

# **AI ASSISTED CODING**

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## **Lab 9 – Documentation Generation: Automatic Documentation and Code Comments**

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

Task:

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

Instructions:

- Provide a Python script to the AI.
- Ask the AI to write a short summary describing the purpose of each function.
- Ensure summaries are brief and technically accurate.
- Do not include code implementation details.

Expected Output -1:

A Python script where each function contains a clear and concise summary explaining its purpose.

## CODE:

## **ANALYSIS:**

- The prompt instructs AI to perform function-level documentation, focusing only on the purpose of each Python function.
  - AI interprets this as a code summarization task, not code explanation, modification, or optimization.
  - Constraints like concise, technically accurate, and no implementation details guide AI to generate brief, high-level summaries only.
  - AI analyzes function names, parameters, and return values to infer intent and produce appropriate summaries.
  - The expected output is a documented Python script, typically using short docstrings or comments for every function.

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

## Task:

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

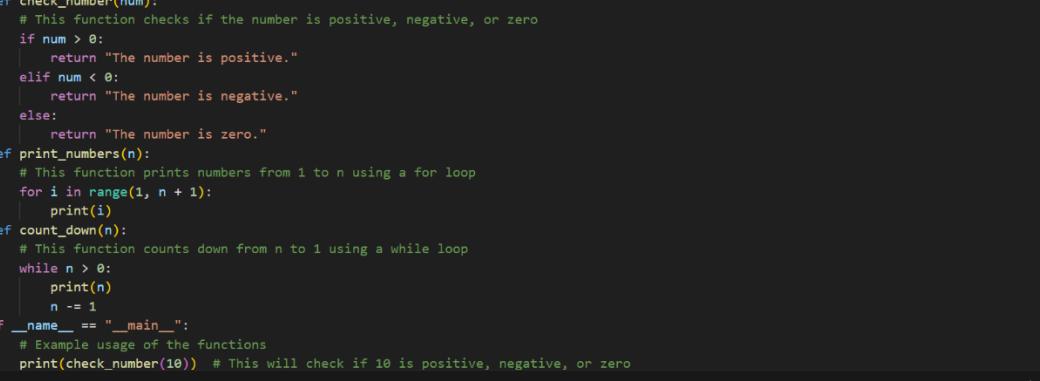
## Instructions:

- Provide a Python program without comments.
  - Instruct AI to explain only decision-making logic and loop behavior.
  - Skip basic syntax explanations.

## Expected Output -2:

Python code with clear explanations describing the logic of conditions and loops.

## **CODE:**



The screenshot shows a Visual Studio Code (VS Code) interface with the following details:

- File Explorer:** Shows a tree view with files: Task-5.py (16-02-2026), Task-1.py (17-02-2026), Task-2.py (17-02-2026, currently active), Task-3.py (16-02-2026), Task-4.py (16-02-2026), and Task-2.py (02-02-2026).
- Code Editor:** Displays Python code for a program that documents logic behind conditional statements and loops. The code includes functions for checking if a number is positive, negative, or zero, printing numbers from 1 to n, and counting down from n to 1.
- Terminal:** Shows a command-line session in powershell... (Python Debug...) where the user runs a script to count down from 5.
- Status Bar:** Shows indexing completed at the bottom left and file statistics (Ln 30, Col 5, Spaces: 4, etc.) at the bottom right.

## **ANALYSIS:**

- The prompt asks AI to perform logic-level documentation, focusing specifically on conditional statements (if, elif, else) and loop structures (for, while).
- AI understands that it must explain the decision-making logic and iteration behavior, not rewrite or modify the code.
- The instruction to skip basic syntax explanations tells AI to avoid describing what if or for means and instead explain why the condition exists and what the loop achieves logically.
- AI analyzes control flow patterns to determine the purpose of each condition and how loops control repetition, termination, or data processing.
- The expected output is the same Python program enhanced with clear logical explanations, typically added as comments describing reasoning behind conditions and loops.

