ASSIGNMENT-9.4

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BATCH-25

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

Scenario

You have joined a development team where several utility functions are already implemented, but the code lacks proper documentation. New team members are struggling to understand how these functions should be used.

Task Description

You are given a Python script containing multiple functions without any docstrings.

Using an AI-assisted coding tool:

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

• Each docstring should include:

o A brief description of the function

o Parameters with data types

o Return values

o At least one example usage (if applicable)

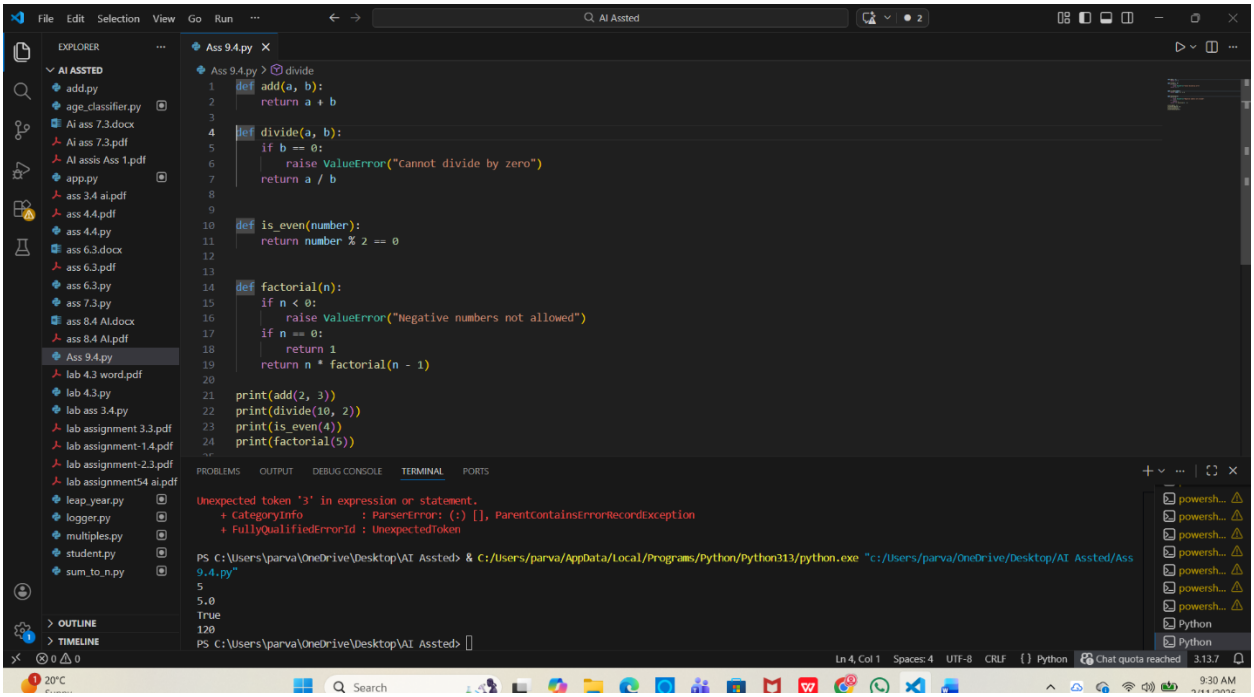
Experiment with different prompting styles (zero-shot or context-based) to observe quality differences.

Expected Outcome

• A Python script with well-structured Google-style docstrings

• Docstrings that clearly explain function behavior and usage

• Improved readability and usability of the codebase



Task 2: Enhancing Readability Through AI-Generated Inline

Comments

Scenario

A Python program contains complex logic that works correctly but is

difficult to understand at first glance. Future maintainers may find it hard

to debug or extend this code.

