

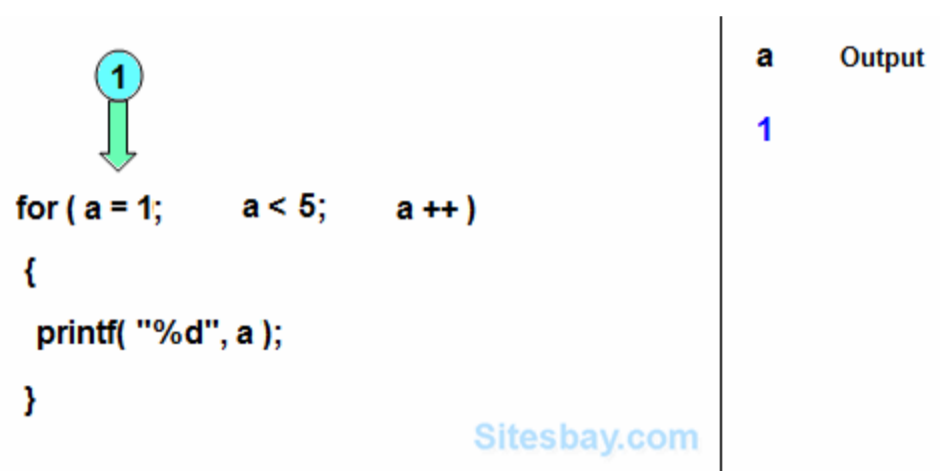
While writing a particular program it may happen that we need to repeat a single or a group of statements, to perform such kind of repetitive we have the looping statements. These are of three kinds:

1. For loop
2. while loop
3. do-while loop

For Loop

For loop is used to repeat set of statements until some condition is met. The for loop has 4 main parts:

- a. Variable initialization – here the loop variable is initialised.
- b. Condition – here a condition is mentioned which is checked in each loop.
- c. Variable update – the variable update happens at the end of every loop.
- d. Body of for loop – this will be executed only if the condition is true.

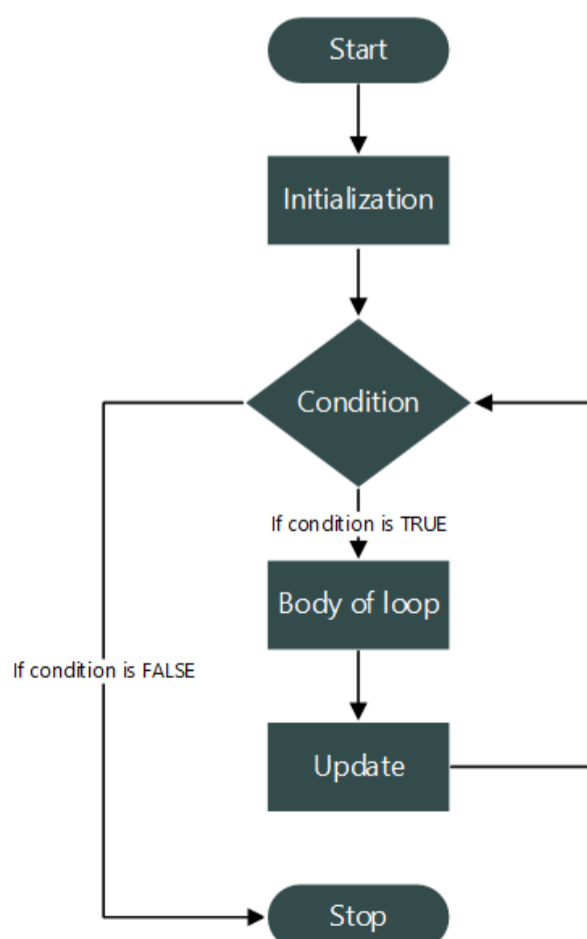


Its Syntax is,

```
for(variable-initialization ; condition ; variable-update)
{
    // Statements to be executed if condition is true
}
```

The best way to understand the for loop is through this GIF,

Let's understand what happened there. In the beginning the variable a is initialised with the value 1. Then the condition is checked, i.e., whether a is less than 5 or not. As the condition is true here the body of the loop, i.e., printing of value of a happens. Now a++ happens, i.e., the value of a is updated to 2. The loop continues till a reaches 5, then as the condition becomes false the loop is exited.



Q. Write a program to print the multiplication table of a number 'n' up to 'k', where 'n' and 'k' are inputted by the user.

For example:

Enter number to print table of: 12

Enter number to print table up to: 12

12 * 1 = 12

12 * 2 = 24

12 * 3 = 36

12 * 4 = 48

12 * 5 = 60

12 * 6 = 72

12 * 7 = 84

12 * 8 = 96

12 * 9 = 108

12 * 10 = 120

12 * 11 = 132

12 * 12 = 144

<https://youtu.be/qD4xjaMVC5w>

While Loop

The while loop is used to repeat a set of statements when number of iterations are not known prior to its execution. While loop has three parts:

- Condition – here a condition is mentioned which is checked in each loop.
- Body of while loop – this will be executed only if the condition is true.
- Variable update – the variable update happens at the end of every loop.

The variable initialization can happen anytime before the while loop.

