AI ASSISTED CODING

## ASSIGNMENT-1.1

# K.Sindhu meenan(2403A51250)-Batch 11

**Task 1: Factorial without Functions**

Description:  
Use GitHub Copilot to generate a Python program that calculates the  
factorial of a number without defining any functions (using loops  
directly in the main code).  
● Expected Output:  
o A working program that correctly calculates the factorial for  
user-provided input.  
o Screenshots of the code generation process

**Prompt:** Write a Python program that calculates the factorial of a user-provided non-negative integer using a loop directly in the main code, without defining any functions. Include input validation for negative numbers and print the result.

**Code:**

**A computer screen shot of a program

AI-generated content may be incorrect.**

**Output:**

**A screen shot of a computer

AI-generated content may be incorrect.**

**Task 2: Improving Efficiency**

Description:  
Examine the Copilot-generated code from Task 1 and demonstrate  
how its efficiency can be improved (e.g., removing unnecessary

variables, optimizing loops).  
● Expected Output:  
o Original and improved versions of the code.  
o Explanation of how the improvements enhance performance.  
Without Functions.

**Prompt**: Improve the following Python code that calculates factorial without using functions. Optimize it by removing unnecessary variables and redundant operations, and make the loop more efficient while keeping the output correct.

**Code:**

**Original Copilot-Generated Code**

**A computer screen with text on it

AI-generated content may be incorrect.**

**Improved Version**

**A screenshot of a computer program

AI-generated content may be incorrect.**

**Output:**

**A screen shot of a computer

AI-generated content may be incorrect.**

**Task-3: Factorial with Functions**

Description:  
Use GitHub Copilot to generate a Python program that calculates the  
factorial of a number using a user-defined function.  
● Expected Output:  
o Correctly working factorial function with sample outputs.  
o Documentation of the steps Copilot followed to generate the  
function.

**Prompt:** Write a Python program that calculates the factorial of a user-provided non-negative integer using a user-defined function. Include input validation for negative numbers and print the result. Provide clear comments**.**

**Code:**

**A screenshot of a computer program

AI-generated content may be incorrect.**

**Output:**

**A screen shot of a computer

AI-generated content may be incorrect.**

**Task 4: Comparative Analysis – With vs Without Functions**

Description:  
Differentiate between the Copilot-generated factorial program with  
functions and without functions in terms of logic, reusability, and  
execution.  
● Expected Output:  
o A comparison table or short report explaining the differences.

**Prompt:** Compare two Python programs: one that calculates factorial without using functions and one that uses a user-defined factorial function. Explain the differences in terms of logic, reusability, and execution, and provide a short report.

**Code:**

**Without Functions:**

**A computer screen shot of a computer code

AI-generated content may be incorrect.**

**With Functions:**

**A computer screen shot of a computer code

AI-generated content may be incorrect.**

**Output:**

**A screen shot of a computer code

AI-generated content may be incorrect.**

**Task 5: Iterative vs Recursive Factorial**

Description:  
Prompt GitHub Copilot to generate both iterative and recursive  
versions of the factorial function.  
● Expected Output:  
o Two correct implementations.  
o A documented comparison of logic, performance, and  
execution flow between iterative and recursive approaches.

**Prompt:** Write two Python programs that calculate the factorial of a non-negative integer: one using an iterative approach with a loop, and one using recursion. Include input validation and comments explaining the logic. Provide a comparison of the two approaches in terms of logic, performance, and execution flow.

**Code:**

**Iterative Factorial:**

**A screen shot of a computer program

AI-generated content may be incorrect.**

**Recursive Factorial:**

**A computer screen shot of a black screen

AI-generated content may be incorrect.**

**Output:**

**A screen shot of a computer

AI-generated content may be incorrect.**