Program to get factorial of a number

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Write a program that calculates the factorial of a given number.

## Program In C

```
#include <stdio.h>
int main() {
    int n, fact = 1;
    printf("Enter a positive integer: ");
    scanf("%d", &n);
    printf("Factorial of %d:\n", n);
    for (int i = 1; i <= n; i++) {
        fact *= i;
        printf("%d! = %d\n", i, fact);
    }
    return 0;
}
```


## Explanation:

- The code starts by including the necessary header file stdio.h, which provides input and output functions. Then, the main() function is defined, which is the entry point of the program.
- Inside main(), two variables are declared: n and fact. n is used to store the userentered positive integer, and fact is initialized to 1 , which will be used to calculate the factorial.
- The program then prompts the user to enter a positive integer using printf(), and reads the input value using scanf(), storing it in n.
- Next, a for loop is used to calculate the factorial. The loop iterates from $\mathrm{i}=1$ to $\mathrm{i}<=\mathrm{n}$, incrementing i by 1 in each iteration.
- Inside the loop, fact is updated by multiplying it with i, and the current factorial value is printed using printf().
- Finally, the program reaches the end, and the main() function returns 0, indicating successful program execution.


## Output:

## Output

Enter a positive integer: 4 Factorial of 4:
$1!=1$
$2!=2$
$3!=6$
$4!=24$

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## Program In Java

## Java

```
import java.util.Scanner;
public class FactorialJava {
    public static void main(String[] args) {
        int n, fact = 1;
        System.out.print("Enter a positive integer: ");
        Scanner scanner = new Scanner(System.in);
        n = scanner.nextInt();
        System.out.println("Factorial of " + n + ":");
        for (int i = 1; i <= n; i++) {
            fact *= i;
            System.out.println(i + "! = " + fact);
        }
        scanner.close();
    }
}
```


## Explanation:

1. import java.util.Scanner;: This line imports the Scanner class from the java.util package, allowing us to read user input from the console.
2. public class FactorialJava: This line defines a public class named FactorialJava.
3. public static void main(String[] args): This line is the entry point of the program. It declares the main method, which is where the execution of the program begins.
4. int $n$, fact $=1 ;$ : This line declares two integer variables, $n$ and fact. $n$ will store the user input, and fact will store the factorial value. fact is initialized to 1 since it will be multiplied with numbers during the factorial calculation.
5. System.out.print("Enter a positive integer: ");: This line displays the message to the console, prompting the user to enter a positive integer.
6. Scanner scanner = new Scanner(System.in);: This line creates a Scanner object named scanner, which allows us to read input from the console.
7. $n=$ scanner.nextInt();: This line reads an integer from the user and assigns it to the variable $n$.
8. System.out.println("Factorial of " $+\mathrm{n}+$ ":");: This line prints the message indicating that the factorial calculation is starting.
9. for (int $\mathrm{i}=1 ; \mathrm{i}<=\mathrm{n} ; \mathrm{i}++$ ) \{: This line begins a for loop that iterates from 1 up to the value of $n$. The loop counter is initialized as int $i=1$, and the loop continues as long as $i$ is less than or equal to $n$.
10. fact $*=i ;$ : This line multiplies the current value of fact by the value of $i$ and assigns the result back to fact. This calculation effectively computes the factorial.
11. System.out.print $\ln (i+$ " $!="+$ fact $) ;:$ This line prints the factorial value for the current value of $i$. It concatenates the values of $i$, " $!=$ ", and fact to form the output string.
12. scanner.close();: This line closes the Scanner object to release system resources associated with it.

## Output

Enter a positive integer: 4
Factorial of 4:
1 ! = 1
$2!=2$
$3!=6$
$4!=24$

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Program to get factorial of a number
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