# AI ASSISTED CODING

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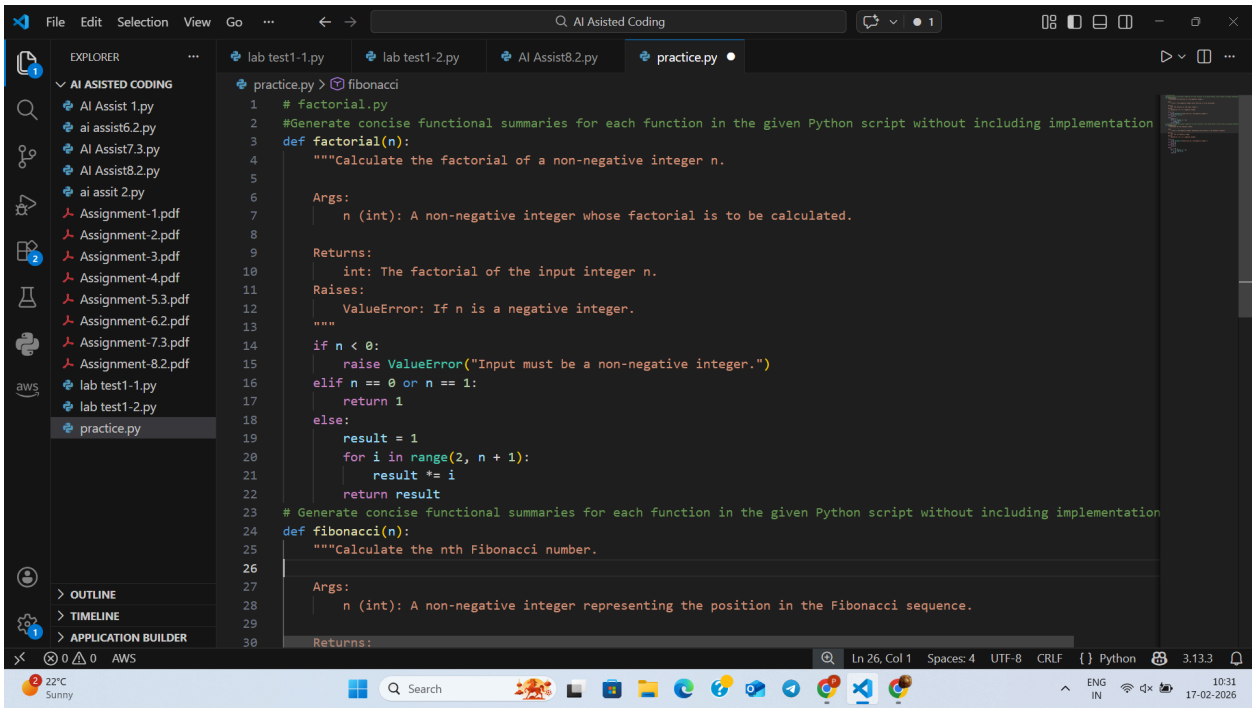
**Batch:** 37 **Assignment-** 9.2

