

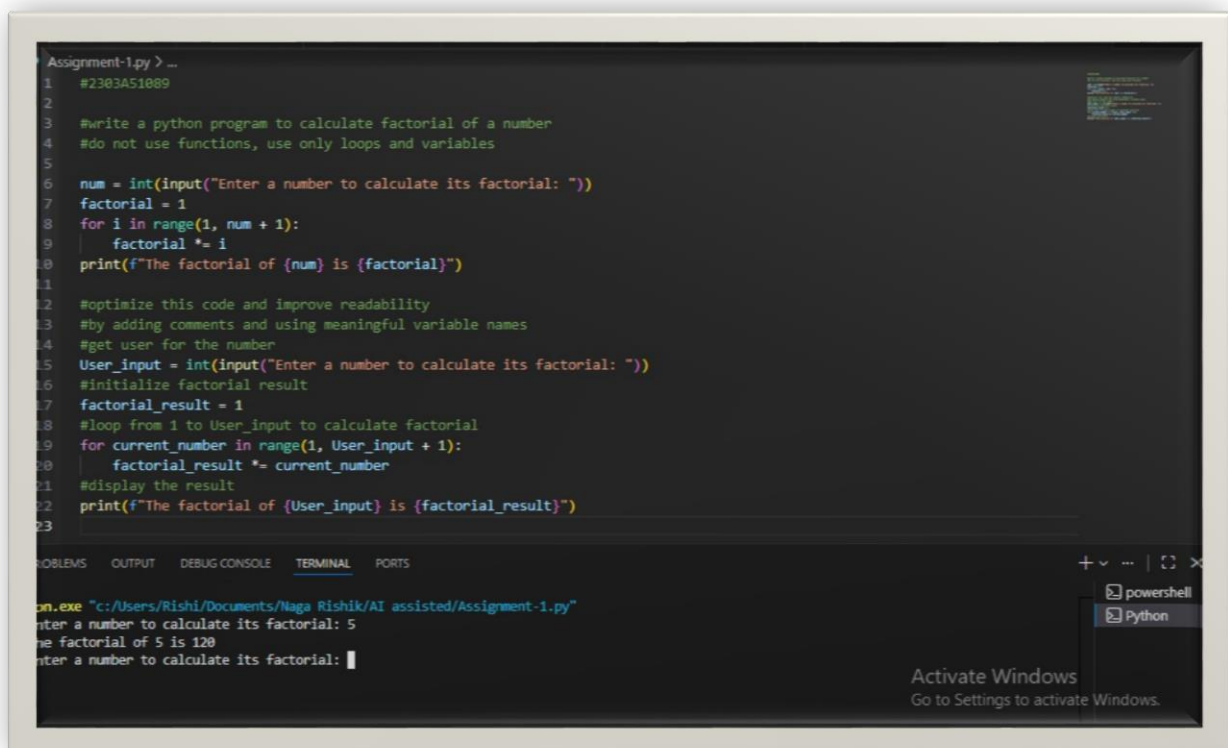
## Assignment-1.1

Name: Naga Rishik Reddy

Hall ticket no: 2303A51089

Batch no: 2

### Task-1: AI-Generated logic without Modularization (Factorial without functions)



```
Assignment-1.py > ...
1  #2303A51089
2
3  #write a python program to calculate factorial of a number
4  #do not use functions, use only loops and variables
5
6  num = int(input("Enter a number to calculate its factorial: "))
7  factorial = 1
8  for i in range(1, num + 1):
9      factorial *= i
10 print(f"The factorial of {num} is {factorial}")
11
12 #optimize this code and improve readability
13 #by adding comments and using meaningful variable names
14 #get user for the number
15 User_input = int(input("Enter a number to calculate its factorial: "))
16 #initialize factorial result
17 factorial_result = 1
18 #loop from 1 to User_input to calculate factorial
19 for current_number in range(1, User_input + 1):
20     factorial_result *= current_number
21 #display the result
22 print(f"The factorial of {User_input} is {factorial_result}")
23
```

python.exe "c:/Users/Rishi/Documents/Naga Rishik/AI assisted/Assignment-1.py"