Task Description

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

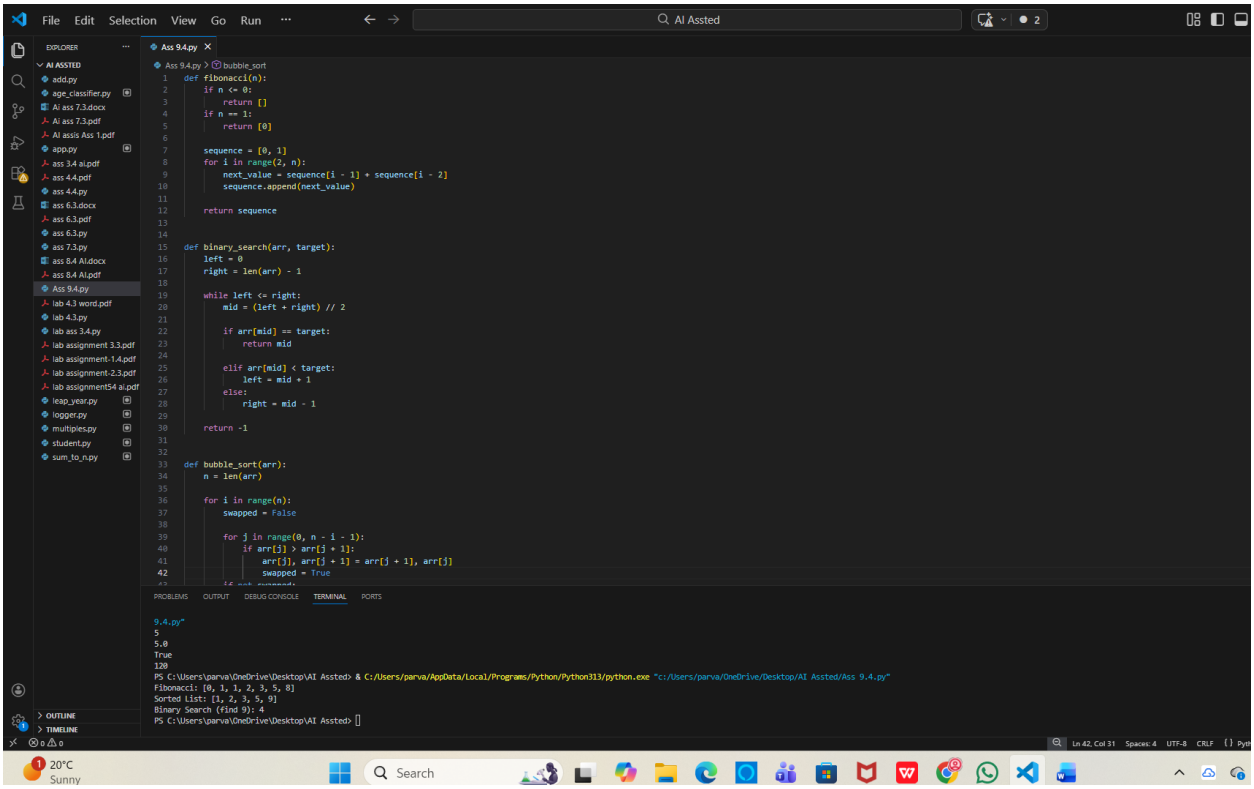
The goal is to improve clarity without cluttering the code.

