FACTORIAL OF A POSITIVE INTEGERS

* The factorial of a positive integer n is equal to 1\*2\*3\*...n.

You will learn to calculate the factorial of a number using for loop in this example.

* The factorial of a number is the product of all the integers from 1 up to that number. The factorial can only be defined for positive integers.
* The factorial of a negative number doesn't exist. And the factorial of 0 is 1.

For example,

* The factorial of a positive number n, say 5, is denoted by 5! and is given by:
* 5! = 1 \* 2 \* 3 \* 4 \* 5 = 120
* So, the Mathematical logic for factorial is:
* n! = 1 \* 2 \* 3 \* ... \* n
* n! = 1 if n = 0 or n = 1
* In this program below, the user is asked to enter a positive integer. Then the factorial of that number is computed and displayed on the screen.
* Example: Find Factorial of a given number

#include <iostream>

using namespace std;

int main() {

int n;

long double factorial = 1.0;

cout << "Enter a positive integer: ";

cin >> n;

if (n < 0)

cout << "Error! Factorial of a negative number doesn't exist.";

else {

for(int i = 1; i <= n; ++i) {

factorial \*= I;

}

cout << "Factorial of " << n << " = " << factorial;

}

return 0;

}

* **output**
* Enter a positive integer: 12
* Factorial of 12 = 479001600
* In this program, we take a positive integer from the user and compute the factorial using for loop. We print an error message if the user enters a negative number.
* We declare the type of factorial variable as long double since the factorial of a number may be very large.
* When the user enters a positive integer (say 4), for loop is executed and computes the factorial. The value of is initially 1.
* The program runs until the statement i <= n becomes false. This prints Factorial of 4 = 24 on the screen. Here's how the program executes when

n = 4.

|  |  |
| --- | --- |
| **i <= 4** | **fact \*= i** |
| 1 <= 4 | fact = 1 \* 1 = 1 |
| 2 <= 4 | fact = 1 \* 2 = 2 |
| 3 <= 4 | fact = 2 \* 3 = 6 |
| 4 <= 4 | fact = 6 \* 4 = 24 |
| 5 <= 4 | Loop terminates. |