

Assignment-9.4

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Batch:44

Task 1: Auto-Generating Function Documentation in a Shared Codebase

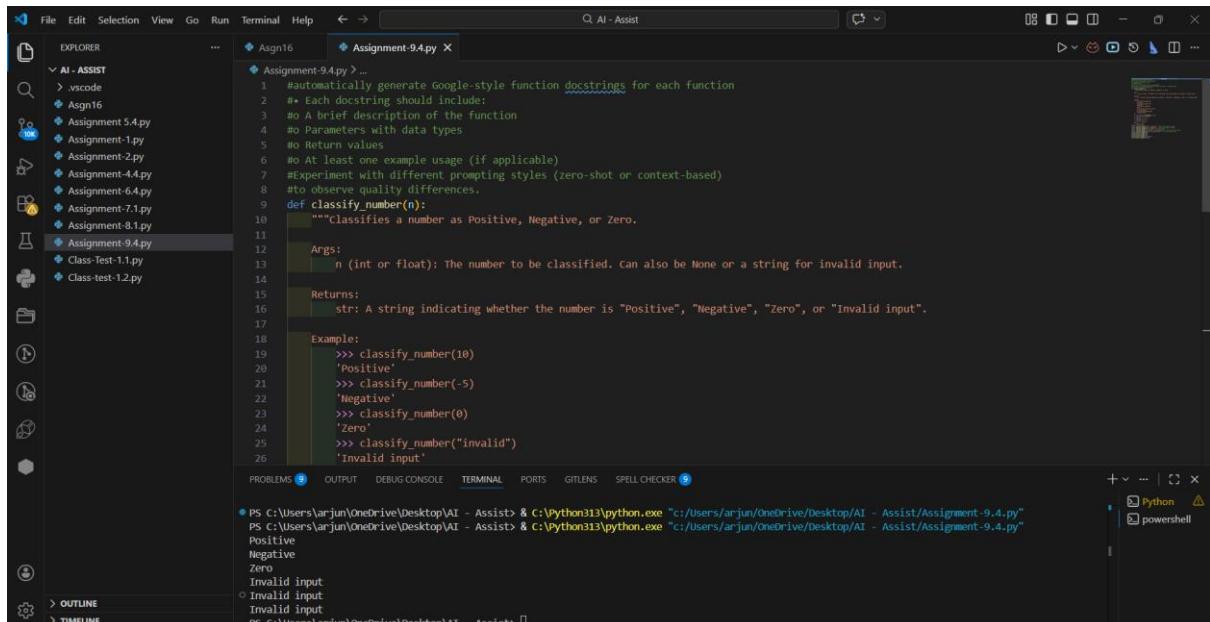
Ask the AI to automatically generate Google-style function docstrings for each function

- Each docstring should include:
- A brief description of the function
- Parameters with data types
- Return values
- At least one example usage

Prompt:

"Generate Google-style docstrings for the following Python function."

Code:

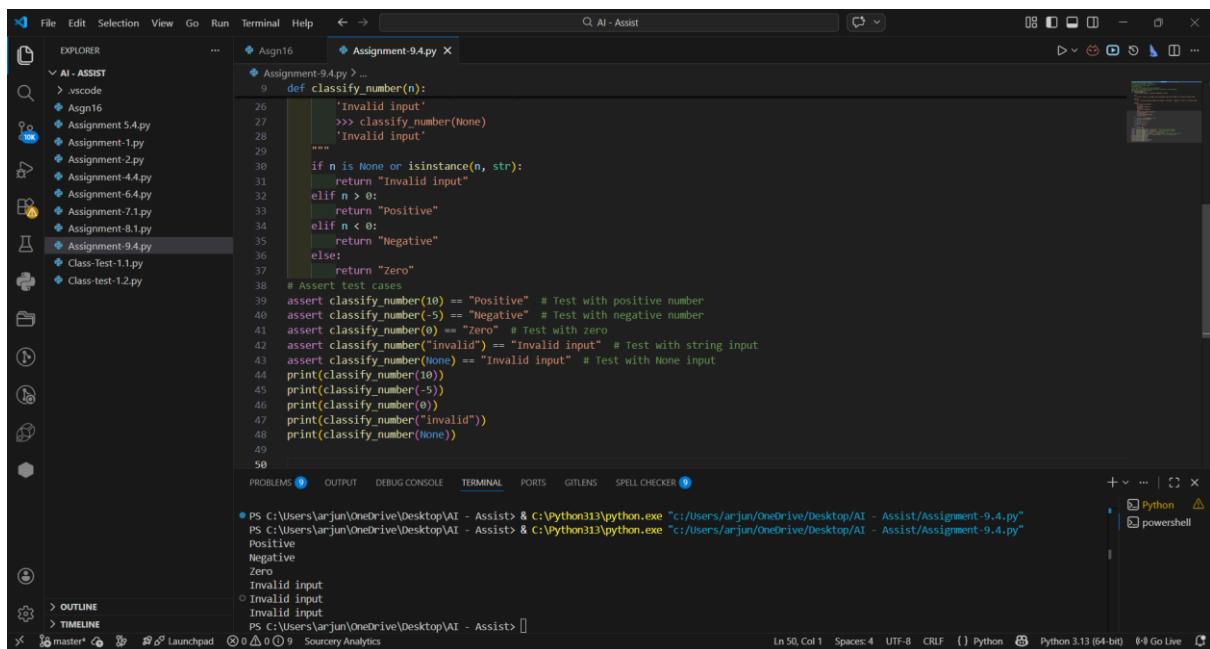


The screenshot shows the VS Code interface with the terminal tab active. The terminal output shows the execution of the generated code, which prints the classification of various numbers: Positive, Negative, Zero, and Invalid input.

```

PS C:\Users\arjun\OneDrive\Desktop\AI - Assist> & C:\Python313\python.exe "c:/users/arjun/OneDrive/Desktop/AI - Assist/Assignment-9.4.py"
Positive
Negative
Zero
Invalid input
PS C:\Users\arjun\OneDrive\Desktop\AI - Assist>

```

The screenshot shows the VS Code interface with the terminal tab active. The terminal output shows the execution of the generated test cases, which assert the correctness of the `classify_number` function for various inputs.

```

PS C:\Users\arjun\OneDrive\Desktop\AI - Assist> & C:\Python313\python.exe "c:/users/arjun/OneDrive/Desktop/AI - Assist/Assignment-9.4.py"
Positive
Negative
Zero
Invalid input
PS C:\Users\arjun\OneDrive\Desktop\AI - Assist>

```

Observation:

- The AI generated a basic docstring.
- Description and parameters were included.
- Examples were sometimes missing or minimal.
- Formatting was correct but less detailed.

Task 2: Enhancing Readability Through AI-Generated Inline Comments

You are provided with a Python script containing:

- Loops
- Conditional logic
- Algorithms (such as Fibonacci sequence, sorting, or searching)

Use AI assistance to:

- Automatically insert inline comments only for complex or non-obvious logic
- Avoid commenting on trivial or self-explanatory syntax

The goal is to improve clarity without cluttering the code.

Prompt:

Insert meaningful inline comments in the following Python code. Comment only complex or non-obvious logic and avoid explaining basic Python syntax

Code:

The screenshot shows a VS Code interface with the following details:

- File Explorer:** Shows a tree view with nodes like "EXPLORER", "AI - ASSIST", "vscode", "Asgn16", "Assignment 5.4.py", "Assignment 1.py", "Assignment 2.py", "Assignment 4.4.py", "Assignment 6.4.py", "Assignment 7.1.py", "Assignment 8.1.py", "Assignment 9.4.py", "Class-test 1.1.py", and "Class-test 1.2.py".
- Editor:** The main editor area displays a Python script named "Assignment 9.4.py". The code defines a function `fibonacci(n)` that generates a sequence up to the nth number. It includes docstrings for Args and Returns, and uses assert statements for testing.
- Terminal:** The terminal at the bottom shows command-line output for running the script with inputs 0, 1, and 2, resulting in outputs [0], [0, 1], and [0, 1, 1, 2, 3] respectively.
- Status Bar:** The status bar indicates the file is at Line 81, Column 72, with 10 spaces, 4 tabs, and 1 CRLF. It also shows Python 3.13 (64-bit) and the file is live.

The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** On the left, it lists files under "AI - ASSIST". The "Assignment-9.4.py" file is currently selected.
- Code Editor:** The main area displays the code for "Assignment-9.4.py". The code defines a function `fibonacci` and includes several assertions to test it with different input values (0, 1, 5, 10). It also includes print statements to show the results.
- Terminal:** At the bottom, the terminal window shows the execution of the script. The output indicates an "Invalid input" error for the first two tests, followed by the correct results for n=5 and n=10.