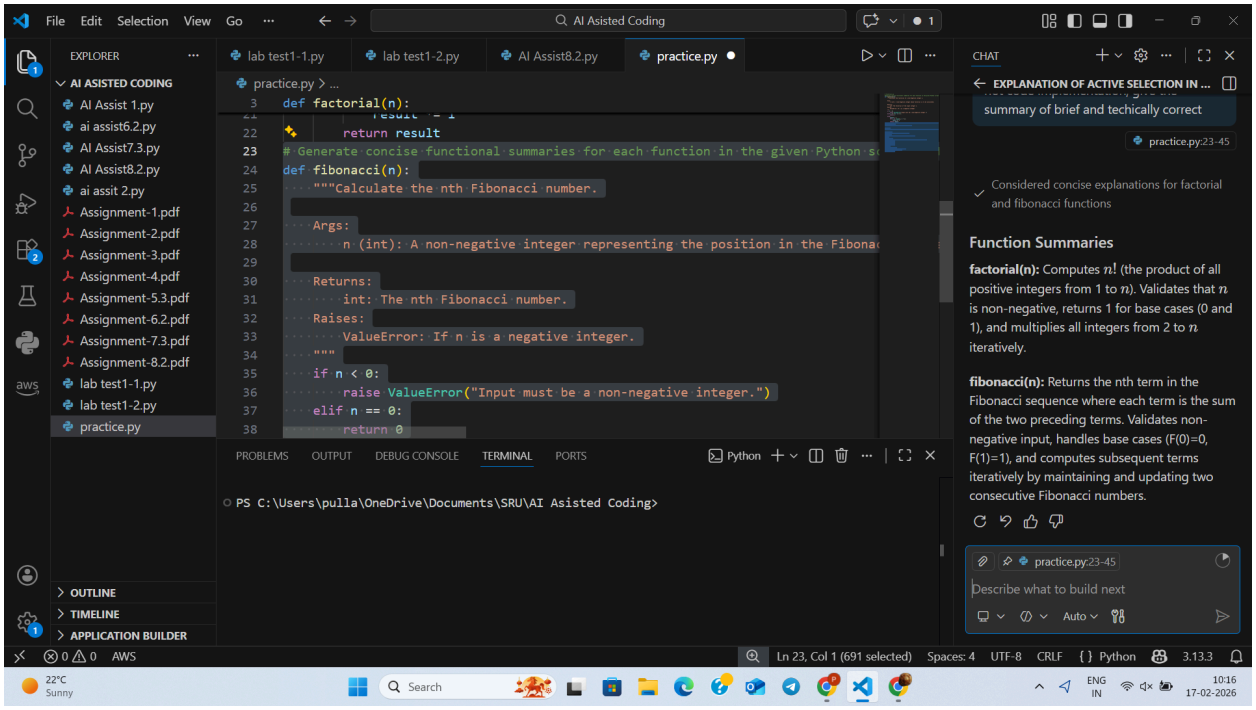
## Task Description -1 (Documentation – Function Summary Generation)

Use AI to generate concise functional summaries for each Python function in a given script.

## Prompt:

**“#Generate concise functional summaries for each function in the given Python script without including implementation details.”**






## Function Summaries

**factorial(n):** Computes n! (the product of all positive integers from 1 to n). Validates that n is non-negative, returns 1 for base cases (0 and 1), and multiplies all integers from 2 to n iteratively.

**fibonacci(n):** Returns the nth term in the Fibonacci sequence where each term is the sum of the two preceding terms. Validates non-negative input, handles base cases (F(0)=0, F(1)=1), and computes subsequent terms iteratively by maintaining and updating two consecutive Fibonacci numbers

## Observation:

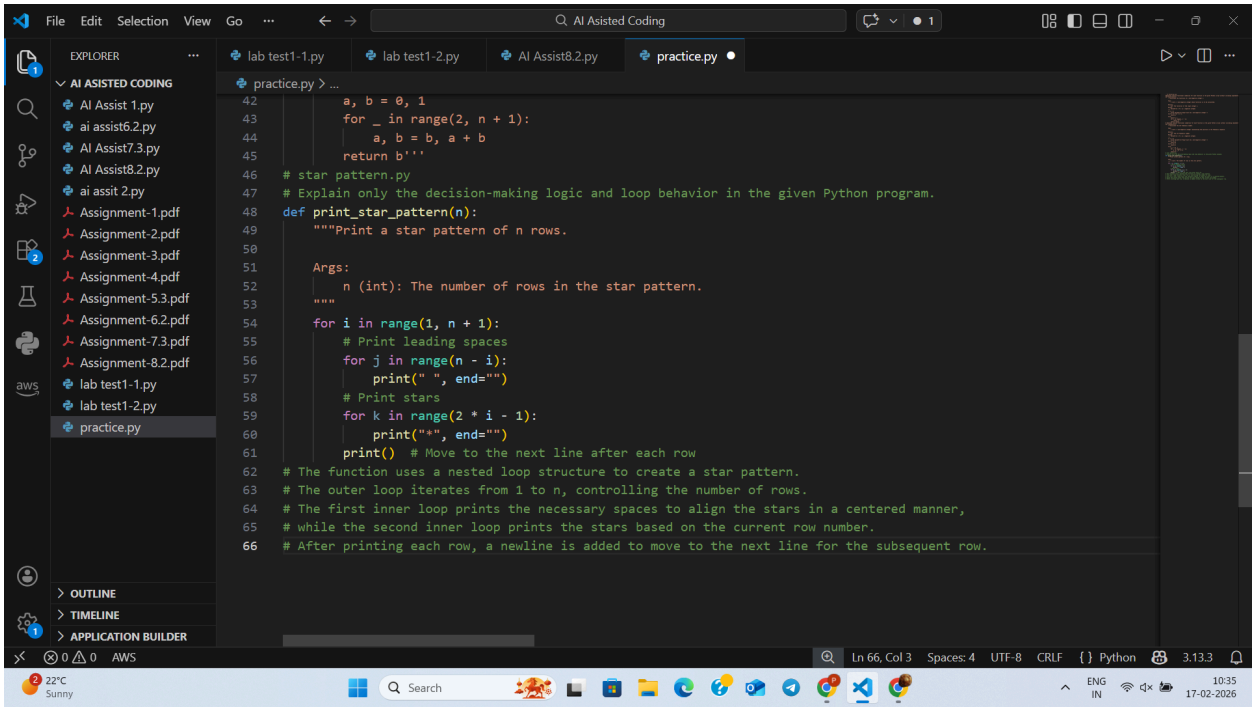
AI successfully generated brief and technically accurate summaries.
The documentation improved readability and understanding of function roles.

