ASSIGNMENT-9.2

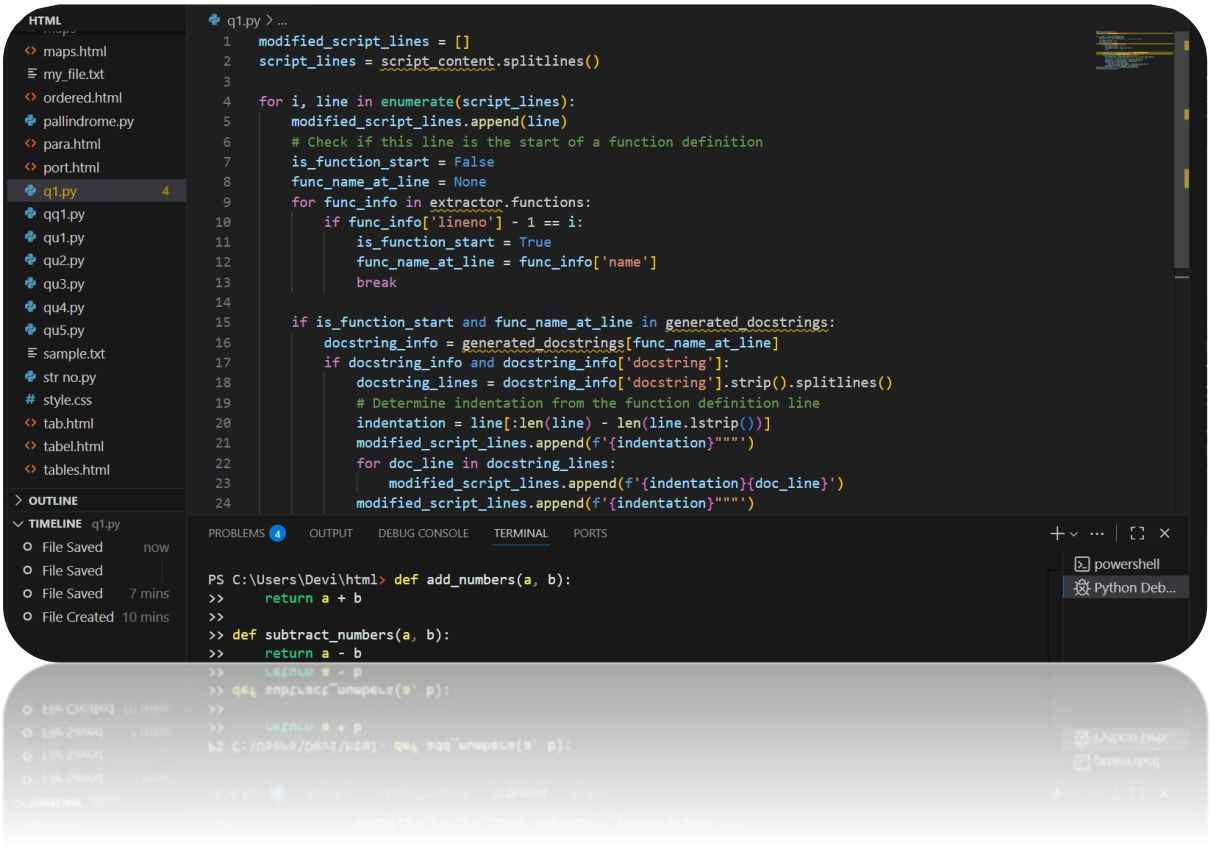
TAFSIL AHMED

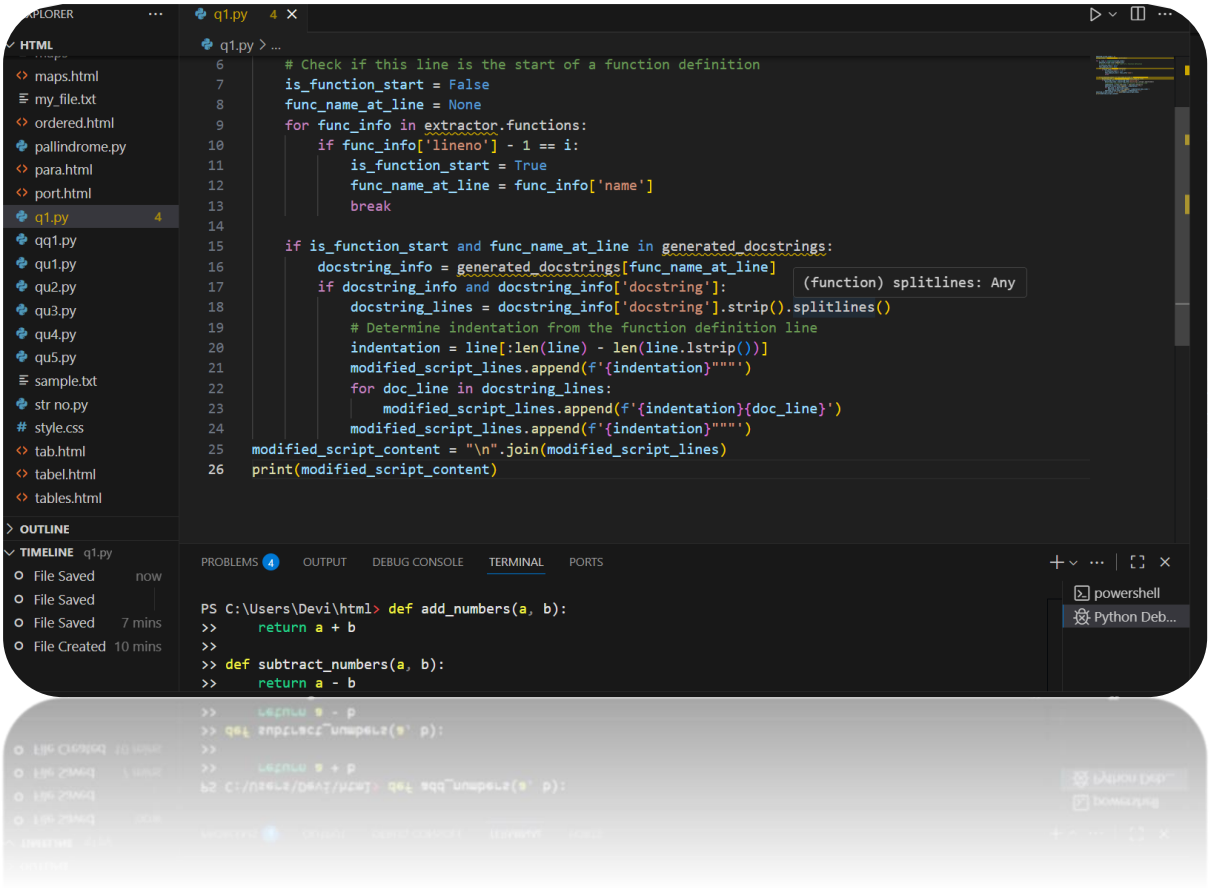
2403A52071

BATCH_03

TASK-1:

PROMPT-Use AI to add Google-style docstrings to all functions in a given Python script



