

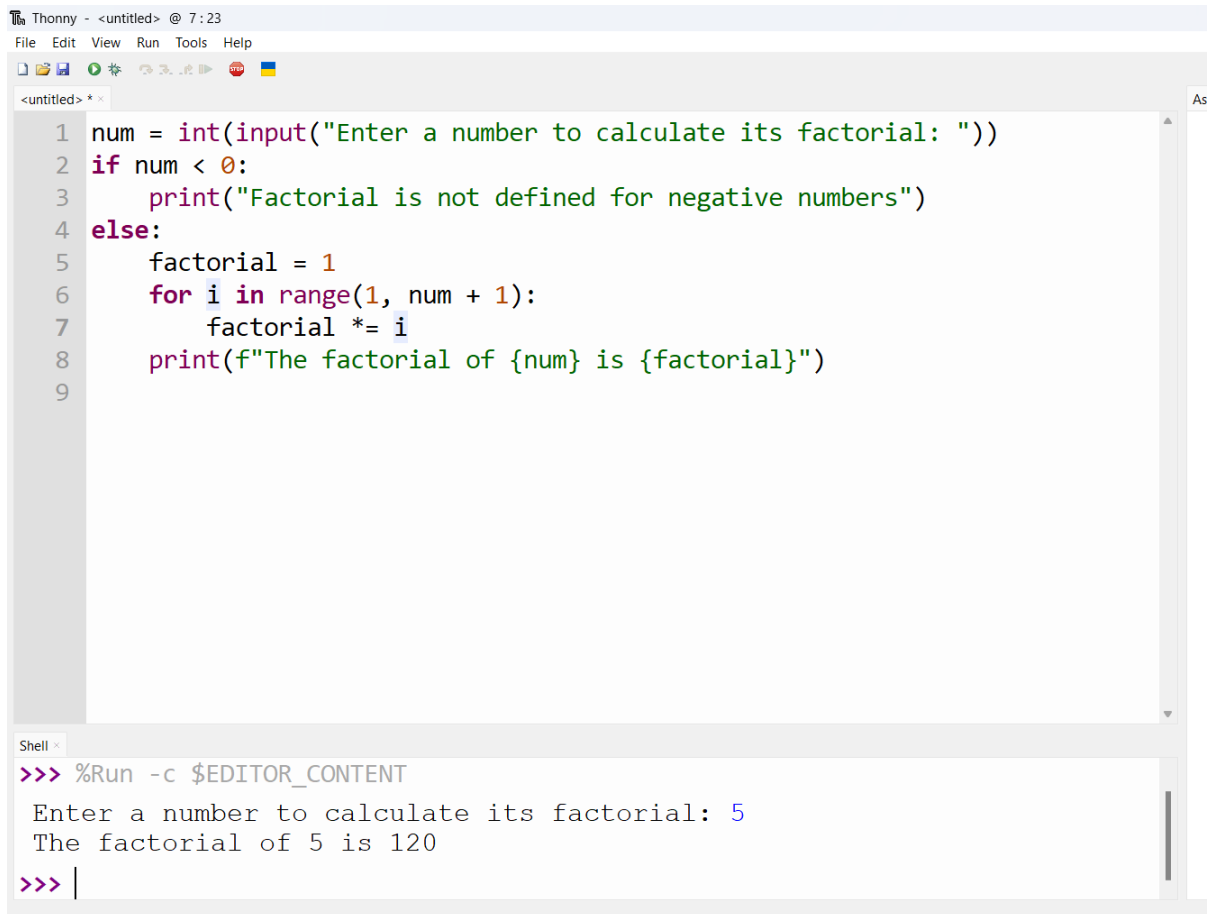
ASSIGNMENT-1

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BATCH-16

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Task1:AI-GeneratedLogicWithoutModularisation(*FactorialwithoutFunctions*)

