

## ASSIGNMENT-1

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BATCH-16

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### Task 1: AI-Generated Logic Without Modularisation (*Factorial without Functions*)

The screenshot shows the Thonny IDE interface. The top window is titled "Thonny - <untitled> @ 7:23" and contains a code editor with the following Python script:

```
1 num = int(input("Enter a number to calculate its factorial: "))
2 if num < 0:
3     print("Factorial is not defined for negative numbers")
4 else:
5     factorial = 1
6     for i in range(1, num + 1):
7         factorial *= i
8     print(f"The factorial of {num} is {factorial}")
9
```

The bottom window is titled "Shell" and shows the output of running the script:

```
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>> |
```

### Task 2: AI Code Optimization & Cleanup (*Improving Efficiency and Readability*)

The screenshot shows the Thonny Python IDE interface. The top window is titled "Thonny - <untitled> @ 7:24" and contains a code editor with the following Python script:

```
1 num = int(input("Enter a number to calculate its factorial: "))
2 if num < 0:
3     print("Factorial is not defined for negative numbers")
4 else:
5     result = 1
6     for value in range(1, num + 1):
7         result *= value
8     print(f"The factorial of {num} is {result}")
9
```

The bottom window is titled "Shell" and shows the output of running the script:

```
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 6
The factorial of 6 is 720
>>> |
```

**Task 3: Modular Design Using AI Assistance (Factorial with Functions)**

The screenshot shows the Thonny Python IDE interface. The top window is titled "Thonny - <untitled> @ 9:34" and contains a code editor with the following Python script:

```
1 def calculate_factorial(n):
2     if n < 0:
3         return "Factorial is not defined for negative numbers"
4     result = 1
5     for i in range(1, n + 1):
6         result *= i
7     return result
8 num = int(input("Enter a number to calculate its factorial: "))
9 output = calculate_factorial(num)
10 if isinstance(output, str):
11     print(output)
12 else:
13     print(f"The factorial of {num} is {output}")
14
```

The bottom window is titled "Shell" and shows the execution of the code:

```
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>>
```

#### **Task 4: Comparative Analysis – Procedural vs Modular AI Code**

**Procedural (Without Function):-**

The screenshot shows the Thonny Python IDE interface. The top window is the code editor with the title "Thonny - <untitled> @ 11:1". It contains the following Python code:

```
1 num = int(input("Enter a number to calculate its factorial: "))
2
3 if num < 0:
4     print("Factorial is not defined for negative numbers")
5 else:
6     result = 1
7     for i in range(1, num + 1):
8         result *= i
9
10    print(f"The factorial of {num} is {result}")
11
```

The bottom window is the "Shell" tab, which displays the output of running the script. It shows the user input "4", the program's response "The factorial of 4 is 24", and an empty command prompt ">>> |".

```
Shell <
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 4
The factorial of 4 is 24
>>> |
```

### ***Modular (With Function)***

The screenshot shows the Thonny Python IDE interface. The top menu bar includes File, Edit, View, Run, Tools, and Help. A toolbar with various icons is located above the code editor. The code editor window contains the following Python script:

```
1 def factorial(n):
2     if n < 0:
3         return "Factorial is not defined for negative numbers"
4     result = 1
5     for i in range(1, n + 1):
6         result *= i
7     return result
8 num = int(input("Enter a number to calculate its factorial: "))
9 res = factorial(num)
10 if isinstance(res, str):
11     print(res)
12 else:
13     print(f"The factorial of {num} is {res}")
14
```

The shell window below shows the execution of the script:

```
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>>
```

### Task 5: AI-Generated Iterative vs Recursive Thinking

#### Iterative Approach

The screenshot shows the Thonny Python IDE interface. The top window is titled "Thonny - <untitled> @ 8:23" and contains a code editor with the following Python script:

```
1 # Iterative factorial program
2 num = int(input("Enter a number to calculate its factorial: "))
3 if num < 0:
4     print("Factorial is not defined for negative numbers")
5 else:
6     factorial = 1
7     for i in range(1, num + 1):
8         factorial *= i
9     print(f"The factorial of {num} is {factorial}")
10
```

The bottom window is titled "Shell" and shows the output of running the script:

```
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>> |
```

### ***Recursive Approach***

Thonny - <untitled> @ 1:30

File Edit View Run Tools Help

<untitled> \* x

```
1 # Recursive factorial program
2 def factorial(n):
3     if n <= 1:
4         return 1
5     return n * factorial(n - 1)
6 num = int(input("Enter a number to calculate its factorial: "))
7 if num < 0:
8     print("Factorial is not defined for negative numbers")
9 else:
10    result = factorial(num)
11    print(f"The factorial of {num} is {result}")
12
```

Shell x

```
>>> %Run -c $EDITOR_CONTENT
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>> |
```