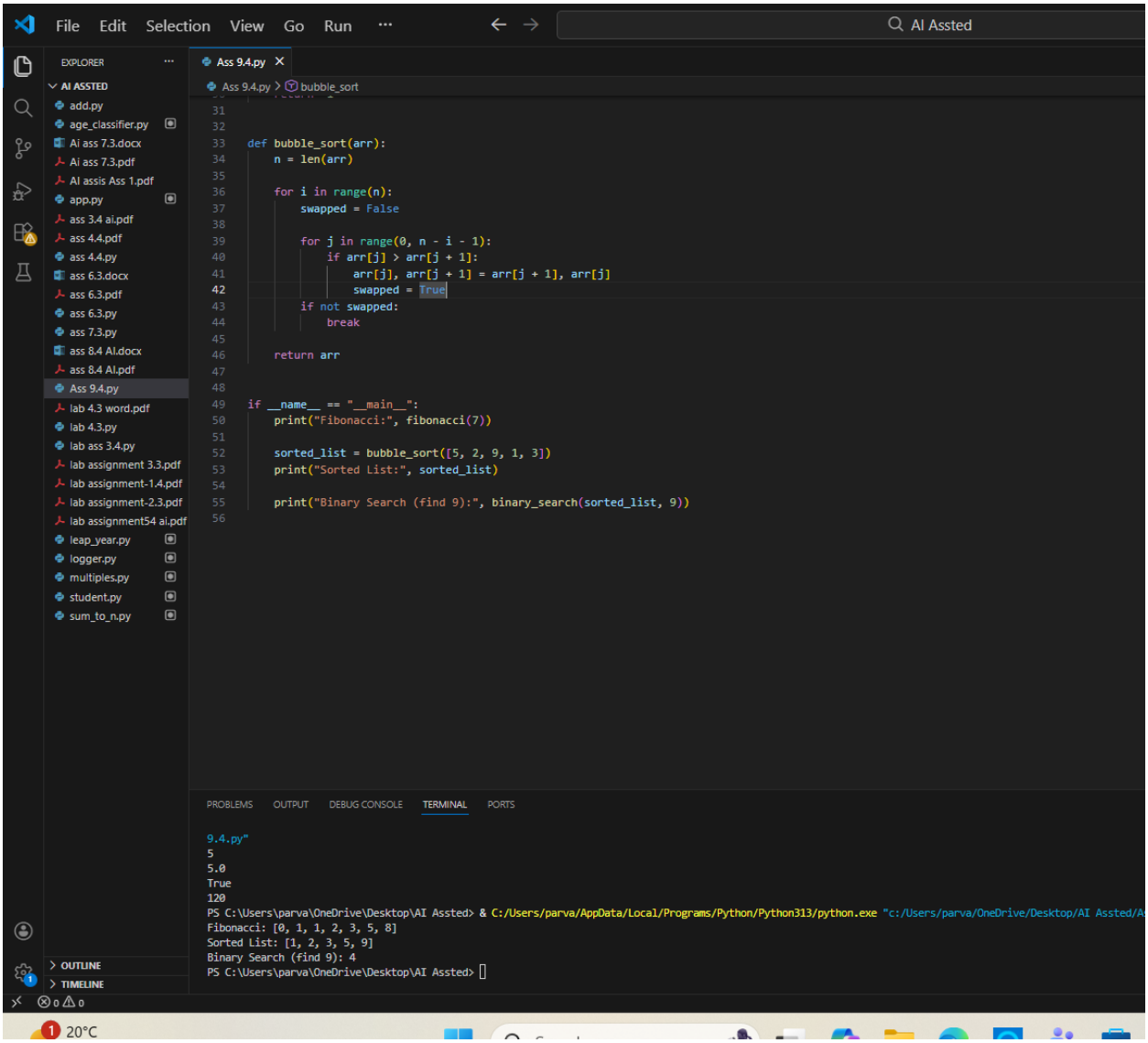
Expected Outcome

• A Python script with concise, meaningful inline comments

• Comments that explain why the logic exists, not what Python syntax does

• Noticeable improvement in code readability





Task 3: Generating Module-Level Documentation for a Python

Package

Scenario

Your team is preparing a Python module to be shared internally (or uploaded to a repository). Anyone opening the file should immediately understand its purpose and structure.

