វិទ្យាស្ថានបច្ចេកវិទ្យាកម្ពុជា

Institute of Technology of Cambodia

# TP-06

## Loop Types
## in C++

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## C++ Loop Types

In computer programming, loops are used to repeat a block of code.

For example, let's say we want to show a message 100 times. Then instead of writing the print statement 100 times, we can use a loop.

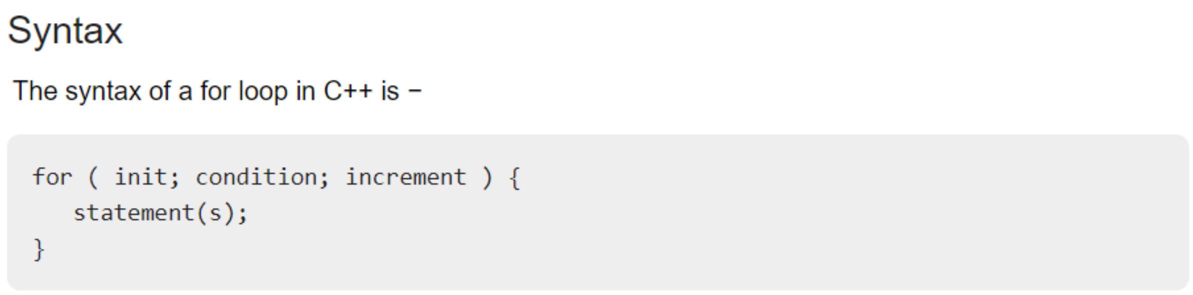
That was just a simple example; we can achieve much more efficiency and sophistication in our programs by making effective use of loops.

There are 3 types of loops in C++.

- for loop
- while loop
- do...while loop

## 1. for loop

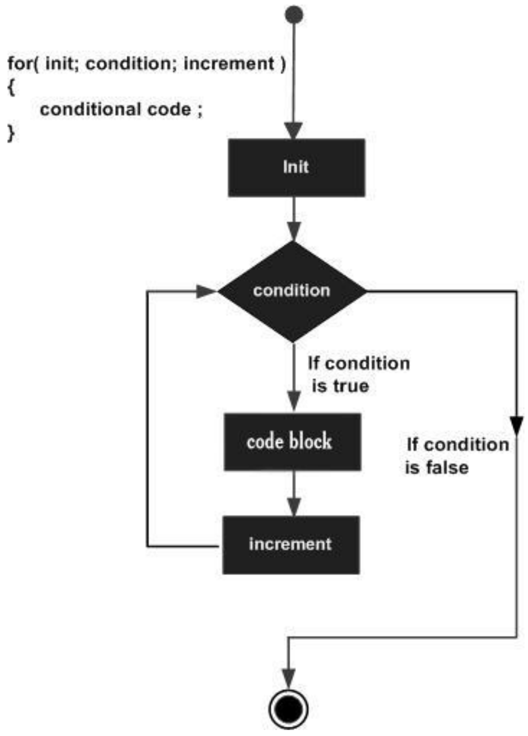
A for loop is a repetition control structure that allows you to efficiently write a loop that needs to execute a specific number of times.



### Syntax

The syntax of a for loop in C++ is −

```
for ( init; condition; increment ) {
   statement(s);
}
```

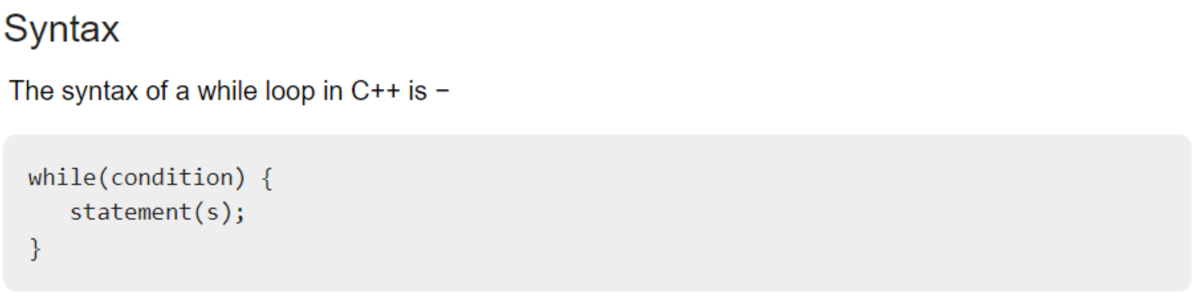


Example:

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

int main () {
   // for loop execution
   for( int a = 10; a < 20; a = a + 1 ) {
      cout << "value of a: " << a << endl;
   }

   return 0;
}
```

## 2. while loop

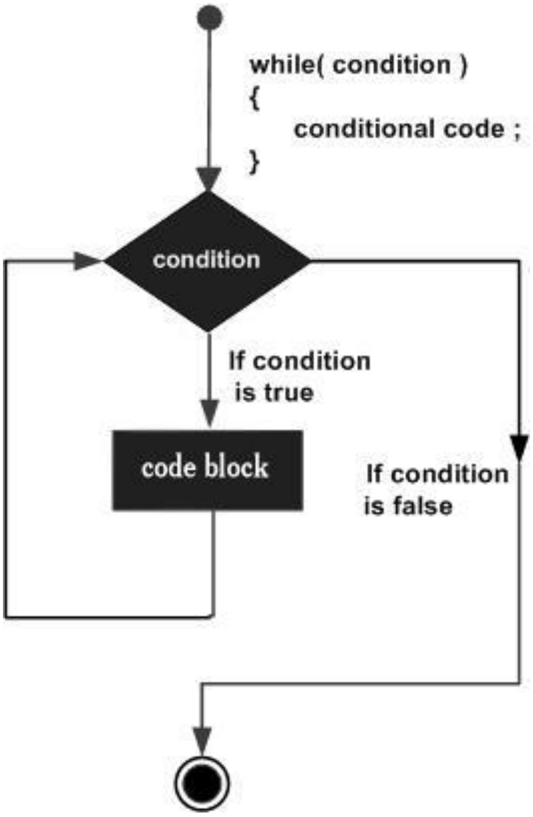
A while loop statement repeatedly executes a target statement as long as a given condition is true.



### Syntax

The syntax of a while loop in C++ is −

