

Loops

- **C Loops**

- The looping can be defined as repeating the same process multiple times until a specific condition satisfies. There are three types of loops used in the C language. In this part of the tutorial, we are going to learn all the aspects of C loops.
- **Why use loops in C language?**
- The looping simplifies the complex problems into the easy ones. It enables us to alter the flow of the program so that instead of writing the same code again and again, we can repeat the same code for a finite number of times.
- For example, if we need to print the first 10 natural numbers then, instead of using the printf statement 10 times, we can print inside a loop which runs up to 10 iterations.

- **Advantage of loops in C**

- 1) It provides code reusability.
- 2) Using loops, we do not need to write the same code again and again.
- 3) Using loops, we can traverse over the elements of data structures (array or linked lists).

- **Types of C Loops**

- There are three types of loops in C language that is given below:

- **do while**

- **while**

- **for**

- **do-while loop in C**

- The do-while loop continues until a given condition satisfies. It is also called **post tested loop**. It is used when it is necessary to execute the loop at least once (mostly menu driven programs).

- The syntax of do-while loop in c language is given below:

```
do{
```

```
//code to be executed
```

```
}while(condition);
```

- **while loop in C**

- The while loop in c is to be used in the scenario where we don't know the number of iterations in advance.
- The block of statements is executed in the while loop until the condition specified in the while loop is satisfied. It is also called a **pre-tested loop**.
- The syntax of while loop in c language is given below:

```
while(condition){  
//code to be executed  
}
```

- **for loop in C**

- The for loop is used in the case where we need to execute some part of the code until the given condition is satisfied. The for loop is also called as a **per-tested loop**. It is better to use for loop if the number of iteration is known in advance.
- The syntax of for loop in c language is given below:

```
for(initialization; condition; incr / decr){  
//code to be executed  
}
```

- **do while loop in C**

- The do while loop is a **post tested loop**. Using the do-while loop, we can repeat the execution of several parts of the statements.
- The do-while loop is mainly used in the case where we need to execute the loop at least once. The do-while loop is mostly used in **menu-driven programs** where the **termination** condition depends upon the **end user**.

- **do while loop syntax**

- The syntax of the C language do-while loop is given below:

```
do{
```

```
//code to be executed
```

```
}while(condition);
```


do while example

There is given the simple program of c language do while loop

```
#include<stdio.h>
```

```
int main(){
```

```
int i=1;
```

```
do{
```

```
printf("%d \n",i);
```

```
i++;
```

```
}while(i<=10);
```

```
return 0;
```

```
}
```

- **while loop in C**
- While loop is also known as a pre-tested loop. In general, a while loop allows a part of the code to be executed multiple times depending upon a given boolean condition.
- It can be viewed as a repeating if statement. The while loop is mostly used in the case where the number of iterations is not known in advance.
- **Syntax of while loop in C language**
- The syntax of while loop in c language is given below:
- while(condition){
- //code to be executed
- }

Example of the while loop in C language

```
#include<stdio.h>
```

```
int main(){
```

```
int i=1;
```

```
while(i<=10){
```

```
printf("%d \n",i);
```

```
i++;
```

```
}
```

```
return 0;
```

```
}
```

- **Properties of while loop**

- A conditional expression is used to check the condition. The statements defined inside the while loop will repeatedly execute until the given condition fails.
- The condition will be true if it returns 0. The condition will be false if it returns any non-zero number.
- In while loop, the condition expression is compulsory.
- Running a while loop without a body is possible.
- We can have more than one conditional expression in while loop.
- If the loop body contains only one statement, then the braces are optional.

- Infinitive while loop in C
- If the expression passed in while loop results in any non-zero value then the loop will run the infinite number of times.
- `while(1){`
- `//statement`
- `}`

- **for loop in C**
- The for loop in C language is used to iterate the statements or a part of the program several times. It is frequently used to traverse the data structures like the array and linked list.
- Syntax of for loop in C
- The syntax of for loop in c language is given below:
 - for(Expression 1; Expression 2; Expression 3){
 - //code to be executed
 - }

C for loop Examples

Let's see the simple program of for loop.

```
#include<stdio.h>
int main(){
int i=0;
for(i=1;i<=10;i++){
printf("%d \n",i);
}
return 0;
}
```