Task Description

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

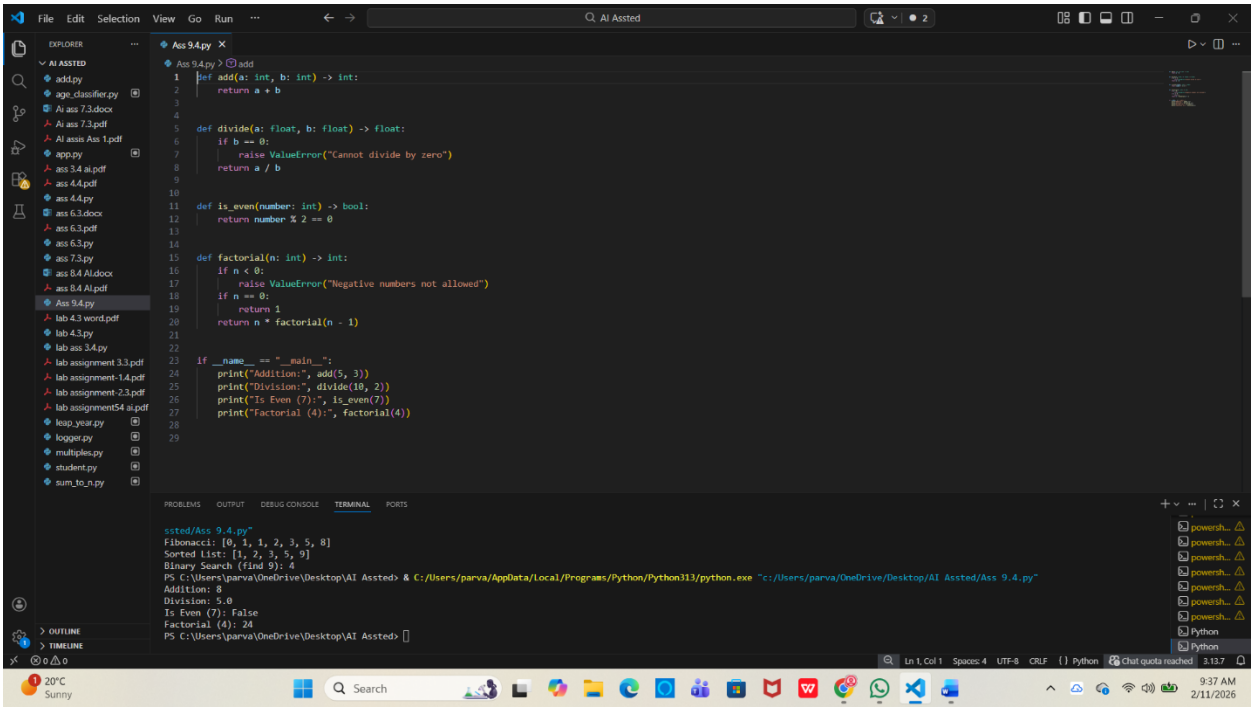
Focus on clarity and professional tone.

Expected Outcome

• A well-written multi-line module-level docstring

• Clear overview of what the module does and how to use it

• Documentation suitable for real-world projects or repositories



Task 4: Converting Developer Comments into Structured Docstrings

Scenario

In a legacy project, developers have written long explanatory comments

inside functions instead of proper docstrings. The team now wants to

standardize documentation.