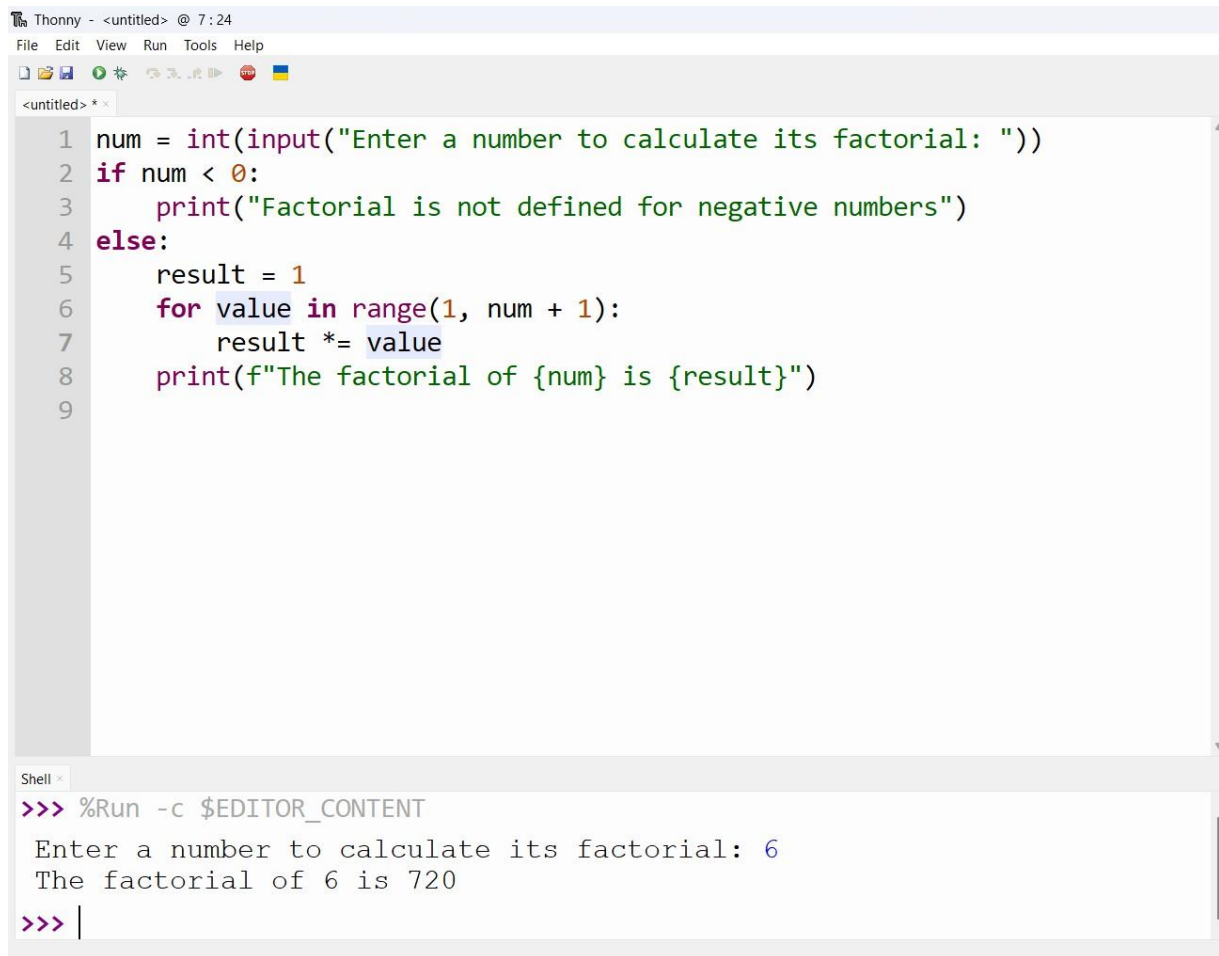


The screenshot displays the Thonny IDE interface. The top pane shows a Python script for calculating the factorial of a number without using functions. The code includes an input prompt, a conditional check for negative numbers, and a loop for calculating the factorial. The bottom pane shows the execution output, where the user entered 5, and the program correctly calculated the factorial as 120.

```
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
```

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

Task2:AI Code Optimization&Cleanup(*ImprovingEfficiencyandReadability*)