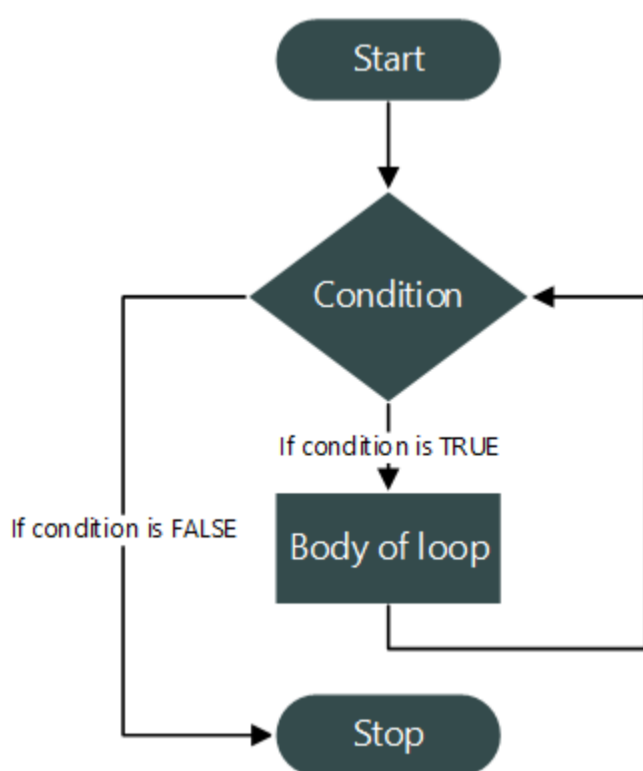
Its Syntax is,

```
while(condition)
{
    // Statements to be executed if condition is true
    //variable udate
}
```

The best way to understand the while loop is through this GIF,

<pre>int a = 1; while (a < 4) { printf("Hello Sitesbay"); a++; }</pre>	<table border="1"><thead><tr><th>a</th><th>Output</th></tr></thead><tbody><tr><td>1</td><td>Hello Sitesbay</td></tr><tr><td>2</td><td>Hello Sitesbay</td></tr><tr><td>3</td><td>Hello Sitesbay</td></tr><tr><td>4</td><td></td></tr></tbody></table>	a	Output	1	Hello Sitesbay	2	Hello Sitesbay	3	Hello Sitesbay	4	
a	Output										
1	Hello Sitesbay										
2	Hello Sitesbay										
3	Hello Sitesbay										
4											

Let's understand what happened there. Originally a has the value 1 then the condition is checked, which is $a < 4$. As the condition is true the body of the while loop that is printing of "hello Sitesbay" happens and the value of a is incremented by 1. Again the condition is checked. The loop continues till 'a' becomes 4. now the condition is false hence the program comes out of the while loop.



Q. Write a program to print reverse of any number entered by the user.

https://youtu.be/t_3LNu4Uvfl

Do...While Loop

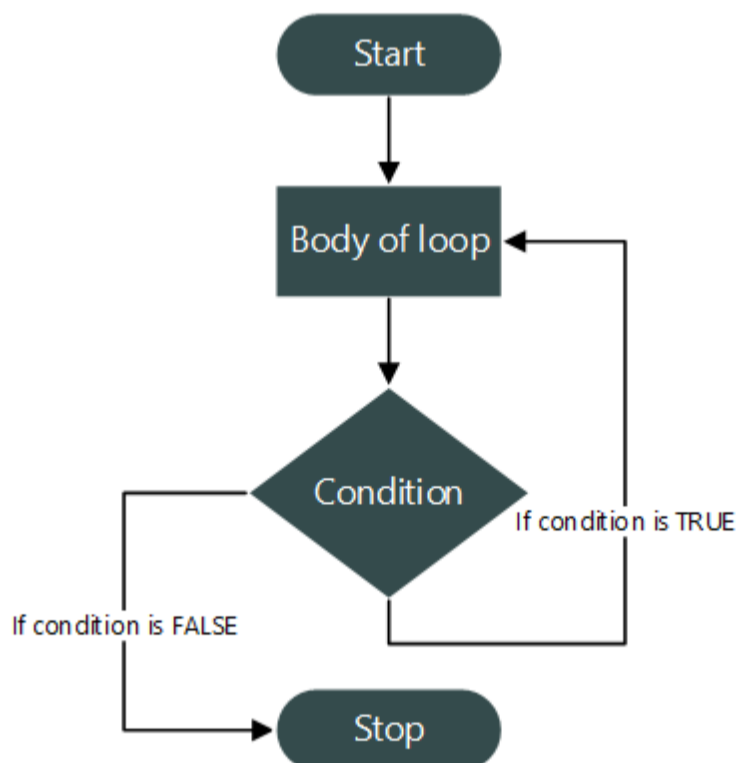
The do...while loop is used when we want to execute the loop body at least one time, for example when we want to validate the input of a user and run the loop until user enters an invalid input. In this case the input statement should run at least once and should repeat in loop until user provides invalid input. Its syntax is given below,

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

The do...while loop can be understood by the following GIF,



The only **difference between do...while and while loop** is that the body of the while loop will not be executed even once if the condition is false whereas the body of the do...while loop will be executed once even if the condition is false.



Q. Write a program to find the total number of digits in a number.

<https://youtu.be/itt8XeAOgrg>

QUESTIONS FOR LOOPS PLS SOLVE THEM: - <https://youtu.be/i705E8f-4ps>