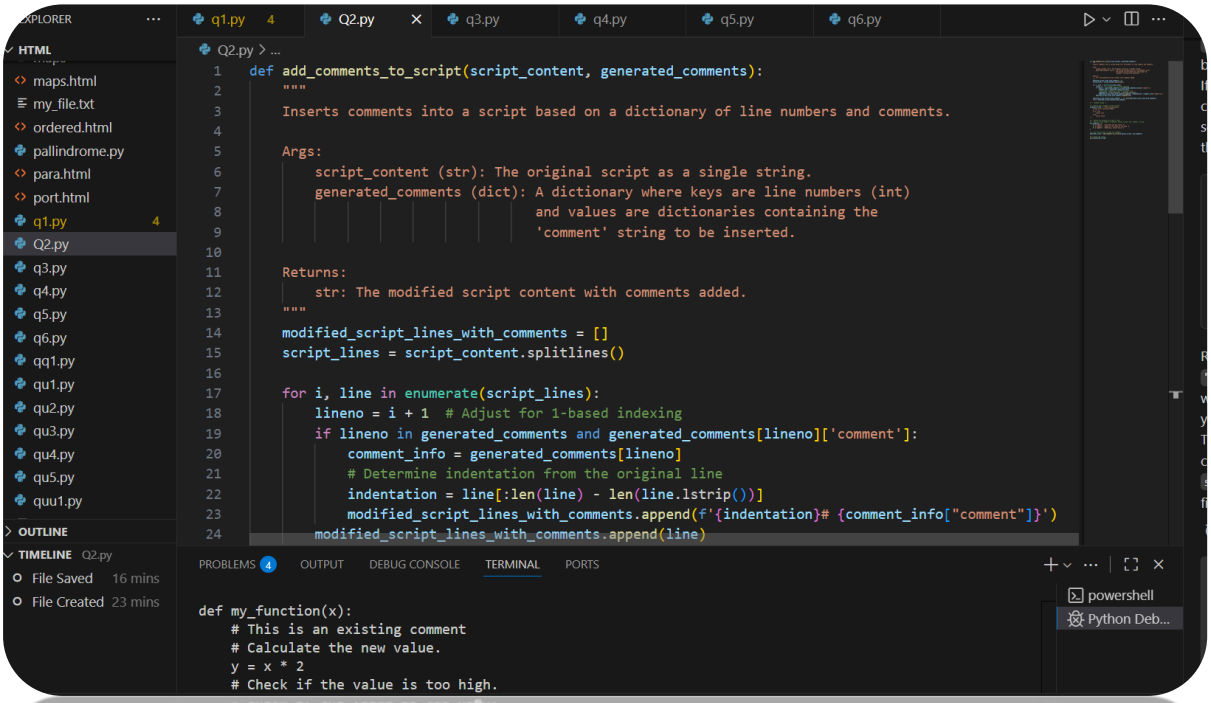


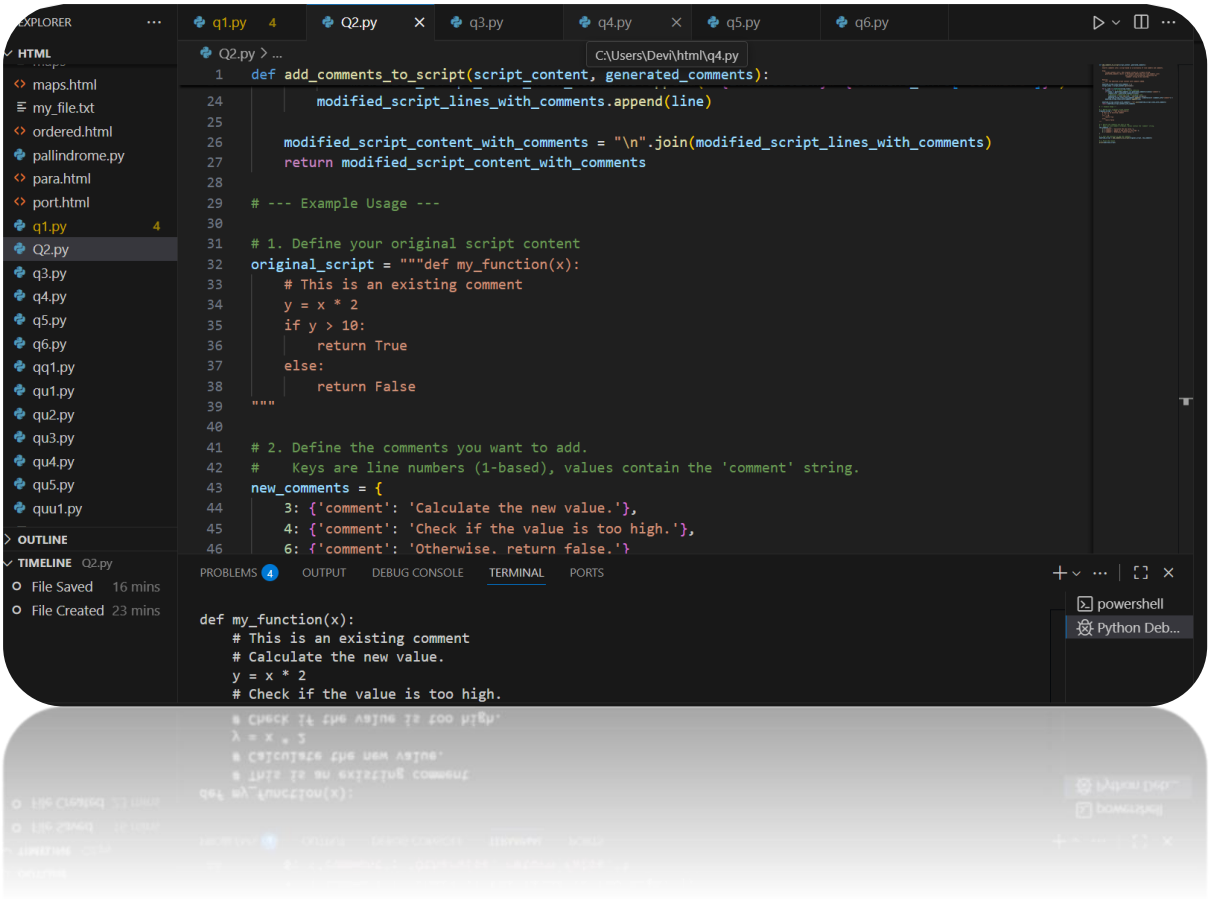
1. **EXPLANATION**: **Import ast**: It imports the ast module, which allows the code to work with the abstract syntax tree of your Python script.
2. **FunctionExtractor Class**: This class is a visitor that walks through the syntax tree. Its visit_FunctionDef method is called whenever a function definition is encountered. It stores the function's name and line numbers in a list called self.functions.
3. **Parse Script**: ast.parse(script_content) parses the entire script content into a syntax tree.
4. **Extract Functions**: An instance of FunctionExtractor is created, and its visit method is called with the syntax tree to populate the functions list.
5. **Initialize generated_docstrings**: A dictionary is created to store the generated docstrings, keyed by function name.

TASK-2:

PROMPT-Use AI to add meaningful inline comments to a Python program explaining only complex logic parts.

Code:




EXPLORER
HTML
maps.html
my_file.txt
ordered.html
pallindrome.py
para.html
port.html
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
qq1.py
qu1.py
qu2.py
qu3.py
qu4.py
qu5.py
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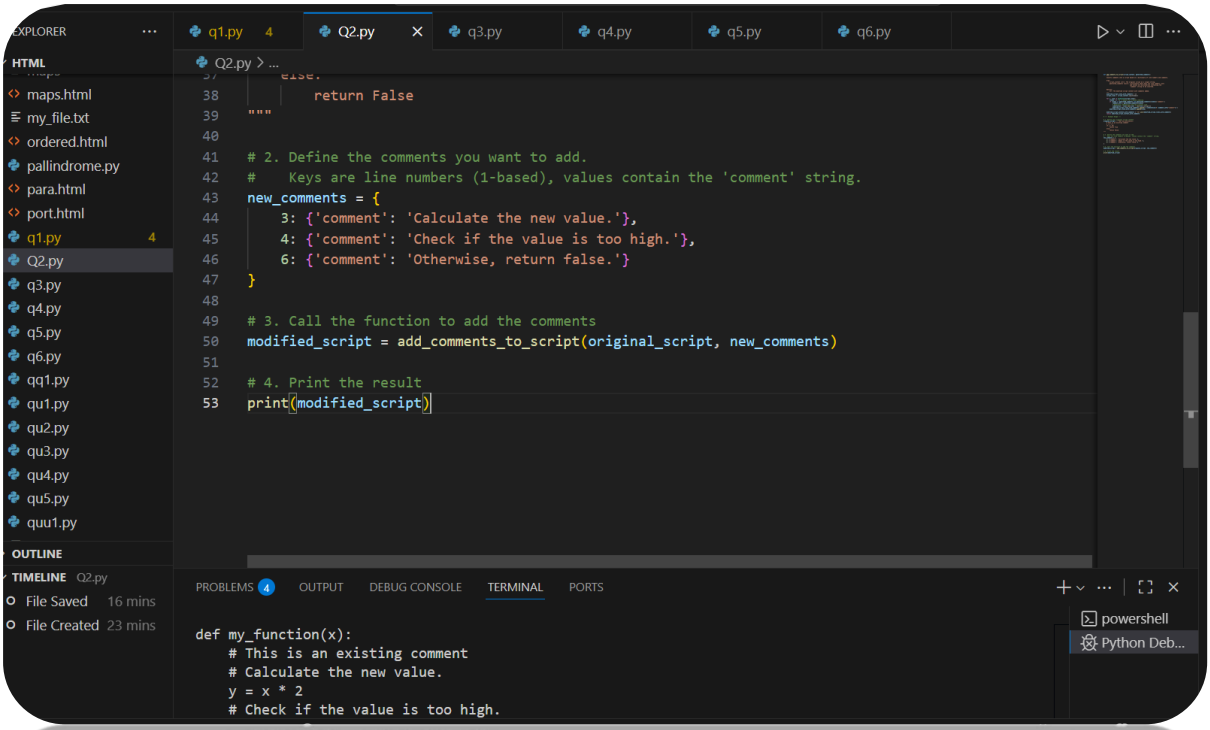
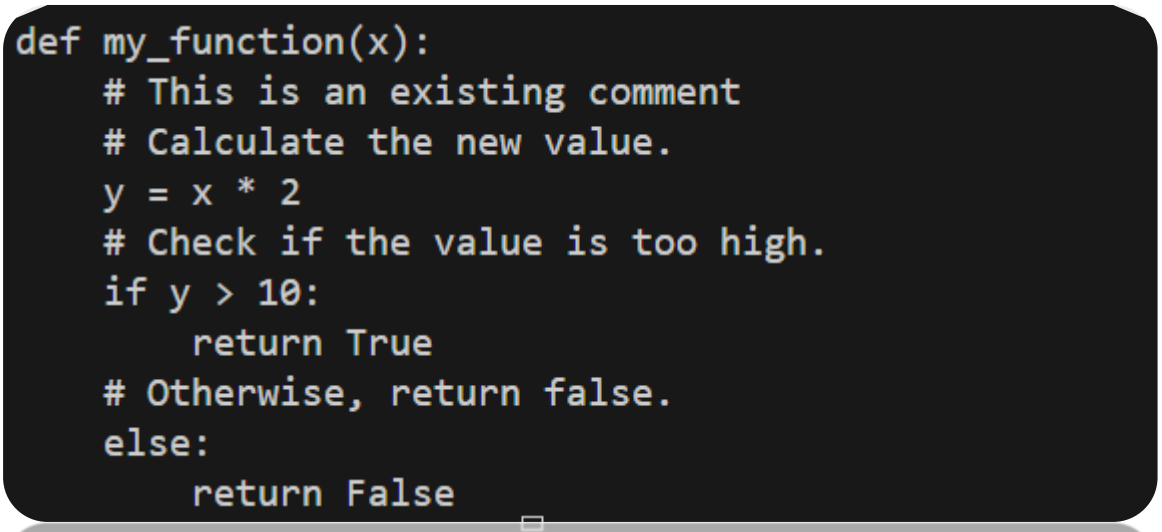
OUTLINE
TIMELINE Q2.py
File Saved 16 mins
File Created 23 mins
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
C:\Users\Devi\html\q4.py
Q2.py > ...
def add_comments_to_script(script_content, generated_comments):
modified_script_lines_with_comments.append(line)
modified_script_content_with_comments = "\n".join(modified_script_lines_with_comments)
return modified_script_content_with_comments
# --- Example Usage ---
# 1. Define your original script content
original_script = """def my_function(x):
# This is an existing comment
y = x * 2
if y > 10:
return True
else:
return False
"""
# 2. Define the comments you want to add.
# Keys are line numbers (1-based), values contain the 'comment' string.
new_comments = {
3: {'comment': 'Calculate the new value.'},
4: {'comment': 'Check if the value is too high.'},
6: {'comment': 'Otherwise. return false.'}
PROBLEMS 4
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
powershell
Python Deb...
def my_function(x):
# This is an existing comment
# Calculate the new value.
y = x * 2
# Check if the value is too high.





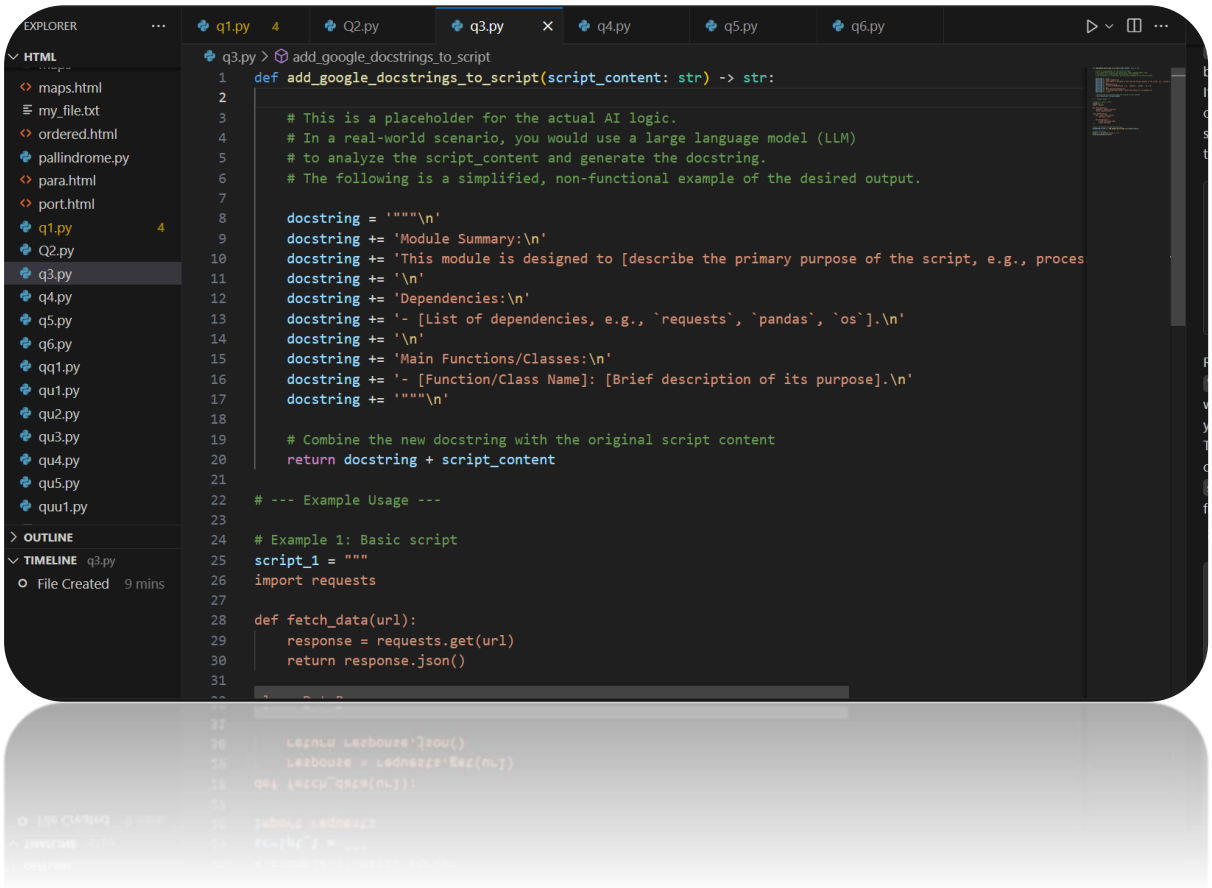
1. **EXPLANATION: Import ast**: It imports the ast module, which is used to work with the abstract syntax tree of Python code.

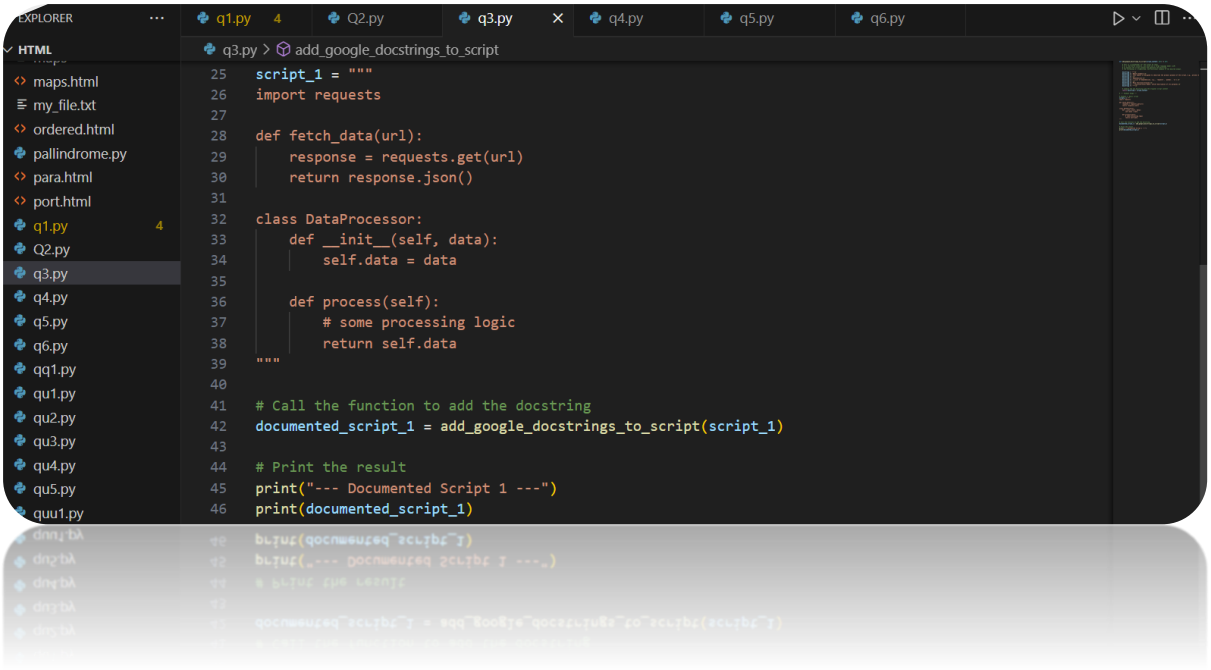
2. **ComplexityAnalyzer Class**: This class inherits from ast.NodeVisitor, allowing it to traverse the syntax tree of the script.
3. **__init__ Method**: The constructor initializes an empty list called self.sections_to_comment. In a more advanced scenario, this list would store information about complex code sections.
4. **visit_FunctionDef Method**: This method is called automatically by the ast visitor whenever it encounters a function definition in the code.