Observation

- The AI added comments only where the logic was not immediately obvious.
 - The tuple update in the Fibonacci algorithm was clearly explained.
 - Trivial lines like variable initialization and loop syntax were not commented.
 - Code readability improved without adding unnecessary clutter.

Task 3: Generating Module-Level Documentation for a Python Package

Provide a complete Python module to an AI tool and instruct it to automatically generate a module-level docstring at the top of the file that includes:

- The purpose of the module
- Required libraries or dependencies
- A brief description of key functions and classes
- A short example of how the module can be used

Prompt:

Generate a professional module-level docstring for this Python module. Include the purpose, dependencies, key functions, and example usage

Code:

```

85 #generate a module-level docstring at the top of the file that includes:
86 #* The purpose of the module
87 #* Required libraries or dependencies
88 #* A brief description of key functions and classes
89 #* A short example of how the module can be used
90 #* Focus on clarity and professional tone.
91
92 """This module provides utility functions for classifying numbers and generating Fibonacci sequences.
Dependencies:
- No external libraries are required.
Key Functions:
- classify_number(n): Classifies a number as Positive, Negative, or Zero, and handles invalid inputs.
- fibonacci(n): Generates the Fibonacci sequence up to the nth number.
Example Usage:"""
93 print(classify_number(10)) # Output: 'Positive'
94 print(classify_number(-5)) # Output: 'Negative'
95 print(classify_number(0)) # Output: 'Zero'
96 print(classify_number("invalid")) # Output: 'Invalid input'
97 print(classify_number(None)) # Output: 'Invalid input'
98 print(fibonacci(10)) # Output: [0, 1, 1, 2, 3, 5, 8, 13, 21, 34]

```

Observation

- The AI generated a structured multi-line docstring at the top of the file.
- The documentation clearly explained the module's purpose and functionality.
- Dependencies and key functions were summarized concisely.
- Example usage improved clarity for new users of the module.
- The tone was professional and suitable for real-world repositories.

Task 4: Converting Developer Comments into Structured Docstrings

You are given a Python script where functions contain detailed inline comments explaining their logic.

Use AI to:

- Automatically convert these comments into structured Google-

style or NumPy-style docstrings

- Preserve the original meaning and intent of the comments
- Remove redundant inline comments after conversion

Prompt:

Convert the following inline explanatory comments into a structured Google-style docstring. Preserve the original meaning and remove redundant inline comments

Code:

```
110 #generate a module-level docstring at the top of the file that includes:  
111 #* The purpose of the module  
112 #* Required libraries or dependencies  
113 #* A brief description of key functions and classes  
114 #* A short example of how the module can be used  
115 #Focus on clarity and professional tone.  
116  
117 """This module provides utility functions for classifying numbers and generating Fibonacci sequences.  
Dependencies:  
- No external libraries are required.  
Key Functions:  
- classify_number(n): classifies a number as Positive, Negative, or Zero, and handles invalid inputs.  
- fibonacci(n): Generates the Fibonacci sequence up to the nth number.  
Example Usage:  
124 print(classify_number(10)) # output: 'Positive'  
125 print(classify_number(-5)) # output: 'Negative'  
126 print(classify_number(0)) # output: 'Zero'  
127 print(classify_number("invalid")) # Output: 'Invalid input'  
128 print(classify_number(None)) # Output: 'Invalid input'  
129 print(fibonacci(10)) # output: [0, 1, 1, 2, 3, 5, 8, 13, 21, 34]  
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134 #Converting Developer Comments into Structured Docstrings  
135 #Python script where functions contain detailed inline comments explaining their logic.  
136 #Automatically convert these comments into structured Google- style or NumPy-style docstrings  
137 #* Preserve the original meaning and intent of the comments  
138 #* Remove redundant inline comments after conversion  
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```

A screenshot of the Visual Studio Code interface. The left sidebar shows a file tree under 'EXPLORER' with files like 'Assignment-9.4.py'. The main editor area displays Python code for calculating averages. A tooltip from the AI ASSIST feature highlights the first function's docstring, which includes descriptive inline comments converted into a structured docstring format.

