

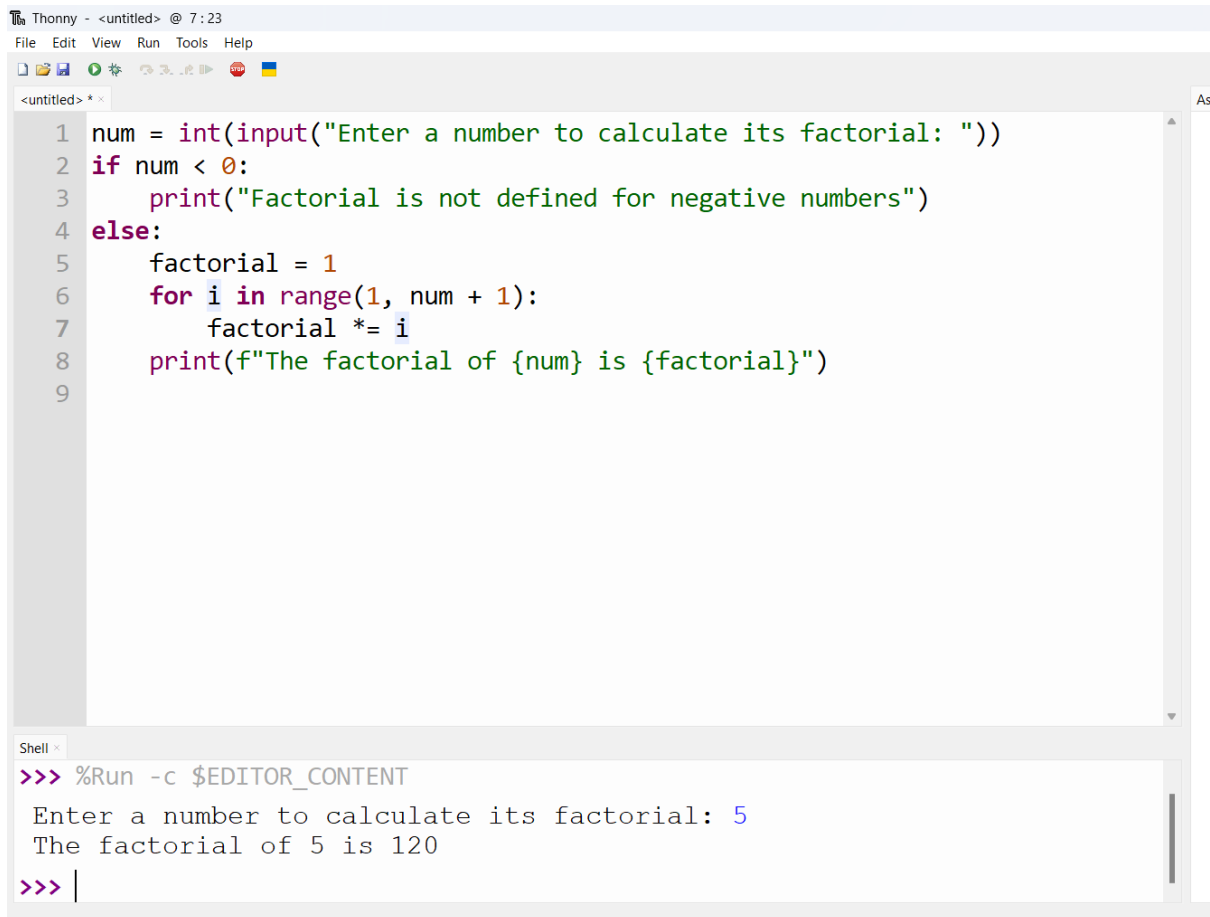
ASSIGNMENT-1

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BATCH-16

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



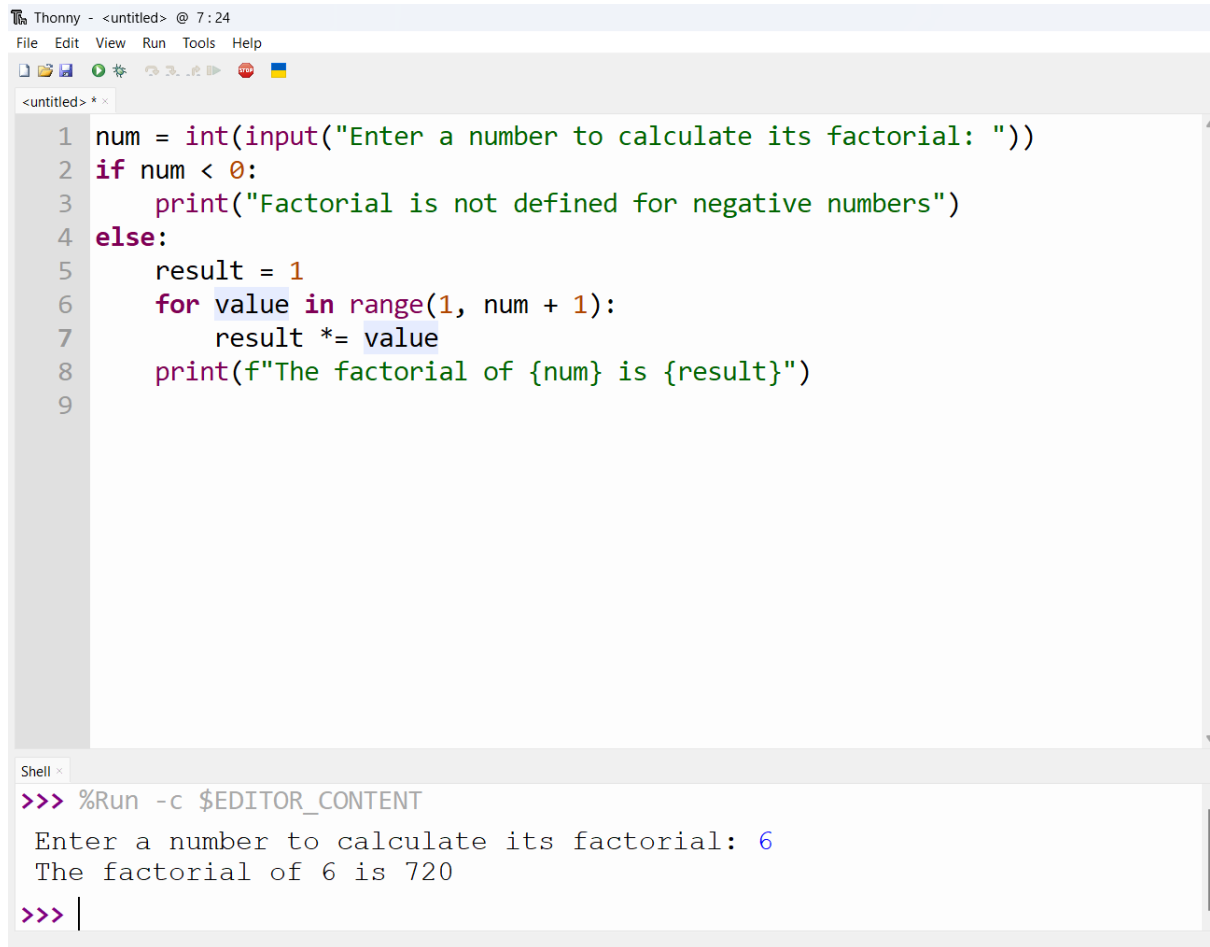
The screenshot shows the Thonny IDE interface. The main editor window displays a Python script for calculating the factorial of a number without using functions. The code is as follows:

```
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
```