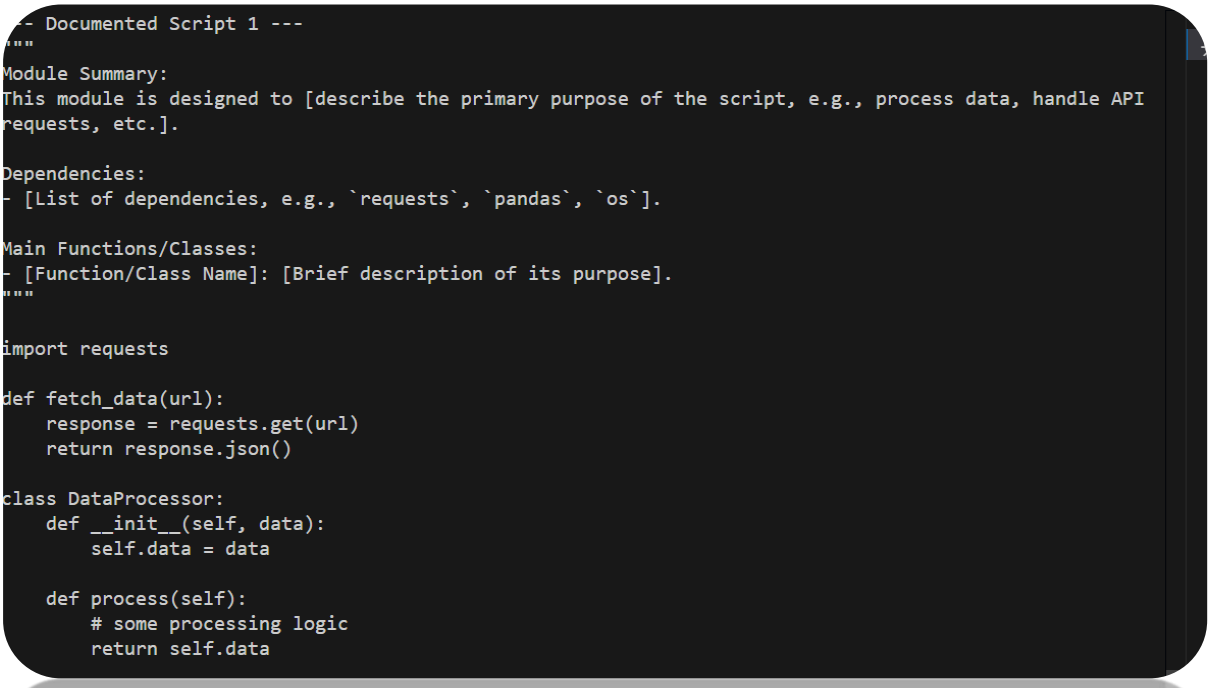
TASK-3:

PROMPT-Use AI to create a module-level docstring summarizing the purpose, dependencies, and main functions/classes of a Python file.

CODE:







EXPLANATION:

This Python script reads another `.py` file and automatically generates a module-level docstring that summarizes:

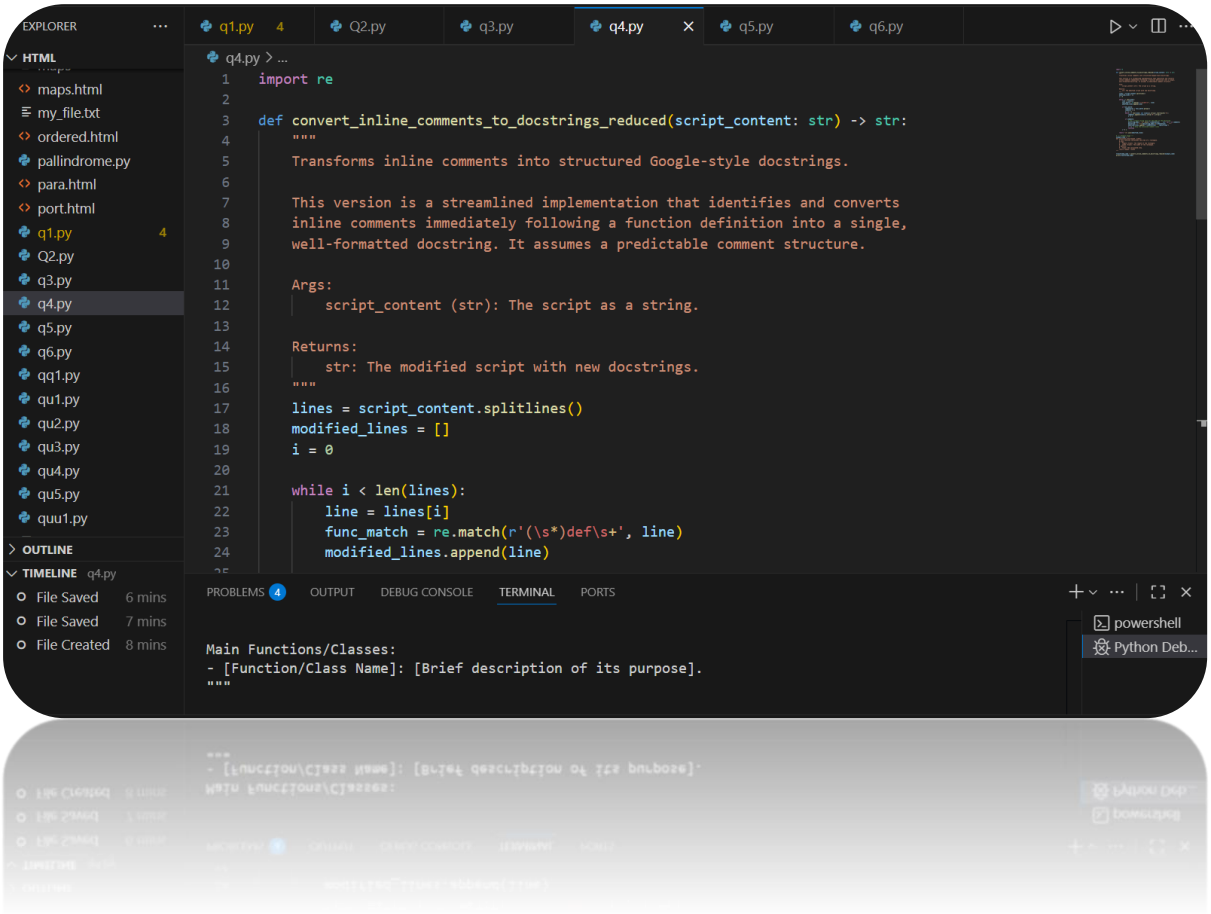
- What the module does (based on its filename)

