

# AI Assisted Coding

## Assignment-01

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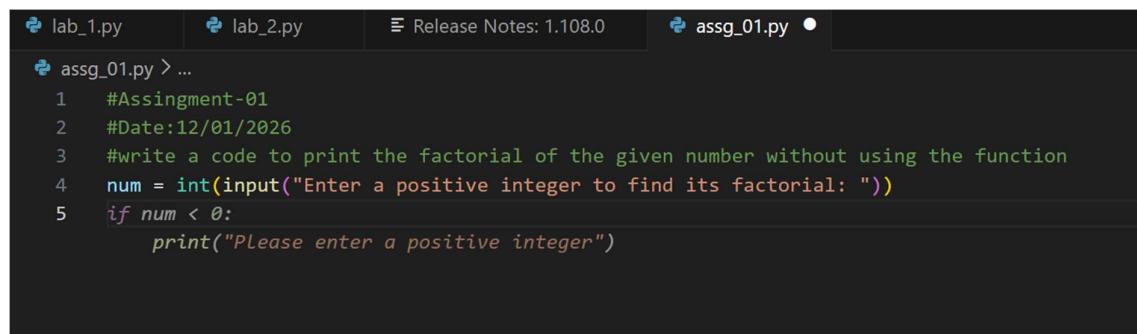
Batch-02

Task:01

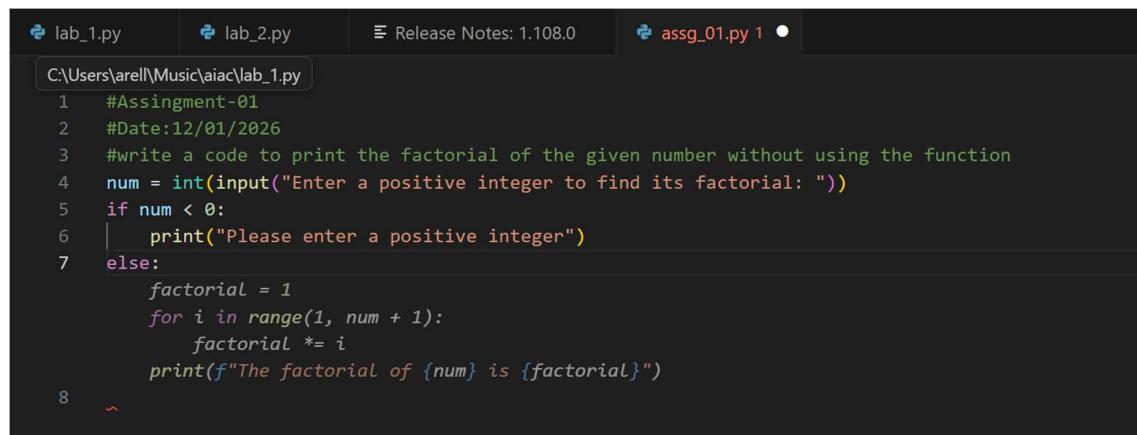
➤ A working Python program generated with Copilot assistance

```
❖ #Assingment-01
❖ #Date:12/01/2026
❖ #write a code to print the factorial of the given number without using the function
❖ num = int(input("Enter a positive integer to find its factorial: "))
❖ if num < 0:
❖     print("Please enter a positive integer")
❖ else:
❖     factorial = 1
❖     for i in range(1, num + 1):
❖         factorial *= i
❖     print(f"The factorial of {num} is {factorial}")
```

➤ Screenshot(s) showing:



The screenshot shows a code editor interface with multiple tabs. The active tab is 'assg\_01.py' which contains the following Python code:1 #Assingment-01
2 #Date:12/01/2026
3 #write a code to print the factorial of the given number without using the function
4 num = int(input("Enter a positive integer to find its factorial: "))
5 if num < 0:
6 print("Please enter a positive integer")