## Task Description -2 (Documentation – Logical Explanation for Conditions and Loops)

Use AI to document the logic behind conditional statements and loops in a Python program.

**Prompt:**

**“#Generate concise functional summaries for each function in the given Python script without including implementation details.”**



```
PS C:\Users\pulla\OneDrive\Documents\SRU\AI Asisted Coding> Python -m pydoc practice
Help on module practice:
Help on module practice:

NAME
    practice

DESCRIPTION
    # factorial.py
    #Generate concise functional summaries for each function in the given Python script without including implementation details.
    def factorial(n):
        """Calculate the factorial of a non-negative integer n.

        Args:
            n (int): A non-negative integer whose factorial is to be calculated.

        Returns:
            int: The factorial of the input integer n.
        Raises:
            ValueError: If n is a negative integer.
        """
        if n < 0:
            raise ValueError("Input must be a non-negative integer.")
        elif n == 0 or n == 1:
            return 1
        else:
            result = 1
            for i in range(2, n + 1):
                result *= i
            return result
    # Generate concise functional summaries for each function in the given Python script without including implementation details.
    def fibonacci(n):
        """Calculate the nth Fibonacci number.

        Args:
            n (int): A non-negative integer representing the position in the Fibonacci sequence.

        Returns:
            int: The nth Fibonacci number.
        Raises:
            ValueError: If n is a negative integer.
        """
        if n < 0:
            raise ValueError("Input must be a non-negative integer.")
        elif n == 0:
            return 0
        elif n == 1:
            return 1
        else:
            a, b = 0, 1
            for _ in range(2, n + 1):
                a, b = b, a + b
            return b

FUNCTIONS
    print_star_pattern(n)
        Print a star pattern of n rows.

        Args:
            n (int): The number of rows in the star pattern.
```

Summary: Star Pattern Function

The print_star_pattern(n) function creates a centered star pyramid with n rows using three nested loops:

1. Outer loop (rows): Iterates from 1 to n, controlling the total number of rows.
2. First inner loop (spaces): Prints n - i leading spaces to center each row, decreasing as rows increase.

3. Second inner loop (stars): Prints 2 * i - 1 stars per row, expanding from 1 to 2n - 1 stars.

After each row completes, a newline is printed to move to the next line. The result is a centered, expanding star pyramid pattern.

**Task Description -3 (Documentation – File-Level Overview)**

Use AI to generate a high-level overview describing the functionality of an entire Python file.

**Prompt:**

**"#Generate a high-level overview describing the functionality of the entire Python file"**

```
"""This Python file contains three functions: factorial, fibonacci, and print_star_pattern.
The factorial function calculates the factorial of a non-negative integer,
while the fibonacci function computes the nth Fibonacci number.
Both functions include error handling for invalid input.
The print_star_pattern function generates a star pattern based on the specified number of rows,
utilizing nested loops to create a visually appealing output.
Each function is well-documented with clear descriptions of their purpose,
arguments, return values, and potential exceptions."""
```

**Generated Documentation:**

A brief module-level overview was added at the top of the file summarizing its purpose and core functionality.

**Observation:**

The file-level overview helps readers quickly understand the script before reading detailed code.

