

Programming with C and C++

CSC-101 (Lecture 12)

Dr. R. Balasubramanian
Professor

Department of Computer Science and Engineering
Mehta Family School of Data Science and Artificial Intelligence
Indian Institute of Technology Roorkee
Roorkee 247 667

bala@cs.iitr.ac.in
<https://faculty.iitr.ac.in/cs/bala/>



The do...while Loop



► Syntax

```
do  
{  
    //Statements  
}  
while(Boolean_expression);
```

A faint, light gray illustration of a lion statue, likely the Roorkee Lion, is visible in the background of the slide.

The do...while Loop



dowhileex1.c

```
1 ▾ #include<stdio.h>
2
3 int main()
4 ▾ {
5     int i=1,number=0;
6     printf("Enter a number: ");
7     scanf("%d",&number);
8 ▾ do{
9     printf("%d \n",(number*i));
10    i++;
11    }while(i<=10);
12    return 0;
13 }
14
```

```
~$ gcc dowhileex1.c
~$ ./a.out
Enter a number: 5
5
10
15
20
25
30
35
40
45
50
~$ █
```

<https://ideone.com/aEgviS#stdin>

The do...while Loop



</> source code

```
1  #include <stdio.h>
2
3  int main()
4  {
5
6      // declaring loop variables
7      int i = 0, j;
8      int count = 0;
9
10     // outer loop starts
```

<https://ideone.com/m5uFEW>

The do...while Loop



```
10 // outer loop starts
11 do {
12     j = 0;
13
14     // inner loop starts
15     do {
16         printf("%d ", count++);
17         j++;
18     } while (j < 3);
19     // inner loop ends
20
21     printf("\n");
22     i++;
23 } while (i < 3);
24 // outer loop ends
25
26 return 0;
27 }
```

⚙️ stdout

0	1	2
3	4	5
6	7	8

The for loop

int i;

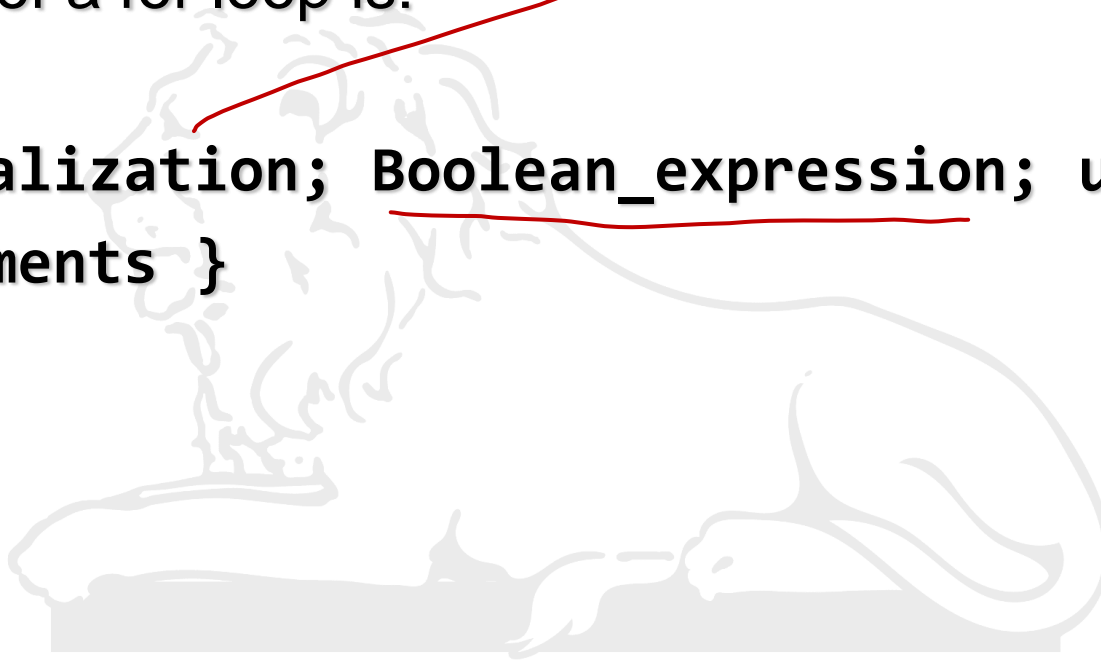


► Syntax

The syntax of a for loop is:

```
for(initialization; Boolean_expression; update)
{ //Statements }
```

for (i = 0; i < 100; i++)



The for loop



</> source code

```
1  #include <stdio.h>
2
3  int main() {
4      int num, isPrime = 1;
5
6      printf("Enter a number: ");
7      scanf("%d", &num);
8
9      if (num <= 1) {
10         printf("%d is not a prime number.\n", num);
11     } else {
12         for (int i = 2; i * i <= num; i++) {
13             if (num % i == 0) {
14                 isPrime = 0;
15                 break;
16             }
17     }
```