The screenshot shows a code editor interface with multiple tabs. The active tab is 'assg\_01.py' which contains the following Python code:C:\Users\arell\Music\aiac\lab\_1.py
1 #Assingment-01
2 #Date:12/01/2026
3 #write a code to print the factorial of the given number without using the function
4 num = int(input("Enter a positive integer to find its factorial: "))
5 if num < 0:
6 print("Please enter a positive integer")
7 else:
8 factorial = 1
9 for i in range(1, num + 1):
10 factorial \*= i
11 print(f"The factorial of {num} is {factorial}")

➤ Sample input/output screenshots

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\arell\Music\aiac> & C:/Users/arell/AppData/Local/Programs/Python/Python311/python.exe C:/Users/arell/Music/aiac/factorial.py
Enter a positive integer to find its factorial: 5
The factorial of 5 is 120
PS C:\Users\arell\Music\aiac>
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\arell\Music\aiac> & C:/Users/arell/AppData/Local/Programs/Python/Python311/python.exe C:/Users/arell/Music/aiac/factorial.py
Enter a positive integer to find its factorial: 5
The factorial of 5 is 120
PS C:\Users\arell\Music\aiac> & C:/Users/arell/AppData/Local/Programs/Python/Python311/python.exe C:/Users/arell/Music/aiac/factorial.py
Enter a positive integer to find its factorial: 12
The factorial of 12 is 479001600
PS C:\Users\arell\Music\aiac>
```

➤ **Brief reflection (5–6 lines):**

- GitHub Copilot was used to generate the logic quickly without putting much thought into the program structure. It advocated a fresh and clean approach to code and made it readable without having functions in use. Following its suggestions, I reduced the need for me to memorize exact syntax, freeing my mind to focus on the core logic. Copilot also helped me write simple and efficient code in a neat way. Overall, it was faster to develop, less stressful and better in terms of clarity.

➤ **How helpful was Copilot for a beginner?**

->copilot is very useful for beginners because it provides instant code suggestion when the user is stuck in middle. It will help beginner by suggesting the code so that user can understand the code and memorized and it makes learning programming easier and more confident

➤ **Did it follow best practices automatically?**

->Yes it follows best practices automatically for user by writing the code itself copilot will guess the next lines by that user can also more confident and user also get to know what next should be .It automatically best practices

## **Task-02**

➤ **Screenshot(s) showing:**

```
lab_1.py X lab_2.py Release Notes: 1.108.0 assg_01.py X
assg_01.py > [o] num
optimize the code and remove the unessary varibale from the code
∅ Add Context...
•F | Add to chat (Alt+X) | Do not show again
4 num = int(input("Enter a positive integer to find its factorial: "))
5 if num < 0:
6     print("Please enter a positive integer")
7 else:
8     factorial = 1
9     for i in range(1, num + 1):
10        factorial *= i
11    print(f"The factorial of {num} is {factorial}")

lab_1.py X lab_2.py Release Notes: 1.108.0 assg_01.py X
assg_01.py > [o] num
C:\Users\arell\Music\aiac\assg_01.py • Pending changes from chat
∅ Add Context...
•F | Add to chat (Alt+X) | Do not show again
4 num = int(input("Enter a positive integer to find its factorial: "))
5 if num < 0:
6     print("Please enter a positive integer")
7 else:
8     factorial = 1
9     result = 1
10    for i in range(1, num + 1):
11        factorial *= i
12        result *= i
13    print(f"The factorial of {num} is {factorial}")
14    print(f"The factorial of {num} is {result}")
```

## code

```
#Assingment-01
#Date:12/01/2026
#write a code to print the factorial of the given number without using the
function
num = int(input("Enter a positive integer to find its factorial: "))
if num < 0:
    print("Please enter a positive integer")
else:
    result = 1
    for i in range(1, num + 1):
        result *= i
    print(f"The factorial of {num} is {result}")
```

## side by side comparition