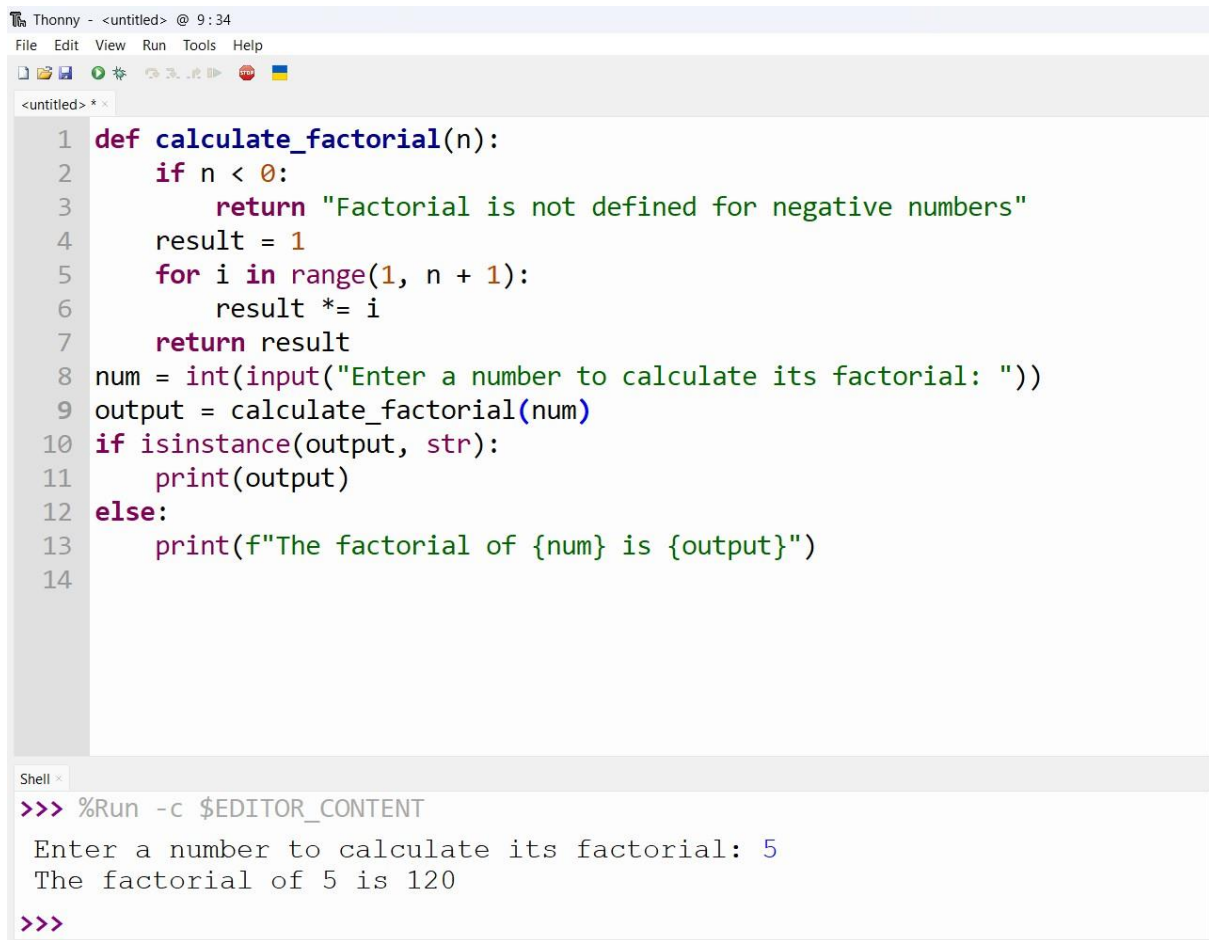
The screenshot shows the Thonny Python IDE interface. The top menu bar includes File, Edit, View, Run, Tools, and Help. Below the menu is a toolbar with icons for file operations and running code. The main editor window, titled '<untitled> *', contains a Python script for calculating factorials. The script uses a loop to calculate the factorial of a user-input number. The bottom panel, titled 'Shell', shows the command '%Run -c \$EDITOR_CONTENT' and the program's output for the input '6'.

```
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
```

Shell

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

Task3:ModularDesignUsingAIAssistance(FactorialwithFunctions)



The screenshot shows the Thonny Python IDE interface. The top menu bar includes File, Edit, View, Run, Tools, and Help. Below the menu is a toolbar with icons for file operations, running, and debugging. The main editor window, titled '<untitled> *', contains the following Python code:

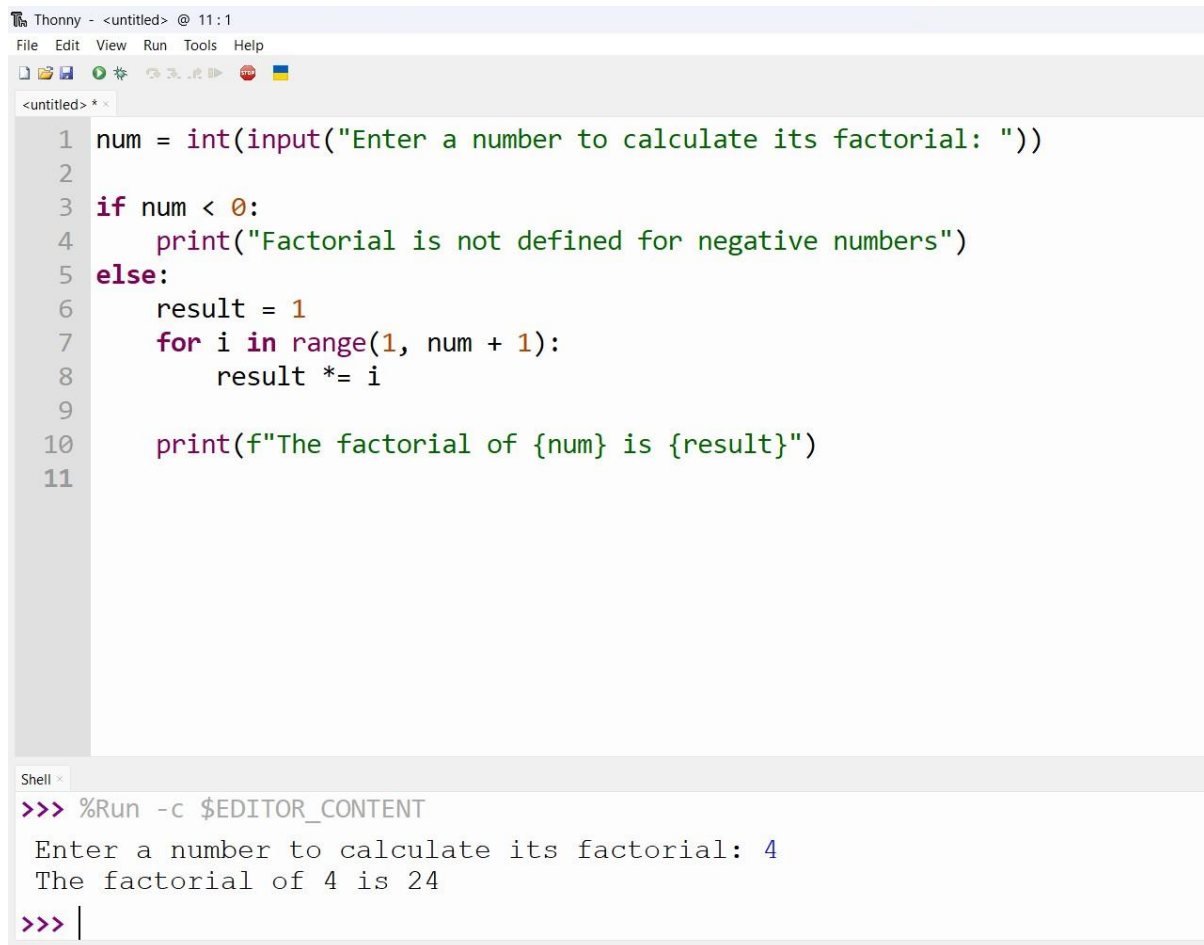
```
1 def calculate_factorial(n):
2     if n < 0:
3         return "Factorial is not defined for negative numbers"
4     result = 1
5     for i in range(1, n + 1):
6         result *= i
7     return result
8 num = int(input("Enter a number to calculate its factorial: "))
9 output = calculate_factorial(num)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

Below the editor is a Shell window titled 'Shell'. It shows the command prompt running the script with the command `>>> %Run -c $EDITOR_CONTENT`. The output of the script is displayed as follows:

```
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>>
```

Task4:ComparativeAnalysis–ProceduralvsModularAI Code Procedural

(Without Function):-



The image shows a screenshot of the Thonny Python IDE. The top window, titled "<untitled> @ 11:1", contains a Python script for calculating factorials. The script prompts the user to enter a number, checks if it's negative, and then calculates the factorial using a loop. The bottom window, titled "Shell", shows the execution of the script, where the user has entered '4' and the output is 'The factorial of 4 is 24'.