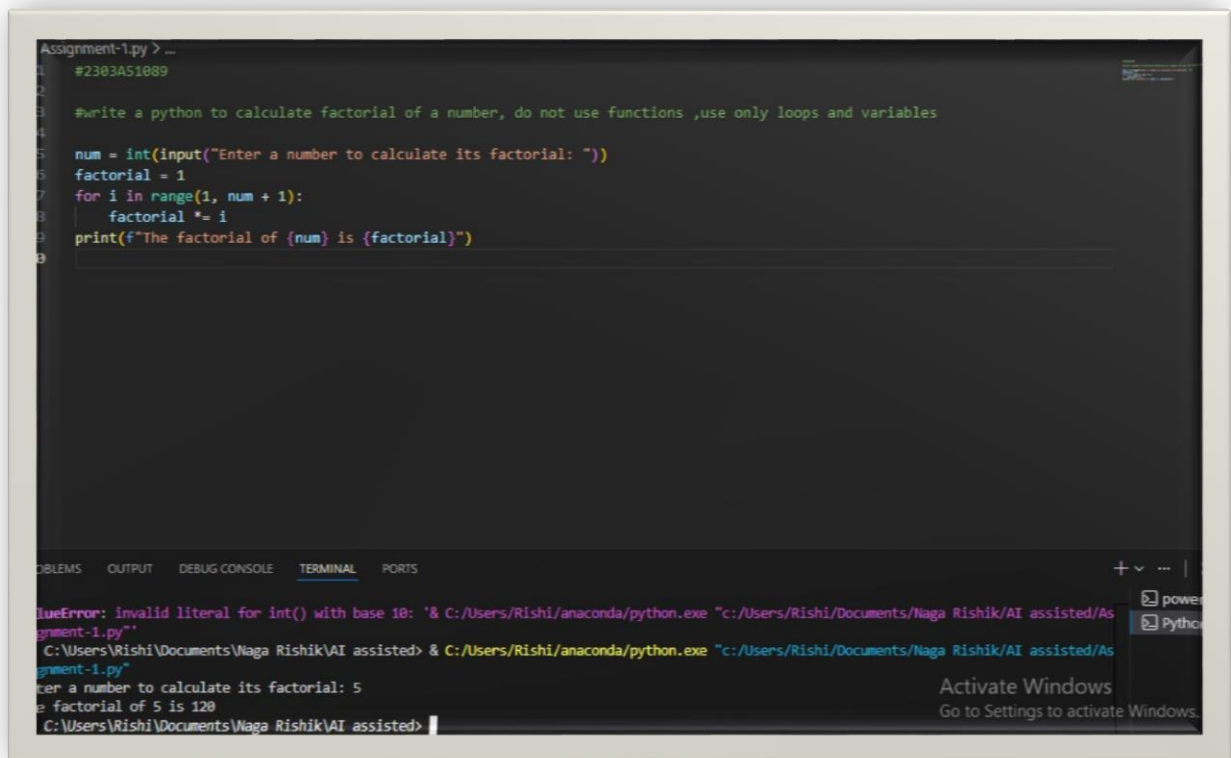
Enter a number to calculate its factorial: 5

The factorial of 5 is 120

Enter a number to calculate its factorial:

Activate Windows  
Go to Settings to activate Windows.

## Task-2: AI code Optimization and cleanup (Improving Efficiency)



The screenshot shows a Python IDE with a dark theme. The editor window displays a Python script for calculating the factorial of a number. The script includes a comment, a variable assignment, a loop, and a print statement. The terminal window at the bottom shows the execution of the script, including a file path error and the successful output of the factorial calculation for the number 5.

```
Assignment-1.py > ...
1 #2303A51089
2
3 #write a python to calculate factorial of a number, do not use functions ,use only loops and variables
4
5 num = int(input("Enter a number to calculate its factorial: "))
6 factorial = 1
7 for i in range(1, num + 1):
8     factorial *= i
9 print(f"The factorial of {num} is {factorial}")
10
```