```
n=int(input("Enter a number: "))
result = 1
if n < 0:
print("Factorial is not defined for negative numbers")
```

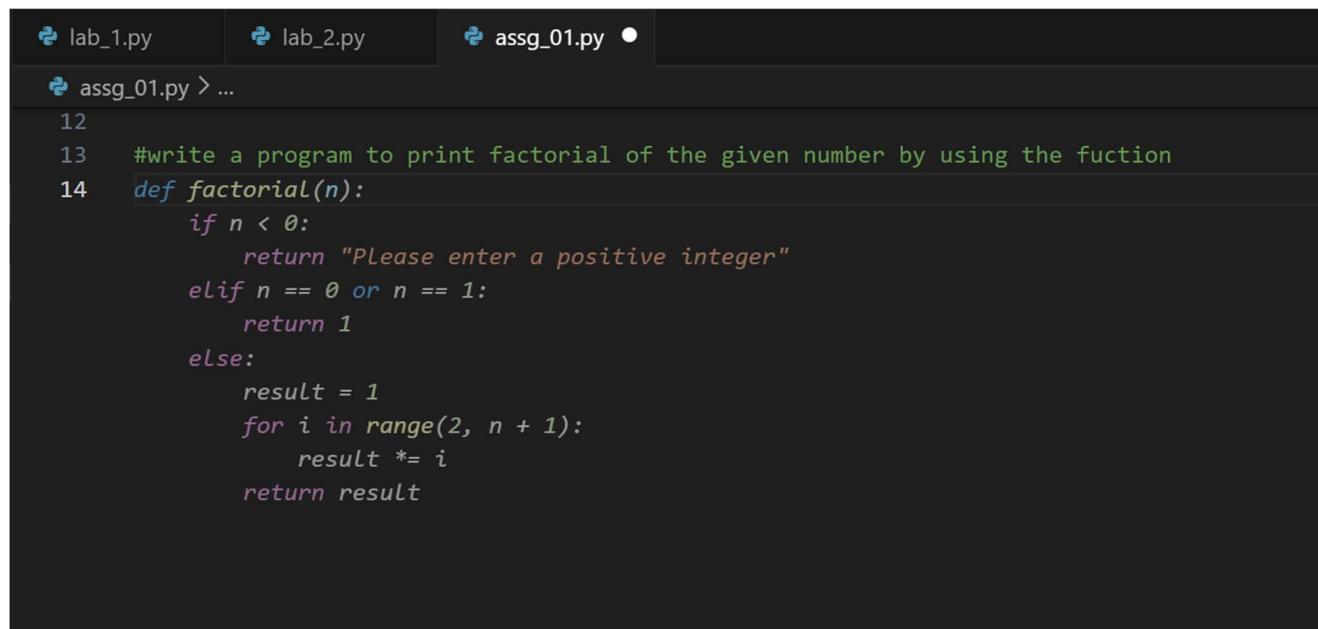
```
else:  
for i in range(1, n + 1):  
    result = result * i  
print("Factorial of", n, "is", result)
```

### optimal code

```
n = int(input("Enter a number: "))  
if n < 0:  
    print("Factorial is not defined for negative numbers")  
else:  
    result = 1  
    for i in range(2, n + 1):  
        result *= i  
    print(f"Factorial of {n} is {result}")
```

### task-03

Modular Design Using AI Assistance (Factorial with Functions)



```
lab_1.py  lab_2.py  assg_01.py ●  
assg_01.py > ...  
12  
13     #write a program to print factorial of the given number by using the fuction  
14     def factorial(n):  
15         if n < 0:  
16             return "Please enter a positive integer"  
17         elif n == 0 or n == 1:  
18             return 1  
19         else:  
20             result = 1  
21             for i in range(2, n + 1):  
22                 result *= i  
23             return result
```

```
#write a program to print factorial of the given number by using the fuction
def factorial(n):
    if n < 0:
        return "Please enter a positive integer"
    elif n == 0 or n == 1: # check for 0! and 1!
        return 1
    else:
        result = 1
        for i in range(2, n + 1): # Loop from 2 to n
            result *= i
        return result
```

lab\_1.py    lab\_2.py    assg\_01.py

assg\_01.py > factorial

