\n";
}
return 0;
```

```
}
```

Output:-

```
121
122
123
```

Created by:-Ajay kumar verma