```
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
```

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

Modular(WithFunction)

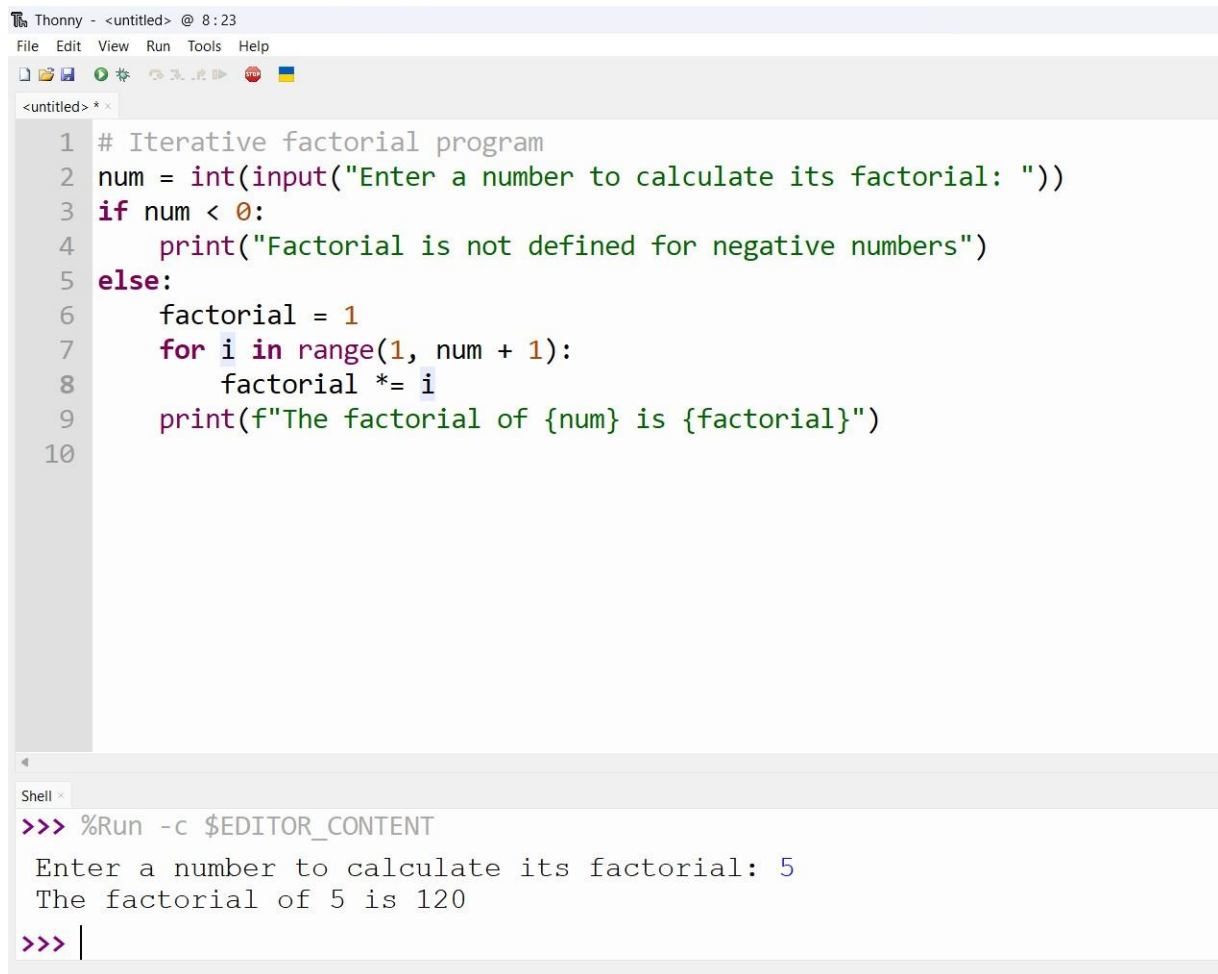
The screenshot shows the Thonny IDE interface. The top menu bar includes File, Edit, View, Run, Tools, and Help. Below the menu is a toolbar with icons for file operations and running code. The main editor window displays a Python script for calculating the factorial of a number iteratively. The script defines a function `factorial(n)` that returns an error message for negative numbers, initializes `result = 1`, and uses a `for` loop to calculate the factorial. It then prompts the user for input, calls the function, and prints the result in a formatted string.

```
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
```

Below the editor is a Shell window. It shows the command `>>> %Run -c $EDITOR_CONTENT` being executed. The output of the script is displayed: `Enter a number to calculate its factorial: 5` followed by `The factorial of 5 is 120`. The prompt `>>>` is shown again at the bottom of the shell window.

Task5:AI-GeneratedIterativevsRecursiveThinking Iterative

Approach



The screenshot shows the Thonny Python IDE interface. The top menu bar includes File, Edit, View, Run, Tools, and Help. Below the menu is a toolbar with icons for file operations, running, and debugging. The main editor window, titled '<untitled> * x', contains a Python script for calculating factorials iteratively. The script is as follows:

```
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
```

Below the editor is a shell window titled 'Shell x'. It shows the command `>>> %Run -c $EDITOR_CONTENT` being executed. The output of the program is displayed in the shell:

```
Enter a number to calculate its factorial: 5
The factorial of 5 is 120
>>> |
```

RecursiveApproach

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
>>> |
```