```
def calculate_average(numbers):
    # This function takes a list of numbers as input.
    # It first checks if the list is empty.
    # If the list is empty, it returns 0 to avoid division by zero.
    # Otherwise, it calculates the total sum of the numbers.
    # Then it divides the total by the number of elements
    # to compute the average value.

    if not numbers:
        return 0

    total = sum(numbers)
    average = total / len(numbers)
    return average

def calculate_average(numbers):
    """
    Calculates the average of a list of numbers.

    Args:
        numbers (list of int or float): A list containing numeric values.

    Returns:
        float: The average of the numbers in the list.
        Returns 0 if the list is empty.

    Examples:
        >>> calculate_average([10, 20, 30])
        20.0
        >>> calculate_average([])
        0
    """

PROBLEMS 12 OUTPUT DEBUG CONSOLE TERMINAL PORTS GITLENS SPELL CHECKER 12
```

A screenshot of the Visual Studio Code interface. The left sidebar shows a file tree under 'EXPLORER' with files like 'Assignment-9.4.py'. The main editor area displays Python code for calculating averages, including test cases at the bottom. A tooltip from the AI ASSIST feature highlights the test cases, showing how the AI has converted the original comments into assert statements.

```
def calculate_average(numbers):
    """
    Args:
        numbers (list of int or float): A list containing numeric values.

    Returns:
        float: The average of the numbers in the list.
        Returns 0 if the list is empty.

    Examples:
        >>> calculate_average([10, 20, 30])
        20.0
        >>> calculate_average([])
        0
    """

    if not numbers:
        return 0

    total = sum(numbers)
    return total / len(numbers)

# Assert test cases
assert calculate_average([10, 20, 30]) == 20.0 # Test with a list of numbers
assert calculate_average([]) == 0 # Test with an empty list
print(calculate_average([10, 20, 30])) # Should return 20.0
print(calculate_average([])) # Should return 0
```

Observation:

- The AI successfully converted descriptive inline comments into a structured docstring.
- The original meaning of the logic was preserved.
- Redundant inline comments were removed.
- The function body became cleaner and more readable.

- Documentation format became consistent with professional standards.

Task 5: Building a Mini Automatic Documentation Generator

Design a small Python utility that:

- Reads a given .py file
- Automatically detects:
 - Functions
 - Classes
- Inserts placeholder Google-style docstrings for each detected function or class

Prompt:

Help me build a Python utility that reads a .py file, detects functions and classes using AST, and inserts placeholder Google-style docstrings where missing

Code:

The screenshot shows the Visual Studio Code interface with the 'AI - Assist' extension active. The 'EXPLORER' sidebar on the left lists several Python files: Asgn16, Assignment-5.4.py, Assignment-1.py, Assignment-2.py, Assignment-4.4.py, Assignment-6.4.py, Assignment-7.1.py, Assignment-8.1.py, Assignment-9.4.py, Class-Test-1.1.py, and Class-test-1.2.py. The 'Assignment-9.4.py' file is open in the main editor area. The code is as follows:

```
189 #Design a small Python utility that:
190 #* Reads a given .py file
191 #* Automatically detects:
192 #* Functions
193 #* Classes
194 #* Inserts placeholder Google-style docstrings for each detected function or class
195 import ast
196 def insert_docstrings(file_path):
197     with open(file_path, 'r') as file:
198         source = file.read()
199         tree = ast.parse(source)
200         for node in ast.walk(tree):
201             if isinstance(node, (ast.FunctionDef, ast.ClassDef)):
202                 if not ast.get_docstring(node):
203                     docstring = f"TODO: Add Google-style docstring for {node.name}."
204                     node.body.insert(
205                         0,
206                         ast.Expr(value=ast.Constant(value=docstring))
207                     )
208         new_source = ast.unparse(tree)
209         with open(file_path, 'w') as file:
210             file.write(new_source)
```

The code completion feature is shown inserting placeholder docstrings for functions and classes. The status bar at the bottom indicates the file is saved in 'master' branch, has 14 changes, and is using Sourcey Analytics.

Observation:

- AI suggested using the `ast` module to parse and modify the syntax tree.
- Functions and classes were automatically detected.
- Placeholder docstrings were inserted only where missing.
- The tool successfully scaffolded documentation without affecting existing docstrings.
- Demonstrates automation of documentation setup.