

# ASSIGNMENT-1

## TASK-1:

### Prompt:

#write a python program that calculates the factorial of a number using loops.

### Code and Output:

```
second1.py > ...
1  #write a program in python that calculates the factorial of a number using loops
2  """
3  This program calculates the factorial of a given number using a loop.
4  The user is prompted to enter a number, and the program computes the factorial
5  by multiplying all integers from 1 up to the entered number. The result is then
6  displayed to the user.
7  Input:
8  |   An integer number from the user.
9  Output:
10 |   The factorial of the entered number.
11 """
12 #write a program in python that calculates the factorial of a number using loops
13
14 num = int(input("Enter a number: "))
15 factorial = 1
16
17 for i in range(1, num + 1):
18     factorial *= i
19
20 print("The factorial of", num, "is", factorial)
```

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Enter a number: 6  
The factorial of 6 is 720

### Explanation:

```
"""
This program calculates the factorial of a given number using a loop.
The user is prompted to enter a number, and the program computes the factorial
by multiplying all integers from 1 up to the entered number. The result is then
displayed to the user.
Input:
|   An integer number from the user.
Output:
|   The factorial of the entered number.
"""
```

## TASK-3 :

### Prompt:

#write a python program that calculate a factorial of a number using a user-defined function.

### Code and Output:

```
second2.py > ...
1  #write a program that calculate a factorial of a number using a user-defined function
2  """
3  This program calculates the factorial of a given number using a user-defined
4  function.
5  Functions:
6  |    factorial(n): Computes the factorial of the integer n.
7  Workflow:
8  |    - Prompts the user to enter a number.
9  |    - Calculates the factorial of the entered number using the factorial() function.
10 |    - Prints the result.
11 """
12 #write a program that calculate a factorial of a number using a user-defined function
13
14 def factorial(n):
15     result = 1
16     for i in range(1, n + 1):
17         result *= i
18     return result
19
20 num = int(input("Enter a number: "))
21 print("The factorial of", num, "is", factorial(num))
```

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Enter a number: 6  
The factorial of 6 is 720

### Explanation:

```
"""
This program calculates the factorial of a given number using a user-defined
function.
Functions:
|    factorial(n): Computes the factorial of the integer n.
Workflow:
|    - Prompts the user to enter a number.
|    - Calculates the factorial of the entered number using the factorial() function.
|    - Prints the result.
"""
```

## TASK-4:

### Prompt:

#write a python program calculate the factorial of a number with functions and without functions.

### Code and Output:

```
second3.py > ...
1  #write a python program to calculate factorial of a number with functions and without functions
2  """
3  This script calculates the factorial of a given number in two ways:
4  1. Without using a function: Computes the factorial directly using a for loop.
5  2. Using a function: Defines a function `factorial_func(n)` that returns the factorial of `n`.
6  The user is prompted to enter a number, and the script prints the factorial calculated by both
7  methods.
8  """
9  #write a python program to calculate factorial of a number with functions and without functions
10
11 # Without using a function
12 num = int(input("Enter a number: "))
13 factorial = 1
14 for i in range(1, num + 1):
15     factorial *= i
16 print("Factorial without function:", factorial)
17
18 # Using a function
19 def factorial_func(n):
20     result = 1
21     for i in range(1, n + 1):
22         result *= i
23     return result
24 print("Factorial using function:", factorial_func(num))

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Python + v []
```

Enter a number: 6  
The factorial of 6 is 720

### Explanation:

```
"""
This script calculates the factorial of a given number in two ways:
1. Without using a function: Computes the factorial directly using a for loop.
2. Using a function: Defines a function `factorial_func(n)` that returns the factorial of `n`.
The user is prompted to enter a number, and the script prints the factorial calculated by both methods.
"""
```

## TASK-5:

### Prompt:

#write a python program to calculate factorial of a number using both iterative and recursive.

### Code and Output:

```
second4.py > ...
1  #write a program to calculate factorial of a number using both iterative and recursive
2  """
3  This module provides two methods to calculate the factorial of a given number:
4  Functions:
5      factorial_iterative(n): Calculates the factorial of n using an iterative approach.
6      factorial_recursive(n): Calculates the factorial of n using a recursive approach.
7  Usage:
8      Prompts the user to enter a number and prints its factorial calculated by both iterative and recursive methods.
9  """
10 #write a program to calculate factorial of a number using both iterative and recursive
11
12 # Iterative method
13 def factorial_iterative(n):
14     result = 1
15     for i in range(1, n + 1):
16         result *= i
17     return result
18
19 # Recursive method
20 def factorial_recursive(n):
21     if n == 0 or n == 1:
22         return 1
23     else:
24         return n * factorial_recursive(n - 1)
25
26 num = int(input("Enter a number: "))
27 print("Factorial (iterative):", factorial_iterative(num))
28 print("Factorial (recursive):", factorial_recursive(num))
```

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Enter a number: 6  
Factorial (iterative): 720  
Factorial (recursive): 720

### Explanation:

```
"""
This module provides two methods to calculate the factorial of a given number:
Functions:
    factorial_iterative(n): Calculates the factorial of n using an iterative approach.
    factorial_recursive(n): Calculates the factorial of n using a recursive approach.
Usage:
    Prompts the user to enter a number and prints its factorial calculated by both iterative and recursive
"""
```