```
while(condition) {
   statement(s);
}
```



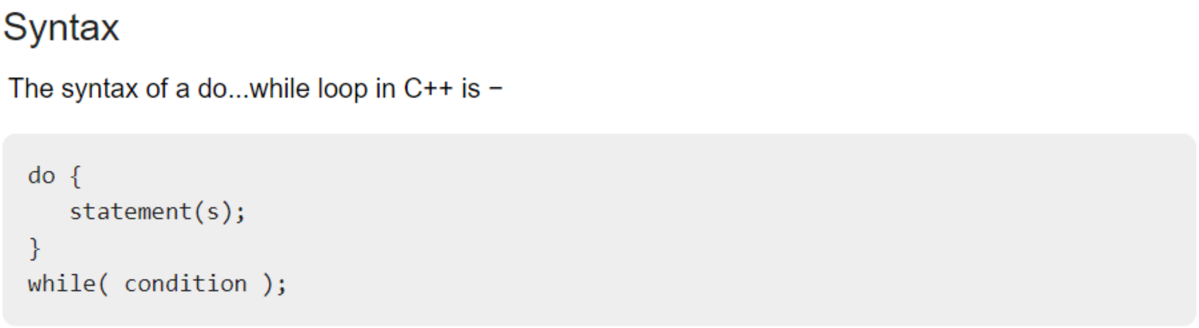
Example:

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

int main () {
   // Local variable declaration:
   int a = 10;

   // while loop execution
   while( a < 20 ) {
      cout << "value of a: " << a << endl;
      a++;
   }

   return 0;
}
```

## 3. do…while loop

Unlike for and while loops, which test the loop condition at the top of the loop, the do...while loop checks its condition at the bottom of the loop.

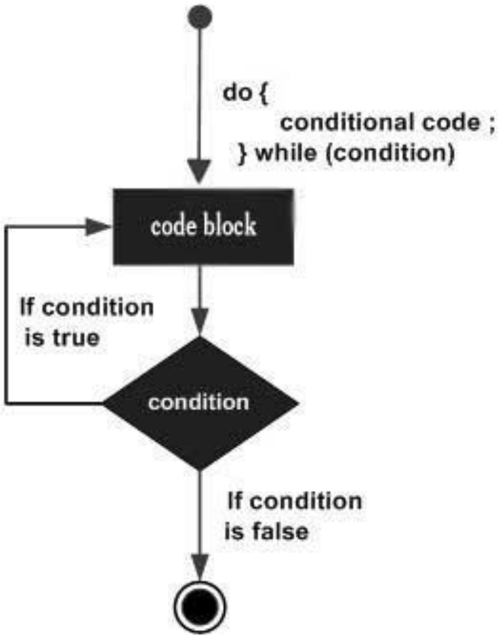
A do...while loop is similar to a while loop, except that a do...while loop is guaranteed to execute at least one time.



### Syntax

The syntax of a do...while loop in C++ is −

```
do {
   statement(s);
}
while( condition );
```



Example:

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

int main () {
   // Local variable declaration:
   int a = 10;

   // do loop execution
   do {
      cout << "value of a: " << a << endl;
      a = a + 1;
   } while( a < 20 );

   return 0;
}
```

**Problem1:**

A program to get st and en from a user, where st is a starting number and en is an ending number. Find summation and multiplication of numbers from st to en.

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st: 2

en: 5

=> SUM: 2+3+4+5

=> MULTIPLY: 2*3*4*5

-----

**Problem2:**

Write a program to get numbers, say m and n, from a user. Display numbers in between [m, n] on screen using 'for' loop, 'while loop', and 'do while' loop.

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m: 5

n: 100

=> Display 5 6 7 8 ... 100

=> Display 5 6 7 8 ... 100

=> Display 5 6 7 8 ... 100

-----

**Problem3:**

Write a program to generate 10 random numbers in between [10, 10000]. Display those randomized numbers on screen.

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=> Output:  20 79 193 284 999 ...

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**Problem4:**

Write a program to check whether an input number is a primary number or not. Display "Primary" if it is a primary number. If not primary, display "NOT primary!".

**Remark:** Keep the program running again so that we can always check another input number.

**Help**: A positive integer which is only divisible by 1 and itself is known as primary number.
For example: 13 is a primary number because it is only divisible by 1 and 13 but, 15 is not primary number because it is divisible by 1, 3, 5 and 15.

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**Problem5:**

Write a program to find maximum number between 10 numbers entered by the user. You are not allowed to create 10 variables for those numbers.
**Hint**:
 -Use 'for' loop, make it run 10 times
 -Get each input inside loop. Check and update max value.

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