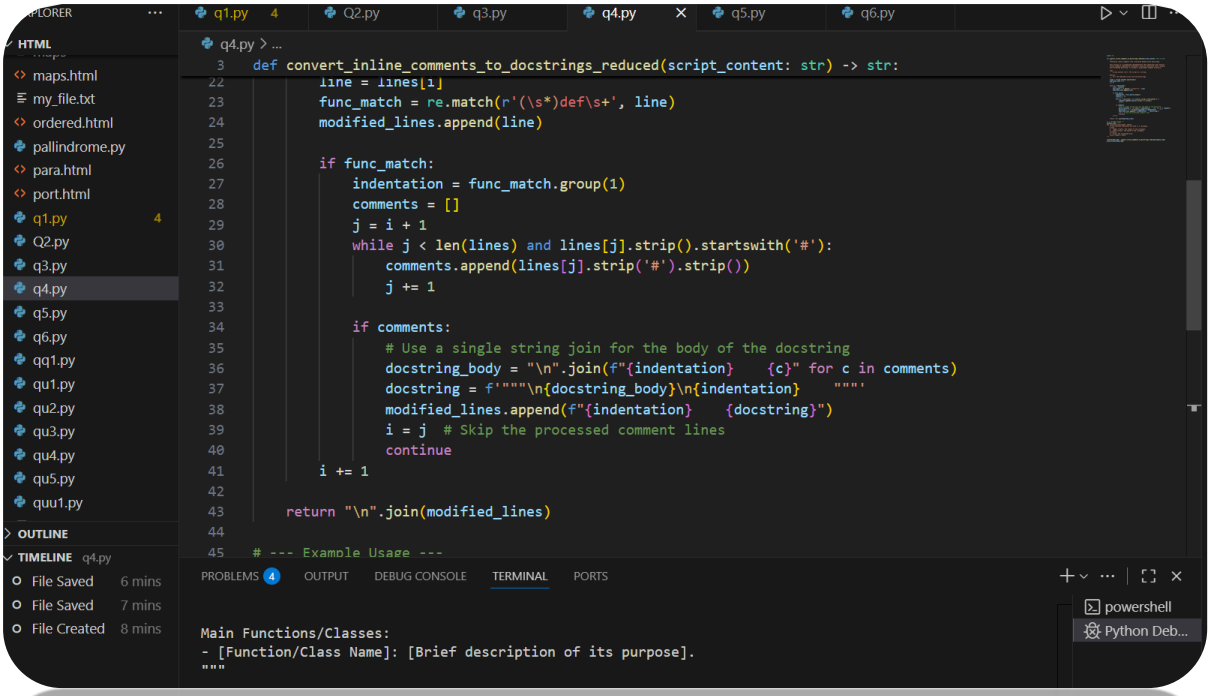
- What libraries it imports
- What functions and classes it defines

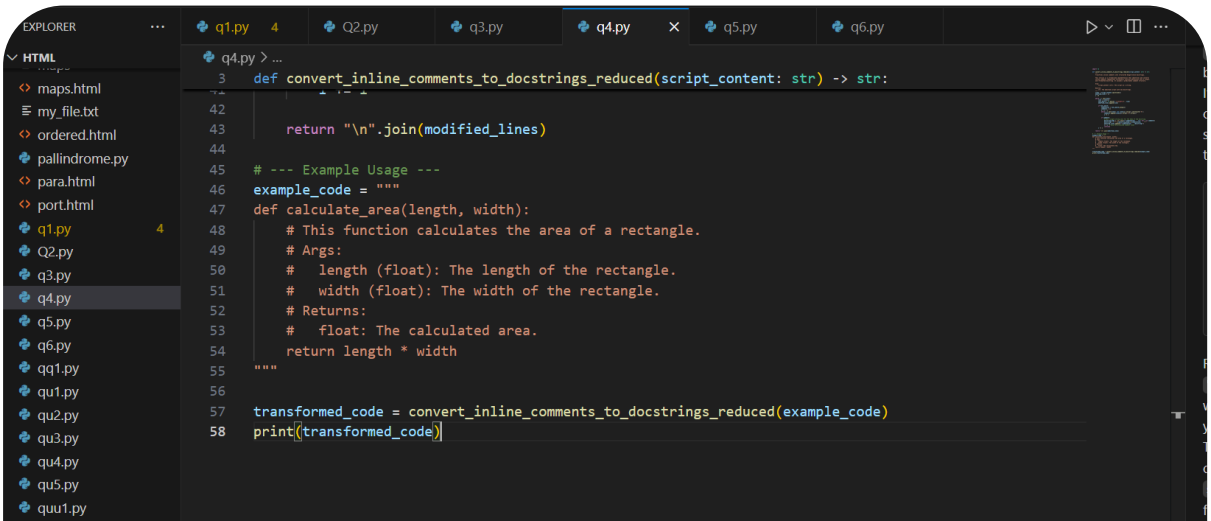
TASK-4:

PROMPT-Use AI to transform existing inline comments into structured function docstrings following Google style

Code:




def convert_inline_comments_to_docstrings_reduced(script_content: str) -> str:
line = lines[i]
func_match = re.match(r'(\s*)def\s+', line)
modified_lines.append(line)
if func_match:
indentation = func_match.group(1)
comments = []
j = i + 1
while j < len(lines) and lines[j].strip().startswith('#'):
comments.append(lines[j].strip('#').strip())
j += 1
if comments:
# Use a single string join for the body of the docstring
docstring_body = "\n".join(f"{indentation}   {c}" for c in comments)
docstring = f'"""\n{docstring_body}\n{indentation}   """'
modified_lines.append(f"{indentation}   {docstring}")
i = j # Skip the processed comment lines
continue
i += 1
return "\n".join(modified_lines)
--- Example Usage ---
Main Functions/Classes:
- [Function/Class Name]: [Brief description of its purpose].
"""


def convert_inline_comments_to_docstrings_reduced(script_content: str) -> str:
return "\n".join(modified_lines)
# --- Example Usage ---
example_code = """
def calculate_area(length, width):
# This function calculates the area of a rectangle.
# Args:
#   length (float): The length of the rectangle.
#   width (float): The width of the rectangle.
# Returns:
#   float: The calculated area.
return length * width
"""
transformed_code = convert_inline_comments_to_docstrings_reduced(example_code)
print(transformed_code)
Main Functions/Classes:
- [Function/Class Name]: [Brief description of its purpose].
"""

```
def calculate_area(length, width):
    """
    # This function calculates the area of a rectangle.
    # Args:
    #   length (float): The length of the rectangle.
    #   width (float): The width of the rectangle.
    # Returns:
    #   float: The calculated area.
    """
    return length * width
```

Explanation:

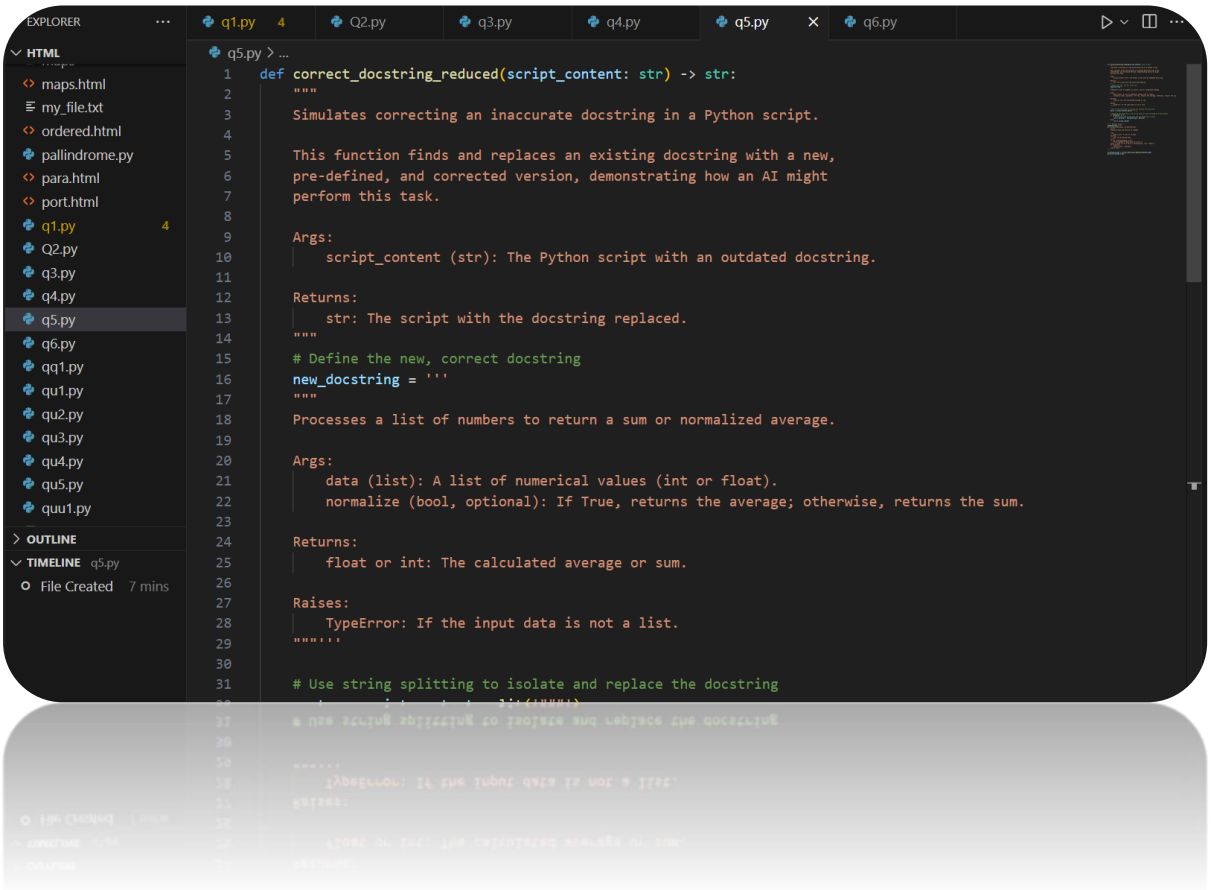
- **`tokenize`**: Finds all inline comments in the code.