```
13  #write a program to print factorial of the given number by using the fuction
14  def factorial(n):
15      if n < 0:# check for negative input
16          return "Please enter a positive integer"
17      elif n == 0 or n == 1: # check for 0! and 1!
18          return 1
19      else:
20          result = 1
21          for i in range(2, n + 1): # loop from 2 to n
22              result *= i # multiply result by i
23          return result # return the factorial value
24  number = int(input("Enter a positive integer to find its factorial using function: "))
25  print(f"The factorial of {number} is {factorial(number)}")
```

```
#write a program to print factorial of the given number by using the fuction
def factorial(n):
    if n < 0:# check for negative input
        return "Please enter a positive integer"
    elif n == 0 or n == 1: # check for 0! and 1!
        return 1
    else:
        result = 1
        for i in range(2, n + 1): # loop from 2 to n
            result *= i # multiply result by i
        return result # return the factorial value
number = int(input("Enter a positive integer to find its factorial using
function: "))
print(f"The factorial of {number} is {factorial(number)}")
```

#### ➤ Sample input/output screenshots

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\arell\Music\aiac> & C:/Users/arell/AppData/Local/Programs/Python/
Enter a positive integer to find its factorial using function: 6
The factorial of 6 is 720
PS C:\Users\arell\Music\aiac>
```

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\arell\Music\aiac> & C:/Users/arell/AppData/Local/Programs/Python/
Enter a positive integer to find its factorial using function: 6
The factorial of 6 is 720
PS C:\Users\arell\Music\aiac> & C:/Users/arell/AppData/Local/Programs/Python/
Enter a positive integer to find its factorial using function: 16
The factorial of 16 is 20922789888000
PS C:\Users\arell\Music\aiac>
```

#### Short note:

How modularity improves reusability.

- Modularity improves reusability by breaking a program into independent, self-contained parts such as functions or modules. Each module can be reused in different programs or in multiple places within the same program without rewriting code. This reduces duplication and saves development time. Modular code is also easier to test, debug, and maintain because changes in one module do not affect the entire program. Overall, modularity makes software more flexible and scalable..

#### Task 4:

Comparative Analysis – Procedural vs Modular AI Code (With vs Without Functions)

##### ◆ Comparative Analysis: Procedural vs Modular AI Code

| Criteria      | Procedural Code (Without Functions)                                     | Modular Code (With Functions)                                |
|---------------|---|--|
| Logic Clarity | The logic is written in a single block, which is easy to understand for | The logic is organized inside a function, making the program |

|                                       |   |  |
|---------------------------------------|---|--|
|                                       | small programs but becomes difficult to follow as the code grows.                           | more structured and easier to understand.  |
| <b>Reusability</b>                    | The code cannot be reused easily and must be rewritten if the same logic is needed again.   | The function can be reused multiple times across the program or in other programs.                         |
| <b>Debugging Ease</b>                 | Debugging is harder because the entire code must be checked for errors.                     | Debugging is easier since errors are confined within the function.   |
| <b>Suitability for Large Projects</b> | This approach is not suitable for large projects due to poor structure and maintainability. | This approach is suitable for large projects because modular design improves organization and scalability. |
| <b>AI Dependency Risk</b>             | Since the logic is simple, dependency on AI is minimal.                                     | Over-dependence on AI-generated functions without understanding the logic can introduce risks.             |

## Task 5:

### AI-Generated Iterative vs Recursive Thinking

```

lab_1.py    lab_2.py    assg_01.py •
assg_01.py
27 #write a program to print factorial of the given number by only on iterative statements with proper comments on each line
28 num = int(input("Enter a positive integer to find its factorial using only iterative statements: ")) # take input from user

```

```

#write a program to print factorial of the given number by only on iterative statements with proper comments on each line
num = int(input("Enter a positive integer to find its factorial using only iterative statements: ")) # take input from user
if num < 0: # check for negative input
    print("Please enter a positive integer")
else:
    factorial = 1 # initialize factorial variable
    i = 2 # start from 2
    while i <= num: # Loop until i is less than or equal to num
        factorial *= i # multiply factorial by i
        i += 1 # increment i by 1
    print(f"The factorial of {num} is {factorial}") # print the result

```