Task Description

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

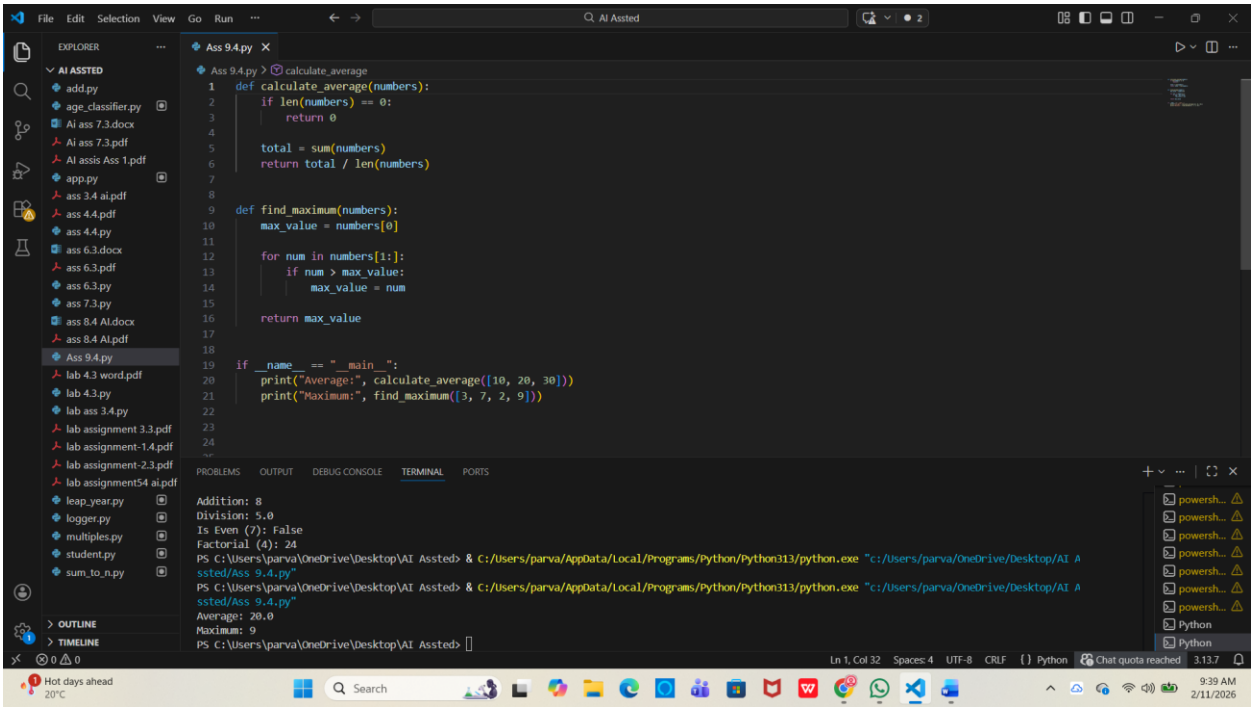
• Remove redundant inline comments after conversion

Expected Outcome

• Functions with clean, standardized docstrings

• Reduced clutter inside function bodies

• Improved consistency across the codebase



Task 5: Building a Mini Automatic Documentation Generator

Scenario

Your team wants a simple internal tool that helps developers start documenting new Python files quickly, without writing documentation from scratch.

Task Description

Design a small Python utility that:

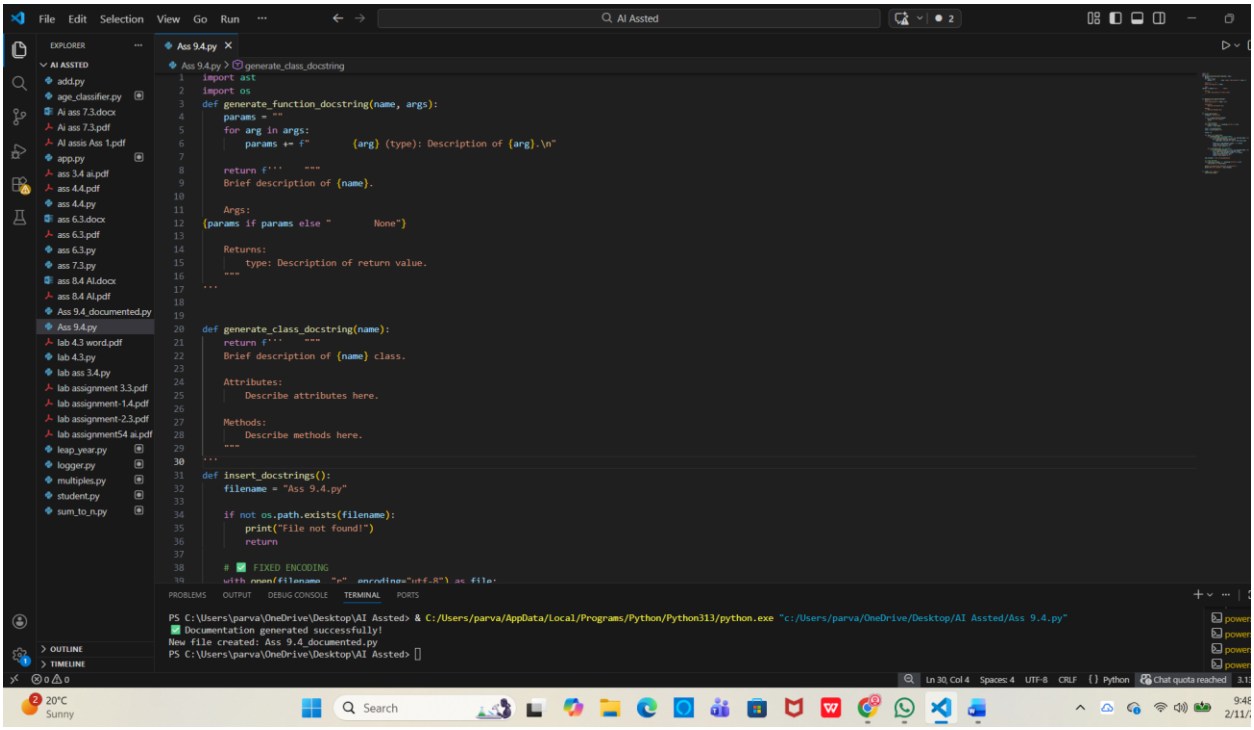
- Reads a given .py file
- Automatically detects:
  - o Functions
  - o Classes
- Inserts placeholder Google-style docstrings for each detected function or class

AI tools may be used to assist in generating or refining this utility.

Note: The goal is documentation scaffolding, not perfect documentation.