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

Task:

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

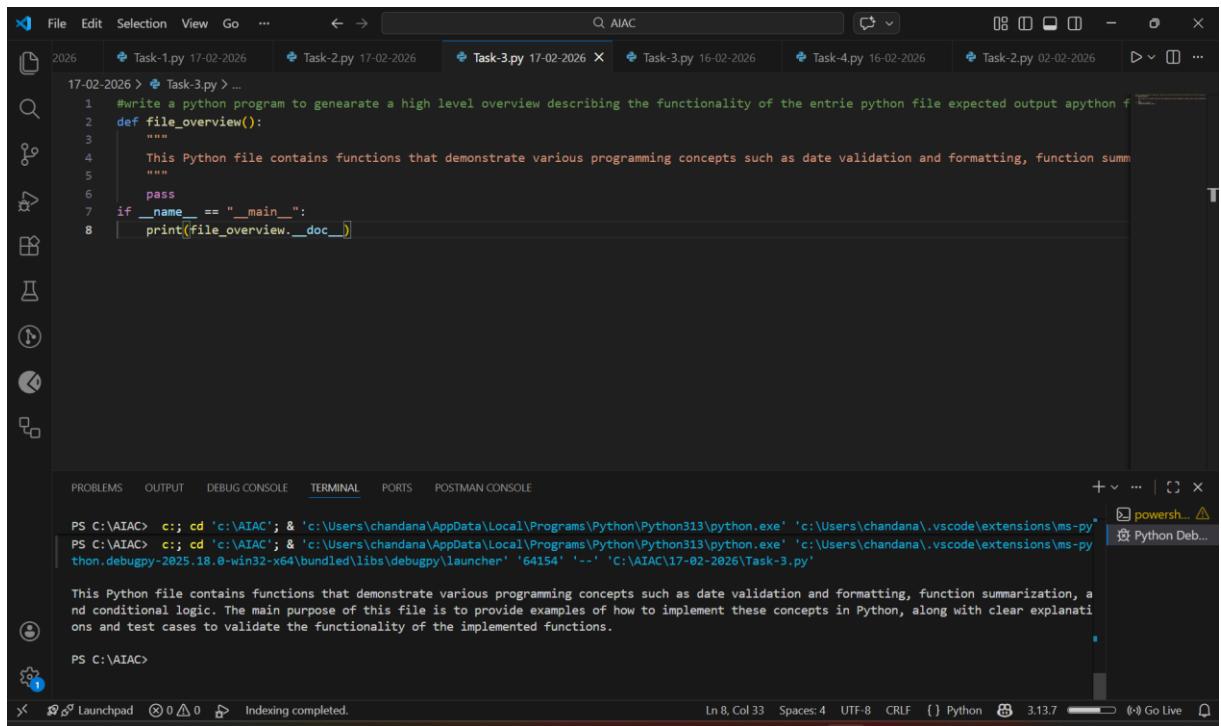
Instructions:

- Provide the complete Python file to AI.
- Ask AI to write a brief overview summarizing the file's purpose and functionality.
- Place the overview at the top of the file.

Expected Output -3:

A Python file with a clear and concise file-level overview at the beginning

## CODE:



The screenshot shows a dark-themed instance of Visual Studio Code. At the top, there's a toolbar with icons for File, Edit, Selection, View, Go, and others. Below the toolbar, a tab bar displays several files: Task-1.py, Task-2.py, Task-3.py (which is the active tab), Task-4.py, and Task-2.py again. The main editor area contains the following Python code:

```
1 #write a python program to generate a high level overview describing the functionality of the entire python file expected output a python f
2 def file_overview():
3     """
4         This Python file contains functions that demonstrate various programming concepts such as date validation and formatting, function summarization, and conditional logic. The main purpose of this file is to provide examples of how to implement these concepts in Python, along with clear explanations and test cases to validate the functionality of the implemented functions.
5     """
6     pass
7 if __name__ == "__main__":
8     print(file_overview.__doc__)
```

Below the editor, a terminal window is open with the following command history:

```
PS C:\AIAC> c;; cd 'c:\AIAC'; & 'c:\Users\chandana\AppData\Local\Programs\Python\Python313\python.exe' 'c:\Users\chandana\.vscode\extensions\ms-python.python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '64154' --- 'C:\AIAC\17-02-2026\Task-3.py'
```

The terminal also displays a summary of the file's purpose:

```
This Python file contains functions that demonstrate various programming concepts such as date validation and formatting, function summarization, and conditional logic. The main purpose of this file is to provide examples of how to implement these concepts in Python, along with clear explanations and test cases to validate the functionality of the implemented functions.
```

At the bottom of the interface, there are status indicators for indexing, a launchpad icon, and other system details like the current line and column (Ln 8, Col 33).