```

#write a program to print factorial of the given number by only on
iterative statements with proper comments on each line
num = int(input("Enter a positive integer to find its factorial using only
iterative statements: ")) # take input from user
if num < 0: # check for negative input
    print("Please enter a positive integer")

```

```
else: # if input is valid
    factorial = 1 # initialize factorial variable
    i = 2 # start from 2
    iteration_count = 0 # initialize iteration counter
    while i <= num: # loop until i is less than or equal to num
        factorial *= i # multiply factorial by i
        i += 1 # increment i by 1
        iteration_count += 1 # increment iteration counter
    print(f"The factorial of {num} is {factorial}") # print the result
    print(f"Number of iterations: {iteration_count}") # print iteration count
```

## outputs

```
Enter a positive integer to find its factorial using only iterative statements: 20
The factorial of 20 is 2432902008176640000
Number of iterations: 19
PS C:\Users\arell\Music\aiac> █
```

## Using Recursion:

```
#write a program to print factorial of the given number by using recursion with proper comments on each line
def factorial(n):
    if n < 0: # check for negative input
        return "Please enter a positive integer"
    elif n == 0 or n == 1: # base case for recursion
        return 1
    else:
        return n * factorial(n - 1) # recursive call
```

```
42 #write a program to print factorial of the given number by using recursion with proper comments on each line
43 def factorial(n):
44     if n < 0: # check for negative input
45         return "Please enter a positive integer"
46     elif n == 0 or n == 1: # base case for recursion
47         return 1
48     else:
49         return n * factorial(n - 1) # recursive case
50 number = int(input("Enter a positive integer to find its factorial using recursion: ")) # take input from user
51 print(f"The factorial of {number} is {factorial(number)}") # print the result
52
```

```
#write a program to print factorial of the given number by using recursion with proper comments on each line
def factorial(n, count=[0]): # define factorial function with iteration counter
    count[0] += 1 # increment iteration counter
    if n < 0: # check for negative input
        return "Please enter a positive integer"
    elif n == 0 or n == 1: # base case for recursion
        return 1
    else:
        return n * factorial(n - 1, count) # recursive case
count = [0] # initialize iteration counter
number = int(input("Enter a positive integer to find its factorial using recursion: ")) # take input from user
print(f"The factorial of {number} is {factorial(number, count)}") # print the result
print(f"Number of iterations: {count[0]}") # print iteration count
```

```
#write a program to print factorial of the given number by using recursion
with proper comments on each line
def factorial(n, count=[0]): # define factorial function with iteration
counter
    count[0] += 1 # increment iteration counter
    if n < 0: # check for negative input
        return "Please enter a positive integer"
    elif n == 0 or n == 1: # base case for recursion
        return 1
    else:
        return n * factorial(n - 1, count) # recursive case
count = [0] # initialize iteration counter
number = int(input("Enter a positive integer to find its factorial using
recursion: ")) # take input from user
print(f"The factorial of {number} is {factorial(number, count)}") # print the
result
print(f"Number of iterations: {count[0]}") # print iteration count
```

## **output:**

```
Enter a positive integer to find its factorial using recursion: 20
The factorial of 20 is 2432902008176640000
Number of iterations: 20
```

## Comparison: Iterative vs Recursive Approach

| <b>Criteria</b> | <b>Iterative Approach</b> | <b>Recursive Approach</b> |
|-----------------|---------------------------|---------------------------|
|-----------------|---------------------------|---------------------------|

|  |   |   |
|--|---|---|
| <b>Readability</b>                       | Easy to understand for beginners, logic is straightforward. | Code is shorter and elegant but may be confusing for beginners.                   |
| <b>Stack Usage</b>                       | Does not use call stack, memory usage is minimal.           | Uses call stack for every function call, increases memory usage.                  |
| <b>Performance Implications</b>          | Faster and more efficient for large inputs.                 | Slower due to repeated function calls and stack overhead.                         |
| <b>When Recursion Is Not Recommended</b> | Not applicable (safe for large inputs).                     | Not recommended for large inputs due to stack overflow risk and recursion limits. |