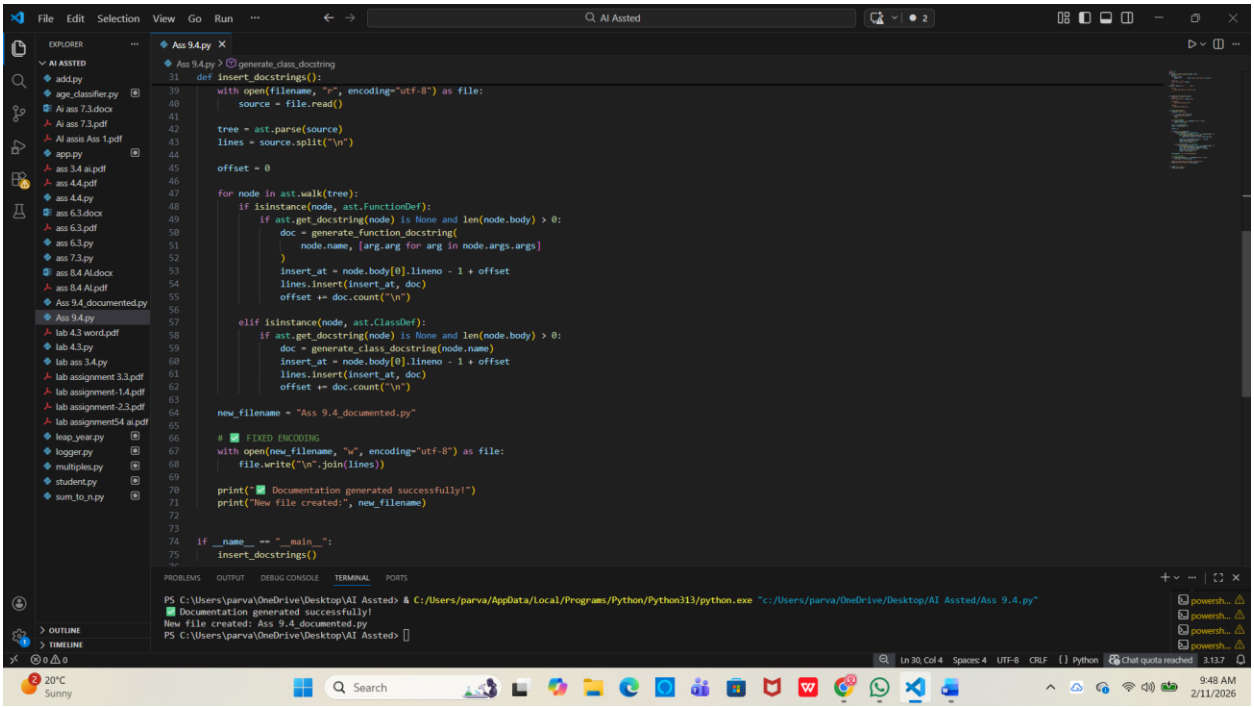
Expected Outcome

- A working Python script that processes another .py file
- Automatically inserted placeholder docstrings
- Clear demonstration of how AI can assist in documentation Automation



```python
import ast
import os
def generate_function_docstring(name, args):
    params = ""
    for arg in args:
        params += f"        {arg} (type): Description of {arg}.\n"

    return f'''    """
    Brief description of {name}.

    Args:
{params if params else "        None"}

    Returns:
        type: Description of return value.
    """
'''


def generate_class_docstring(name):
    return f'''    """
    Brief description of {name} class.

    Attributes:
        Describe attributes here.

    Methods:
        Describe methods here.
    """
'''
def insert_docstrings():
    filename = "Ass 9.4.py"

    if not os.path.exists(filename):
        print("File not found!")
        return

    # ✅ FIXED ENCODING
    with open(filename, "r", encoding="utf-8") as file:
```

```
PS C:\Users\parva\OneDrive\Desktop\AI Assted> & C:/Users/parva/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/parva/OneDrive/Desktop/AI Assted/Ass 9.4.py"
✅ Documentation generated successfully!
New file created: Ass 9.4_documented.py
PS C:\Users\parva\OneDrive\Desktop\AI Assted>
```



```python
def insert_docstrings():
    with open(filename, "r", encoding="utf-8") as file:
        source = file.read()

    tree = ast.parse(source)
    lines = source.split("\n")

    offset = 0

    for node in ast.walk(tree):
        if isinstance(node, ast.FunctionDef):
            if ast.get_docstring(node) is None and len(node.body) > 0:
                doc = generate_function_docstring(
                    node.name, [arg.arg for arg in node.args.args]
                )
                insert_at = node.body[0].lineno - 1 + offset
                lines.insert(insert_at, doc)
                offset += doc.count("\n")

        elif isinstance(node, ast.ClassDef):
            if ast.get_docstring(node) is None and len(node.body) > 0:
                doc = generate_class_docstring(node.name)
                insert_at = node.body[0].lineno - 1 + offset
                lines.insert(insert_at, doc)
                offset += doc.count("\n")

    new_filename = "Ass 9.4_documented.py"

    # ✅ FIXED ENCODING
    with open(new_filename, "w", encoding="utf-8") as file:
        file.write("\n".join(lines))

    print("✅ Documentation generated successfully!")
    print("New file created:", new_filename)


if __name__ == "__main__":
    insert_docstrings()
```

```
PS C:\Users\parva\OneDrive\Desktop\AI Assted> & C:/Users/parva/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/parva/OneDrive/Desktop/AI Assted/Ass 9.4.py"
✅ Documentation generated successfully!
New file created: Ass 9.4_documented.py
PS C:\Users\parva\OneDrive\Desktop\AI Assted>
```