Below the editor is a Shell window showing the execution of the code. The prompt is `>>> %Run -c \$EDITOR_CONTENT`. The user has entered the number 5, and the program has outputted the factorial of 5, which is 120.

```
>>> %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*)

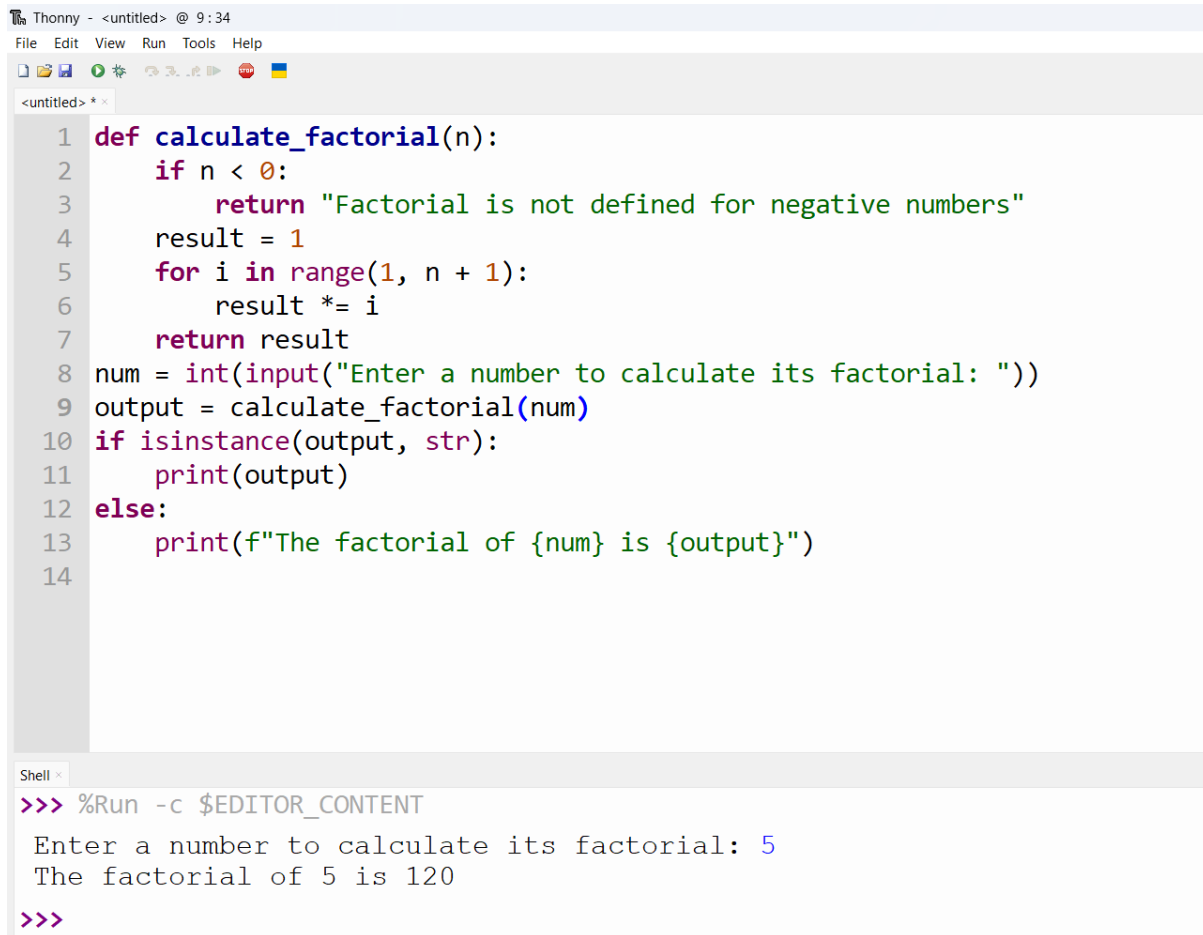


The image shows a screenshot of the Thonny Python IDE. The top window, titled "<untitled> @ 7:24", contains a Python script for calculating factorials. The script uses an if-else structure to handle negative numbers and a for loop to calculate the factorial for positive numbers. The bottom window, titled "Shell x", shows the execution of the script using the command "%Run -c \$EDITOR_CONTENT". The output shows the user entering the number 6, and the program correctly calculating the factorial of 6 as 720.

```
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
```

```
>>> %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 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 the following Python code:

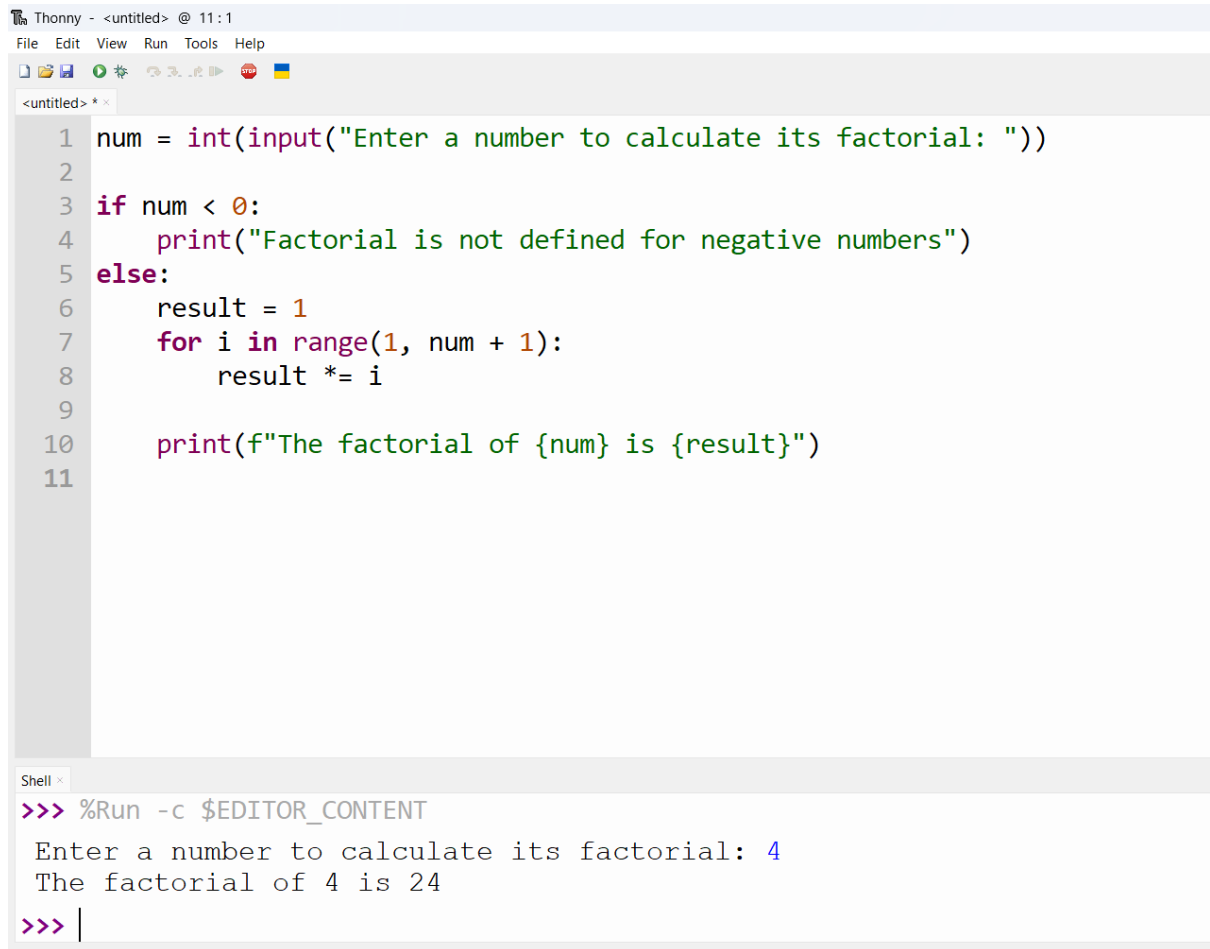
```
1 def calculate_factorial(n):
2     if n < 0:
3         return "Factorial is not defined for negative numbers"
4     result = 1
5     for i in range(1, n + 1):
6         result *= i
7     return result
8 num = int(input("Enter a number to calculate its factorial: "))
9 output = calculate_factorial(num)
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 x'. It shows the command prompt running 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):-

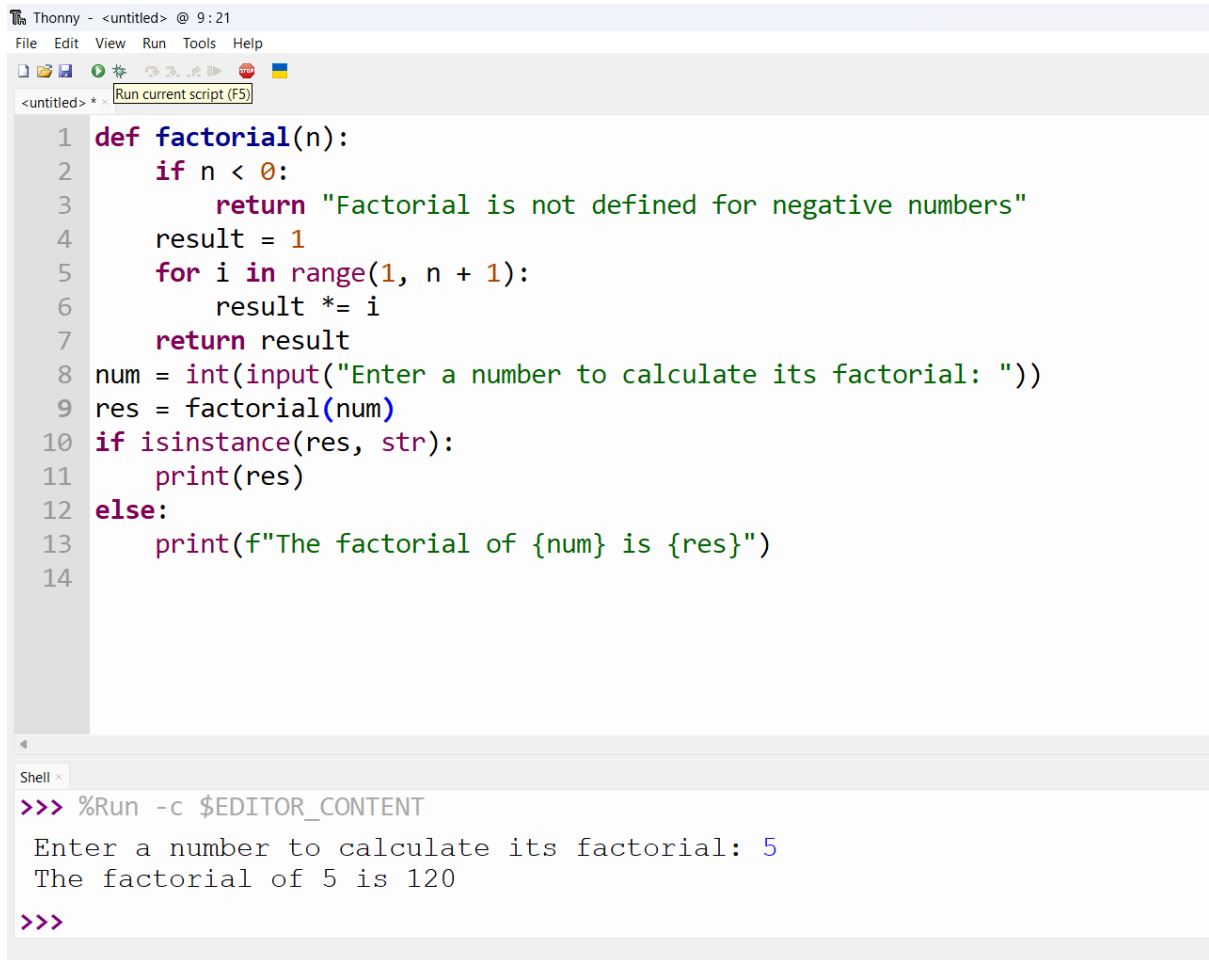


The screenshot shows the Thonny IDE interface. The top bar indicates the file is untitled and the time is 11:1. The menu bar includes File, Edit, View, Run, Tools, and Help. Below the menu is a toolbar with icons for file operations and execution. The main editor window, titled '<untitled> * x', contains a Python script for calculating factorials. The script uses an if-else statement to handle negative numbers and a for loop to calculate the factorial for positive numbers. The bottom panel, titled 'Shell x', shows the command '%Run -c \$EDITOR_CONTENT' being executed, followed by the program's output: 'Enter a number to calculate its factorial: 4' and '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 (With Function)



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 displays a Python script for calculating factorials. The script defines a function `factorial(n)` that returns an error message for negative numbers, initializes a result to 1, and uses a `for` loop to calculate the factorial. It then prompts the user for a number, calls the function, and prints the result using `isinstance` to handle both string and integer inputs. The bottom panel shows a shell window where the script was executed, displaying the input '5' and the output 'The factorial of 5 is 120'.

```
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
```

Shell

```
>>> %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

```
Thonny - <untitled> @ 8:23
File Edit View Run Tools Help

<untitled> * x
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

Shell x
>>> %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
>>> |
```