Terminal Output:

```
FileError: Invalid literal for int() with base 10: '& C:/Users/Rishi/anaconda/python.exe "c:/Users/Rishi/Documents/Naga Rishik/AI assisted/Assignment-1.py"'
C:\Users\Rishi\Documents\Naga Rishik\AI assisted> & C:/Users/Rishi/anaconda/python.exe "c:/Users/Rishi/Documents/Naga Rishik/AI assisted/Assignment-1.py"
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
C:\Users\Rishi\Documents\Naga Rishik\AI assisted>
```

## Task-3: Modular Design using AI assistance (Factorial with functions)

```
1
2
3 #write a python program to calculate factorial using a function , use meaningful variable names, add coments
4 def calculate_factorial(number):
5     """This function calculates the factorial of a given number."""
6     if number < 0:
7         return "Factorial is not defined for negative numbers."
8     elif number == 0 or number == 1:
9         return 1
10    else:
11        factorial = 1
12        for i in range(2, number + 1):
13            factorial *= i
14        return factorial
15
16 num = int(input("Enter a number to calculate its factorial: "))
17 result = calculate_factorial(num)
18 print(f"The factorial of {num} is {result}.")
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
```

AI/Assisted/Assignment-1.py"

C:\Users\Rishi\Documents\Naga Rishik\AI assisted> & C:/Users/Rishi/anaconda/python.exe "c:/Users/Rishi/Documents/Naga Rishik/AI assisted/Assignment-1.py"

Enter a number to calculate its factorial: 6

The factorial of 6 is 720.

Activate Windows

## Task-4: Comparative Analysis-Procedural vs Modular AI Code(with vs without functions)

```
1
2
3 #comparative analysis of a factorial calculation method - procedural vs Modular AI code (with vs without functions)
4 # Procedural approach (without functions)
5 n = int(input("Enter a number to calculate its factorial (procedural): "))
6 factorial = 1
7 for i in range(1, n + 1):
8     factorial *= i
9 print(f"Factorial of {n} (procedural) is: {factorial}")
10 # Modular approach (with functions)
11 def factorial_modular(num):
12     if num == 0 or num == 1:
13         return 1
14     else:
15         return num * factorial_modular(num - 1)
16 n_mod = int(input("Enter a number to calculate its factorial (modular): "))
17 result = factorial_modular(n_mod)
18 print(f"Factorial of {n_mod} (modular) is: {result}")
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
```

(procedural): 5

Factorial of 5 (procedural) is: 120

Enter a number to calculate its factorial (modular): 6

Factorial of 6 (modular) is: 720

PS C:\Users\Rishi\Documents\Naga Rishik\AI assisted>

Activate Windows

Go to Settings to activate Windows.

## Task-5:AI-Generated iterative vs Recursive thinking

```
2
3 #generate iterative program in python
4 def iterative_factorial(n):
5     result = 1
6     for i in range(2, n + 1):
7         result *= i
8     return result
9 print("Iterative Factorial of 5:", iterative_factorial(5))
10
11 #generate recursive program in python
12 def recursive_factorial(n):
13     if n == 0 or n == 1:
14         return 1
15     else:
16         return n * recursive_factorial(n - 1)
17 print("Recursive Factorial of 5:", recursive_factorial(5))
18 #generate recursive factorial program in python
19 def recursive_factorial(n):
20     if n == 0 or n == 1:
21         return 1
22     else:
23         return n * recursive_factorial(n - 1)
24 print("Recursive Factorial of 5:", recursive_factorial(5))
25
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

> & C:/Users/Rishi/anaconda/python.exe "c:/Users/Rishi/Documents/Naga Rishik/AI assisted/Assignment-1.py"

Iterative Factorial of 5: 120  
Recursive Factorial of 5: 120  
Recursive Factorial of 5: 120  
PS C:\Users\Rishi\Documents\Naga Rishik\AI assisted>

Activate Windows  
Go to Settings to activate Windows.