## ANALYSIS:

- The prompt asks AI to generate a file-level overview, meaning a high-level summary of the entire Python script rather than individual functions or logic blocks.
- AI understands this as a global summarization task, where it must analyze the overall structure, main components, and primary purpose of the file.
- The instruction to keep it brief and concise guides AI to produce a short paragraph that summarizes functionality without detailing internal logic or implementation steps.
- AI evaluates elements such as main functions, classes, workflows, and program objectives to infer the overall intent of the file.
- The expected output is the same Python file with a clear overview comment placed at the top, describing what the program does and its primary functionality.

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

Task:

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

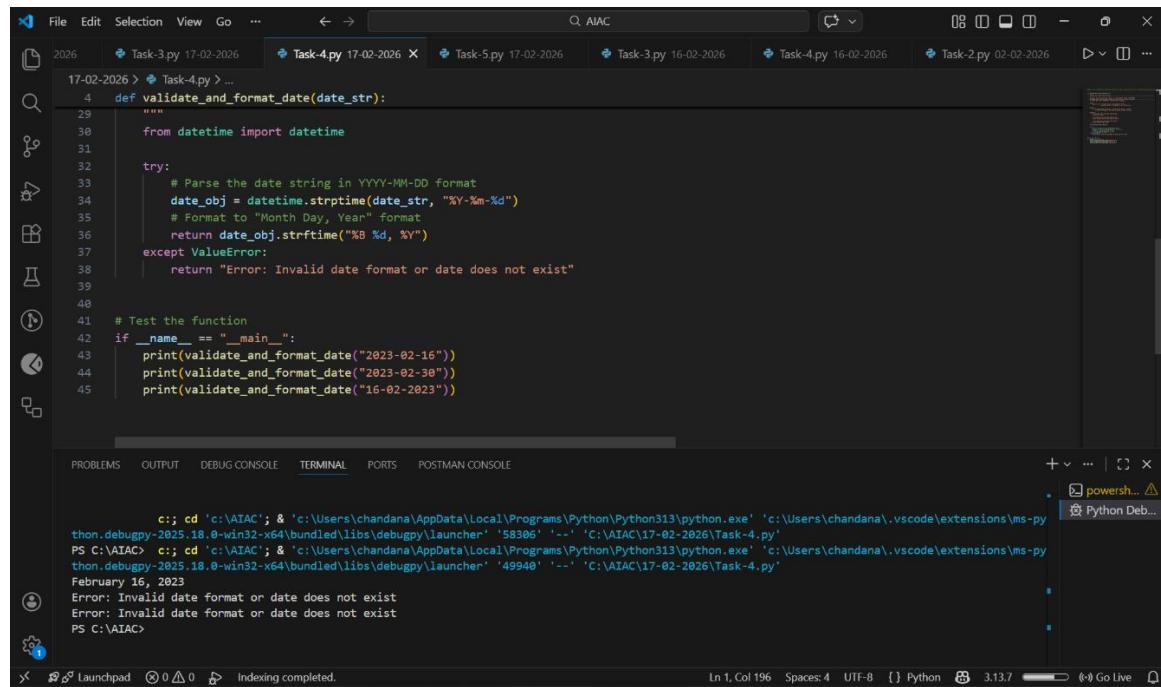
Instructions:

- Provide Python code containing basic or unclear comments.
- Ask AI to rewrite the documentation to improve clarity and consistency.
- Ensure technical meaning remains unchanged.

Expected Output -4:

Python code with refined and improved documentation that is clear and consistent.

**CODE:**



The screenshot shows a VS Code interface with multiple tabs open. The active tab is 'Task-4.py' (17-02-2026). The code in the editor is as follows:

```
2026 > Task-4.py 17-02-2026
17-02-2026 > Task-4.py > ...
4 def validate_and_format_date(date_str):
    """
    from datetime import datetime
    try:
        # Parse the date string in YYYY-MM-DD format
        date_obj = datetime.strptime(date_str, "%Y-%m-%d")
        # Format to "Month Day, Year" format
        return date_obj.strftime("%B %d, %Y")
    except ValueError:
        return "Error: Invalid date format or date does not exist"
    # Test the function
if __name__ == "__main__":
    print(validate_and_format_date("2023-02-16"))
    print(validate_and_format_date("2023-02-30"))
    print(validate_and_format_date("16-02-2023"))
```

