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C Program to Calculate Factorial of a Number

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C Program to Calculate Factorial of a Number

In this tutorial, we will write a program to calculate the factorial of a number in C language. Factorial is a way to multiply all the numbers from our given number. For example if we want to take a factorial of 5 it will be like **5!** = **5 x 4 x 3 x 2 x 1** = **120**. An example program is shown below

```c
#include<stdio.h>

int factorialIterative(int n){
    int val = 1;
    for (int i = n; i > 1; i--)
    {
        val *= i;
    }
    return val;
}

int main(){
    int n;
```

```
    printf("Enter the value of number for factorial calculation\n");
    scanf("%d", &n);
    int factorial = factorialIterative(n);
    printf("The value of factorial is %d\n", factorial);
    return 0;
}
```

Code Snippet 1: Factorial iteratiive program

As shown in a code snippet 1,

1. We created a function “factorialIterative” which take 1 parameter “n”;
2. In function body an integer variable “val” is initialized which has value “a”; the variable “val” will be used to store the factorial value.
3. We have used “for” loop to multiply all the values. The “for” loop will start for the value of “n” and at each iteration, its values will be decrement by 1. The value for each multiplication will be stored in “val”, and when loops will terminate the “val” will return to the main program.
4. In the main program, we have declared an integer variable “n” this variable will be used to store user input.
5. The “printf” function is used to print “Enter the value of number for factorial calculation”; and “scanf” function will take input from the user at run time.
6. The variable “factorial” is declared and the function “factorialIterative” is called and the variable “n” is passed to it.

The output of the following program is shown below

```
Enter the value of number for factorial calculation
5
The value of factorial is 120
```

Figure 1: Program Output Iterative

Another method to find factorial is by using the recursive method which is shown below

```
#include<stdio.h>

int factorialRecursive(int n){
    if(n == 0 || n == 1){
        return 1;
    }
    else{
        return n * factorialRecursive(n-1);
    }
```

```
}

int main(){
    int n;
    printf("Enter the value of number for factorial calculation\n");
    scanf("%d", &n);
    int factorial = factorialRecursive(n);
    printf("The value of factorial is %d\n", factorial);
    return 0;
}
```

Code Snippet 2: Factorial recursive program

As shown in a code snippet 2,

1. We created a function “factorialRecursive” which take 1 parameter “n”;
2. In the function body, the “if” condition will check that if the value of “n” is 1 or 0 then it will return 1 to the main program, but if the value is greater than 1 than the “else” will run in which recursive function will call itself again and again and at the end value will be returned to the main program.
3. In the main program, we have declared an integer variable “n” this variable will be used to store user input.
4. The “printf” function is used to print “Enter the value of number for factorial calculation”; and “scanf” function will take input from the user at run time.
5. The variable “factorial” is declared and the function “factorialRecursive” is called and the variable “n” is passed to it.

The output of the following program is shown below

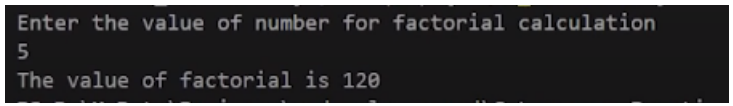

Figure 2: Program Output Recursive

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