The for loop



```
18
19 ▼      if (isPrime) {
20          printf("%d is a prime number.\n", num);
21 ▼      } else {
22          printf("%d is not a prime number.\n", num);
23      }
24  }
25
26      return 0;
27  }
28  |
```

```
~$ gcc primecheck.c
```

```
~$ ./a.out
```

```
Enter a number: 43
```

```
43 is a prime number.
```

```
~$ gcc primecheck.c
```

```
~$ ./a.out
```

```
Enter a number: 1729
```

```
1729 is not a prime number.
```

```
~$ █
```

<https://ideone.com/kCBtTI>

- Write a C program to generate Hemachandra series, 1, 2, 3, 5, 8, 13, 21..

</> source code

```
1  #include <stdio.h>
2
3  int main() {
4      int n;
5
6      // Input the number of terms
7      printf("Enter the number of terms in the series: ");
8      scanf("%d", &n);
9
10     // Generate and print the series
11     int a = 1, b = 2;
12     printf("%d ", a); // First term
13     for (int i = 1; i < n; i++) {
14         printf("%d ", b); // Print the current term
15         int temp = b;
16         b = a + b; // Compute the next term
17         a = temp;
18     }
19 }
```

<https://ideone.com/ZuHOlg>

```
19  
20     printf("\n");  
21     return 0;  
22 }  
23
```

 stdin

10

 stdout

Enter the number of terms in the series: 1 2 3 5 8 13 21 34 55 89

- ▶ Write a C Program to find the maximum of n numbers using do-while loop



</> source code

```
1  #include <stdio.h>
2
3  int main() {
4      int n, num, max;
5
6      // Input the number of numbers
7      printf("Enter the value of n: ");
8      scanf("%d", &n);
9
10     // Input the first number
11     printf("Enter number 1: ");
12     scanf("%d", &num);
13
14     max = num; // Initialize max with the first number
15
```



```
15
16 // Input remaining numbers and find maximum
17 int i = 2;
18 do {
19     printf("Enter number %d: ", i);
20     scanf("%d", &num);
21
22     if (num > max) {
23         max = num;
24     }
25
26     i++;
27 } while (i <= n);
28
29 // Print the maximum
30 printf("The maximum of %d numbers is: %d\n", n, max);
31
32 return 0;
33 }
```

<https://ideone.com/5x4kci>

output



```
~$ gcc maxn.c
~$ ./a.out
Enter the value of n: 5
Enter number 1: 10
Enter number 2: 100
Enter number 3: 80
Enter number 4: 200
Enter number 5: 160
The maximum of 5 numbers is: 200
~$ █
```

for loop



</> Source Code ...



fortest.c

```
1 ▾ #include <stdio.h>
2
3 ▾ int main() {
4
5 ▾     for (; ; ) {
6         printf("Welcome to IITR \n ");
7     }
8     return 0;
9 }
```



```
Welcome to IITR  
Welcome to IITR  
Welcome to IITR  
Welcome to IITR  
Welcome to IITR  
Welcome to IITR  
Welcome to IITR  
Welcome to IITR  
Welcome to IITR
```

```
^Z
```

```
[2]+ Stopped
```

```
~$
```

<https://ideone.com/FttvA4>

```
./a.out
```


Books to develop algorithms




- ▶ How to solve it by Computer by **R. J. Dromey**, Prentice-Hall India EEE Series
- ▶ Introduction to Algorithms by **CLRS** (Cormen, Leiserson, Rivest, Stein), MIT Press



break statement



```
while (isOk)
{
    ...
    if (anotherCondition)
        break;
    ...
}
// Statement
// Statement
```

A red arrow originates from the 'break;' statement and points to the closing brace of the while loop, indicating that the loop is terminated immediately.

Initialization;

```
do
{
    Statement 1 ;
    Statement 2 ;
    Statement 3 ;
    .....
    .....
    if ( If Condition)
        break;

    Statement N-1 ;
    Statement N ;
    Increment;
} while (condition);
```

OutsideStatement 1;

continue Statement



```
while (isOK)
{
    ... ✓
    if (aCondition)
        continue;
} ... ✗
```

```
for (int n = 0; n < 10; n++)
{
    ... ✓
    if (aCondition)
        continue;
} ... ✗
```

</> source code

```
1  #include <stdio.h>
2
3  int main() {
4      for (int i=1;i<=10;i++)
5          {if (i<=5)
6              continue;
7              printf("%d\n",i);
8          }
9      return 0;
10 }
11
```

Success #stdin

6
7
8
9
10

<https://ideone.com/LWQKAD>