The terminal below shows the output of running the script:

```
c:\ cd 'c:\AIAC'; & 'c:\Users\chandana\AppData\Local\Programs\Python\Python313\python.exe' 'c:\Users\chandana\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '58306' '' 'C:\AIAC\17-02-2026\Task-4.py'
PS C:\AIAC> c:\ cd 'c:\AIAC'; & 'c:\Users\chandana\AppData\Local\Programs\Python\Python313\python.exe' 'c:\Users\chandana\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '49940' '' 'C:\AIAC\17-02-2026\Task-4.py'
February 16, 2023
Error: Invalid date format or date does not exist
Error: Invalid date format or date does not exist
PS C:\AIAC>
```

At the bottom, status icons include Launchpad, indexing progress (0/0), and indexing completed.

## **ANALYSIS:**

- The prompt asks AI to perform documentation refinement, meaning it must improve existing comments without changing the actual code or technical meaning.
- AI understands this as an editing and clarity enhancement task, not code modification or logic correction.
- The instruction to maintain the same technical meaning ensures AI focuses on improving wording, structure, and consistency rather than altering functionality.
- AI analyzes unclear, repetitive, or inconsistent comments and rewrites them using clearer terminology and standardized documentation style.
- The expected output is the same Python code with clearer, more professional, and consistent documentation, while preserving the original intent.

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

Task:

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

Instructions:

Create two prompts: one brief and one detailed.

- Use both prompts to document the same Python function.
- Compare the generated outputs.

Expected Output -5:

A comparison table highlighting differences in completeness, clarity, and accuracy of documentation.

Note: Report should be submitted a word document for all tasks in a single document with prompts, comments & code explanation, and

output and if required, screenshots.

## **CODE:**

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

- File Explorer:** Shows files like Task-3.py, Task-4.py, Task-4.py, Task-4.py, and Task-2.py.
- Search Bar:** AIAC
- Code Editor:** Python code for generating a comparison table. The code includes:
  - Header: # Display comparison table
  - Print statement: print("\n" + "="\*100)
  - Print statement: print("COMPARISON TABLE: IMPACT OF PROMPT DETAIL ON DOCUMENTATION QUALITY")
  - Print statement: print("="\*100 + "\n")
  - Print header: # Print header
  - Print header: header = f'{Aspect':<35} | {Brief Prompt':<30} | {Detailed Prompt':<35} | {Improvement':<25}'
  - Print statement: print(header)
  - Print statement: print("-" \* 100)
  - Print rows: # Print rows
  - Loop: for i in range(len(comparison\_data["Aspect"])): ...
  - Print row: row = f"[comparison\_data['Aspect'][i]:<35] | [comparison\_data['Brief Prompt'][i]:<30] | [comparison\_data['Detailed Prompt'][i]:<35] | [comparison\_data['Improvement'][i]:<25]"
  - Print statement: print(row)
  - Print statement: print("\n" + "="\*100 + "\n")
  - Print key findings: # Key findings
  - Print statement: print("KEY FINDINGS:")
  - Print statement: print("-" \* 100)
- Terminal:** PS C:\AIAC> & "c:/Users/chandana/AppData/Local/Programs/Python/Python313/python.exe" "c:/Users/chandana/.vscode/extensions/ms-python.debugpy-2025.18.0-win32-x64/bundled/libs/debugpy/launcher" "61988" '--' 'c:/AIAC/17-02-2026/Task-5.py'
- Output:** Comparison table output:

```
=====
COMPARISON TABLE: IMPACT OF PROMPT DETAIL ON DOCUMENTATION QUALITY
=====
```

Aspect	Brief Prompt	Detailed Prompt	Improvement
--------	--------------	-----------------	-------------
- Bottom Status Bar:** Indexing completed. Ln 1, Col 198 Spaces: 4 UTF-8 CR/LF {} Python 3.13.7 Go Live

## **ANALYSIS:**

- The prompt asks AI to perform a comparative analysis task, examining how different levels of prompt detail affect documentation quality.
  - AI understands that it must create two different prompts (brief vs. detailed) and generate documentation for the same Python function using both.
  - The task focuses on evaluating differences in completeness, clarity, and accuracy, rather than modifying the function itself.
  - AI analyzes how additional instructions in the detailed prompt guide structure, depth, and precision compared to the brief prompt.
  - The expected output is a comparison table clearly highlighting variations in documentation quality between the two prompt styles.