  - **`ast`**: Parses the code to locate function definitions.
  - **`generate_google_docstring()`**: Builds a structured docstring with:
    - Function name
    - Arguments (`Args:`)
    - Return type (`Returns:`)
    - Notes from inline comments
  - **`transform_comments_to_docstrings()`**: Inserts the new docstring right inside each function.

TASK-5:

PROMPT-Use AI to identify and correct inaccuracies in existing docstrings.

Code:


EXPLORER
HTML
maps.html
my_file.txt
ordered.html
pallindrome.py
para.html
port.html
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
qq1.py
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qu2.py
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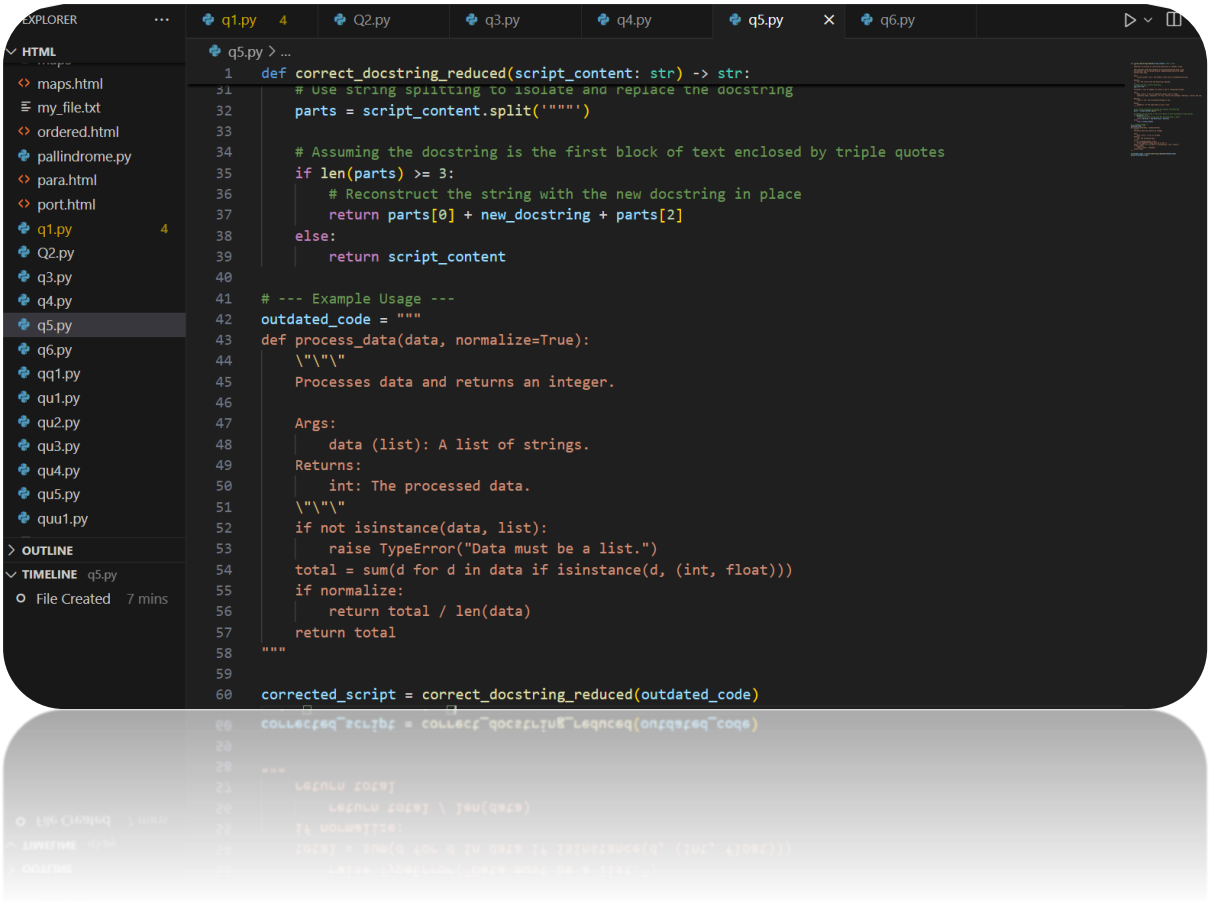
OUTLINE
TIMELINE q5.py
File Created 7 mins
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
q5.py > ...
def correct_docstring_reduced(script_content: str) -> str:
"""
Simulates correcting an inaccurate docstring in a Python script.
This function finds and replaces an existing docstring with a new,
pre-defined, and corrected version, demonstrating how an AI might
perform this task.
Args:
script_content (str): The Python script with an outdated docstring.
Returns:
str: The script with the docstring replaced.
"""
# Define the new, correct docstring
new_docstring = '''
"""
Processes a list of numbers to return a sum or normalized average.
Args:
data (list): A list of numerical values (int or float).
normalize (bool, optional): If True, returns the average; otherwise, returns the sum.
Returns:
float or int: The calculated average or sum.
Raises:
TypeError: If the input data is not a list.
"""'''
Use string splitting to isolate and replace the docstring




```
def process_data(data, normalize=True):

    """
    Processes a list of numbers to return a sum or normalized average.

    Args:
        data (list): A list of numerical values (int or float).
        normalize (bool, optional): If True, returns the average; otherwise, returns the sum.

    Returns:
        float or int: The calculated average or sum.

    Raises:
        TypeError: If the input data is not a list.
    """
    if not isinstance(data, list):
        raise TypeError("Data must be a list.")
    total = sum(d for d in data if isinstance(d, (int, float)))
    if normalize:
        return total / len(data)
    return total
```

Explanation:

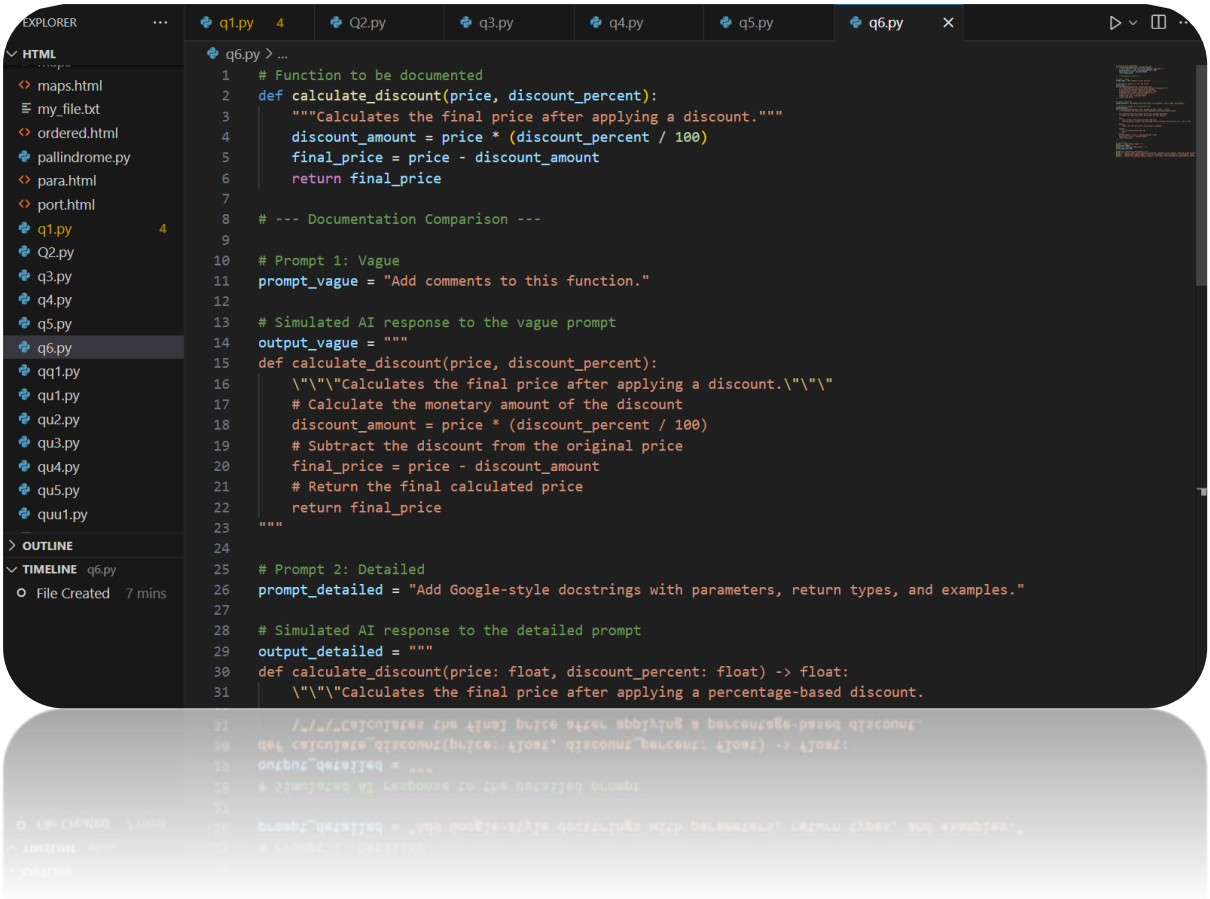
- **`ast` module**: Parses the Python file to find function definitions and their docstrings.

- **`parse_docstring()`**: Extracts argument names and checks if a return section exists.
- **`get_return_type()`**: Detects if the function has a return statement.
- **`generate_correct_docstring()`**: Builds a clean, structured docstring with:
  - Function name
  - Arguments (`Args:`)
  - Return type (`Returns:`)
- **`validate_and_correct_docstrings()`**: Compares actual function structure with its docstring and suggests corrections if needed.

TASK-6:

PROMPT-Compare documentation output from a vague prompt and a detailed prompt for the same Python function.

Code:


EXPLORER
HTML
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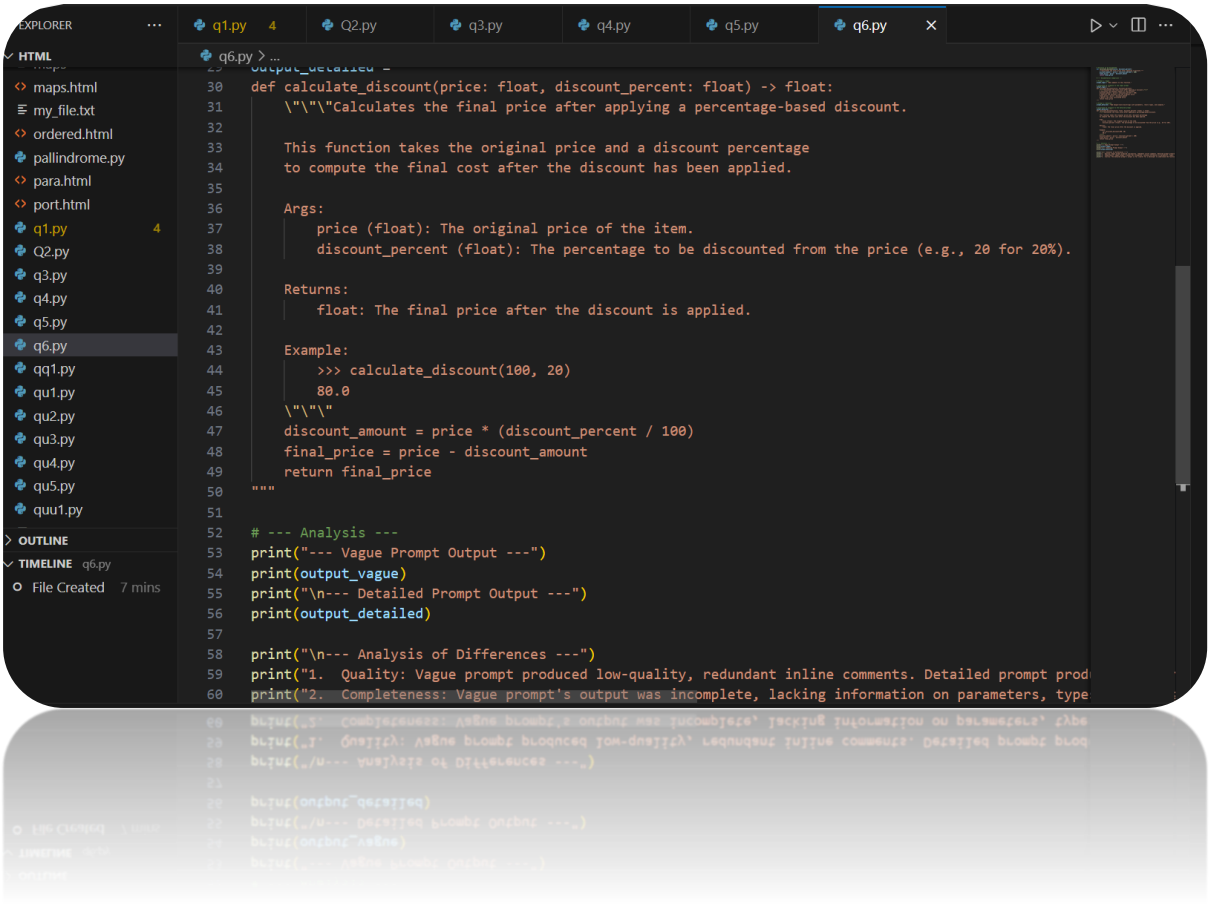
OUTLINE
TIMELINE q6.py
File Created 7 mins
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
q6.py > ...
# Function to be documented
def calculate_discount(price, discount_percent):
"""Calculates the final price after applying a discount."""
discount_amount = price * (discount_percent / 100)
final_price = price - discount_amount
return final_price
# --- Documentation Comparison ---
# Prompt 1: Vague
prompt_vague = "Add comments to this function."
# Simulated AI response to the vague prompt
output_vague = """
def calculate_discount(price, discount_percent):
\"\"\"Calculates the final price after applying a discount.\"\"\"
# Calculate the monetary amount of the discount
discount_amount = price * (discount_percent / 100)
# Subtract the discount from the original price
final_price = price - discount_amount
# Return the final calculated price
return final_price
"""
# Prompt 2: Detailed
prompt_detailed = "Add Google-style docstrings with parameters, return types, and examples."
# Simulated AI response to the detailed prompt
output_detailed = """
def calculate_discount(price: float, discount_percent: float) -> float:
\"\"\"Calculates the final price after applying a percentage-based discount.


