

Loops in C++

A loop is used for executing a block of statements repeatedly until a particular condition is satisfied. A loop consists of an initialization statement, a test condition and an increment statement.

for loop

The syntax of the for loop is

```
for (initialization; condition; update) {  
    // body of-loop  
}
```

```
#include<iostream>  
using namespace std;  
  
int main(){  
  
    for(int i=1;i<=5;i++){  
        cout<<i<<" ";  
    }  
  
    return 0;  
}
```

Output –

```
URVIs-MacBook-Air:helloworld urvigoel$ ./forloop  
1 2 3 4 5
```

The for loop is initialized by the value 1, the test condition is $i \leq 5$ i.e the loop is executed till the value of i remains lesser than or equal to 5. In each iteration the value of i is incremented by one by doing $i++$.

while loop

The syntax for while loop is

```
while (condition) {  
    // body of the loop  
}
```

```
#include<iostream>  
using namespace std;  
  
int main(){  
  
    int i=1;  
  
    while(i<=5){  
        cout<<i<<" ";  
        i++;  
    }  
    return 0;  
}
```

Output-

```
URVIs-MacBook-Air:helloworld urvigoel$ ./whileloop
1 2 3 4 5
```

The while loop is initialized by the value 1, the test condition is $i \leq 5$ i.e the loop is executed till the value of i remains lesser than or equal to 5. In each iteration the value of i is incremented by one by doing $i++$.

do...while loop

The syntax for while loop is

```
do {
    // body of loop;
}
while (condition);
```

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

int main(){

    int i=1;

    do
    {
        cout<<i<<" ";
        i++;
    } while (i<=5);

    return 0;
}
```

Output-

```
URVIs-MacBook-Air:hellworld urvigoel$ ./dowhile  
1 2 3 4 5
```

The do while loop variable is initialized by the value 1, in each iteration the value of i is incremented by one by doing i++, the test condition is $i \leq 5$ i.e the loop is executed till the value of i remains lesser than or equal to 5. Since the testing condition is checked only once the loop has already run so a do while loop runs at least once.

Examples –

Ques1. Program to find sum of natural numbers till n.

```
#include<iostream>  
using namespace std;  
  
int main(){  
  
    int n;  
    cin>>n;  
  
    int sum=0;  
    for(int counter=1;counter<=n;counter++){  
        sum=sum+counter;  
    }  
  
    cout<<sum<<endl;  
  
    return 0;  
}
```

Apni Kaksha

Ques2. Program to display multiplication table upto 10.

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

int main()
{
    int n;

    cout << "Enter a positive integer: ";
    cin >> n;

    for (int i = 1; i <= 10; ++i) {
        cout << n << " * " << i << " = " << n * i << endl;
    }

    return 0;
}
```

Ques3. Program to add only positive numbers.

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

int main() {
    int number;
    int sum = 0;

    cout << "Enter a number: ";
    cin >> number;
```

```
while (number >= 0) {  
  
    sum += number;  
    cout << "Enter a number: ";  
    cin >> number;  
}  
  
cout << "\nThe sum is " << sum << endl;  
  
return 0;  
}
```