**Task Description -4 (Documentation – Refine Existing Documentation)**

Use AI to improve clarity and consistency of existing documentation in Python code.

**Prompt:**

**“#Rewrite existing comments to improve clarity and consistency without changing technical meaning.”**

```python
# Rewrite existing comments to improve clarity and consistency without changing technical meaning.
def factorial(n):
    """Calculate the factorial of a non-negative integer n.

    Args:
        n (int): A non-negative integer whose factorial is to be calculated.

    Returns:
        int: The factorial of the input integer n.
    Raises:
        ValueError: If n is a negative integer.
    """
    if n < 0:
        raise ValueError("Input must be a non-negative integer.")
    elif n == 0 or n == 1:
        return 1
    else:
        result = 1
        for i in range(2, n + 1):
            result *= i
        return result
def fibonacci(n):
    """Calculate the nth Fibonacci number.

    Args:
        n (int): A non-negative integer representing the position in the Fibonacci sequence.

    Returns:
        int: The nth Fibonacci number.
    Raises:
        ValueError: If n is a negative integer.
    """
    if n < 0:
        raise ValueError("Input must be a non-negative integer.")
    elif n == 0:
        return 0
    elif n == 1:
        return 1
    else:
        a, b = 0, 1
        for _ in range(2, n + 1):
            a, b = b, a + b
        return b
def print_star_pattern(n):
```

```python
def print_star_pattern(n):
    """Print a star pattern of n rows.

    Args:
        n (int): The number of rows in the star pattern.
    """
    for i in range(1, n + 1):
        # Print leading spaces to center the stars
        for j in range(n - i):
            print(" ", end="")
        # Print stars based on the current row number
        for k in range(2 * i - 1):
            print("*", end="")
        print()  # Move to the next line after each row
```

**Generated Documentation:**

AI refined unclear comments into structured and consistent explanations.

**Observation:**

Improved documentation enhanced readability while preserving original logic.

**Task Description -5 (Documentation – Prompt Detail Impact Study)**

Study the impact of prompt detail on AI-generated documentation quality.

**Prompt Used (1):**

**“#Document this Python function.”**

```python
# Document this Python function.
def calculate(a, b, operation):
    """Calculate the result of a binary operation on two numbers.

    Args:
        a (float): The first operand.
        b (float): The second operand.
        operation (str): The operation to perform. Must be one of "add", "sub", "mul", or "div".

    Returns:
        float: The result of the operation.

    Raises:
        ValueError: If the operation is not one of the supported operations.
        ZeroDivisionError: If attempting to divide by zero.
    """
    if operation == "add":
        return a + b
    elif operation == "sub":
        return a - b
    elif operation == "mul":
        return a * b
    elif operation == "div":
```

**Prompt Used (2):**

**“#Generate structured documentation including purpose, parameters, return value, and usage example.”**

```python
# Generate structured documentation including purpose, parameters, return value, and usage example.
def calculate(a, b, operation):
    """Calculate the result of a binary operation on two numbers.

    Args:
        a (float): The first operand.
        b (float): The second operand.
        operation (str): The operation to perform. Must be one of "add", "sub", "mul", or "div".

    Returns:
        float: The result of the operation.

    Raises:
        ValueError: If the operation is not one of the supported operations.
        ZeroDivisionError: If attempting to divide by zero.

    Example:
        >>> calculate(10, 5, 'add')
        15
        >>> calculate(10, 5, 'sub')
        5
        >>> calculate(10, 5, 'mul')
        50
        >>> calculate(10, 5, 'div')
        2.0
    """
    if operation == "add":
        return a + b
    elif operation == "sub":
        return a - b
    elif operation == "mul":
        return a * b
    elif operation == "div":
        if b == 0:
            raise ZeroDivisionError("Cannot divide by zero.")
        return a / b
    else:
        raise ValueError("Unsupported operation. Use 'add', 'sub', 'mul', or 'div'.")
```

## Generated Documentation:

The brief prompt produced short comments.

The detailed prompt produced structured and comprehensive documentation.

**Observation:**

Detailed prompts resulted in clearer and more complete documentation.

Prompt specificity directly affects documentation quality.

**Conclusion:**

This lab demonstrates that AI-assisted documentation improves code readability, and detailed prompts significantly enhance documentation quality and clarity.