EXPLORER
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q4.py
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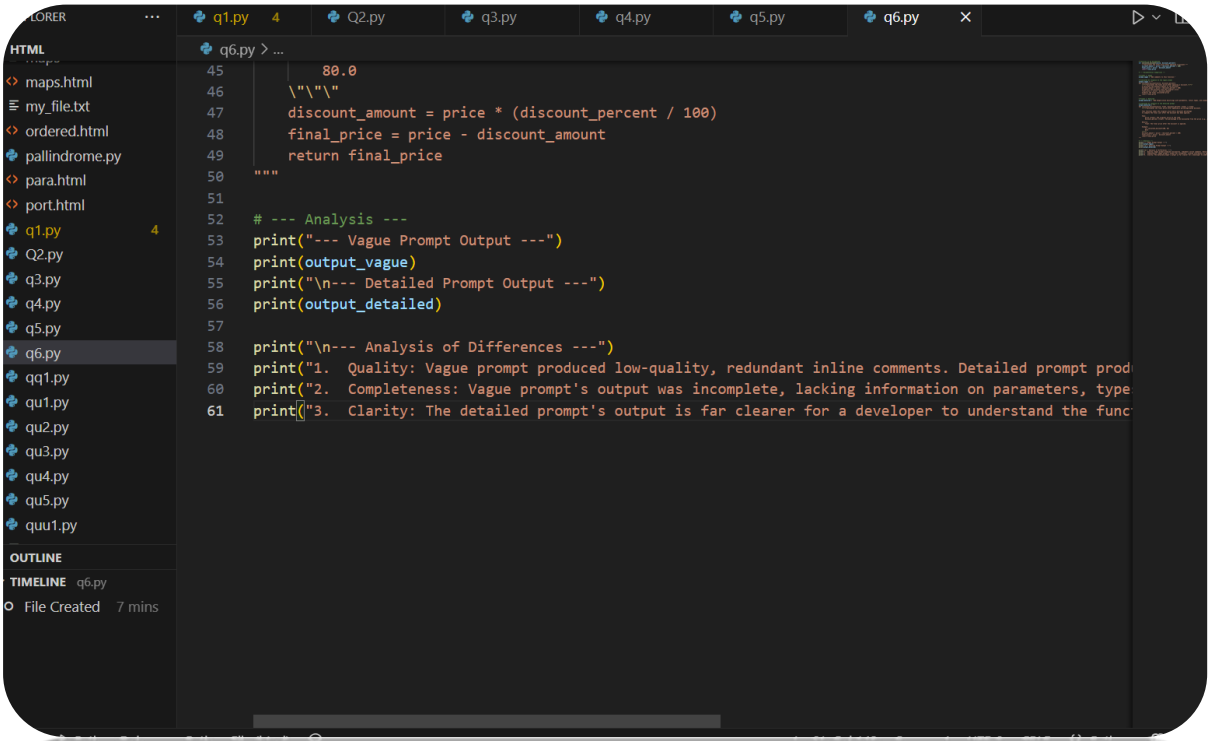
OUTLINE
TIMELINE q6.py
File Created 7 mins
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
q6.py > ...
def calculate_discount(price: float, discount_percent: float) -> float:
\"\"\"Calculates the final price after applying a percentage-based discount.
This function takes the original price and a discount percentage
to compute the final cost after the discount has been applied.
Args:
price (float): The original price of the item.
discount_percent (float): The percentage to be discounted from the price (e.g., 20 for 20%).
Returns:
float: The final price after the discount is applied.
Example:
>>> calculate_discount(100, 20)
80.0
\"\"\"
discount_amount = price * (discount_percent / 100)
final_price = price - discount_amount
return final_price
"""
# --- Analysis ---
print("--- Vague Prompt Output ---")
print(output_vague)
print("\n--- Detailed Prompt Output ---")
print(output_detailed)
print("\n--- Analysis of Differences ---")
print("1. Quality: Vague prompt produced low-quality, redundant inline comments. Detailed prompt prod
print("2. Completeness: Vague prompt's output was incomplete, lacking information on parameters, type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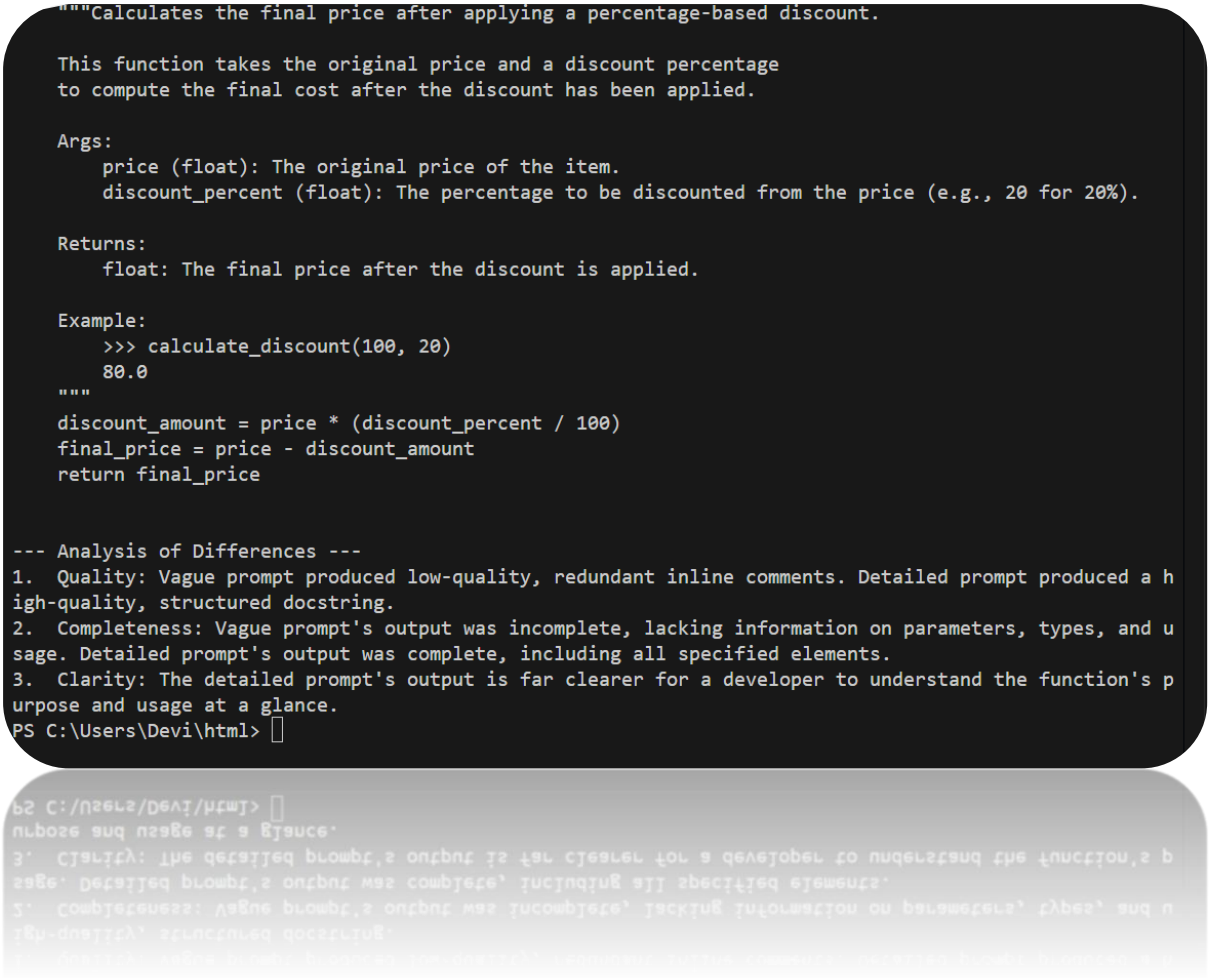
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
qq1.py
qu1.py
qu2.py
qu3.py
qu4.py
qu5.py
quu1.py
OUTLINE
TIMELINE q6.py
File Created 7 mins
q1.py 4
Q2.py
q3.py
q4.py
q5.py
q6.py
q6.py > ...
80.0
\"\"\"
discount_amount = price * (discount_percent / 100)
final_price = price - discount_amount
return final_price
"""
# --- Analysis ---
print("--- Vague Prompt Output ---")
print(output_vague)
print("\n--- Detailed Prompt Output ---")
print(output_detailed)
print("\n--- Analysis of Differences ---")
print("1. Quality: Vague prompt produced low-quality, redundant inline comments. Detailed prompt prod
print("2. Completeness: Vague prompt's output was incomplete, lacking information on parameters, type
print("3. Clarity: The detailed prompt's output is far clearer for a developer to understand the func

```
--- Vague Prompt Output ---

def calculate_discount(price, discount_percent):
    """Calculates the final price after applying a discount."""
    # Calculate the monetary amount of the discount
    discount_amount = price * (discount_percent / 100)
    # Subtract the discount from the original price
    final_price = price - discount_amount
    # Return the final calculated price
    return final_price


--- Detailed Prompt Output ---

def calculate_discount(price: float, discount_percent: float) -> float:
    """Calculates the final price after applying a percentage-based discount.

    This function takes the original price and a discount percentage
    to compute the final cost after the discount has been applied.

    Args:
        price (float): The original price of the item.
        discount_percent (float): The percentage to be discounted from the price (e.g., 20 for 20%).

    Returns:
        float: The final price after the discount is applied.

    Example:
        >>> calculate_discount(100, 20)
        80.0
    """
    discount_amount = price * (discount_percent / 100)
    final_price = price - discount_amount
    return final_price
```



Explanation:

- Defines a sample function `sample_function()` that filters values above a threshold.

- `generate_docstring()` returns either a vague or detailed docstring based on the prompt type.
- `compare_docstrings()` prints both versions side by side for comparison.