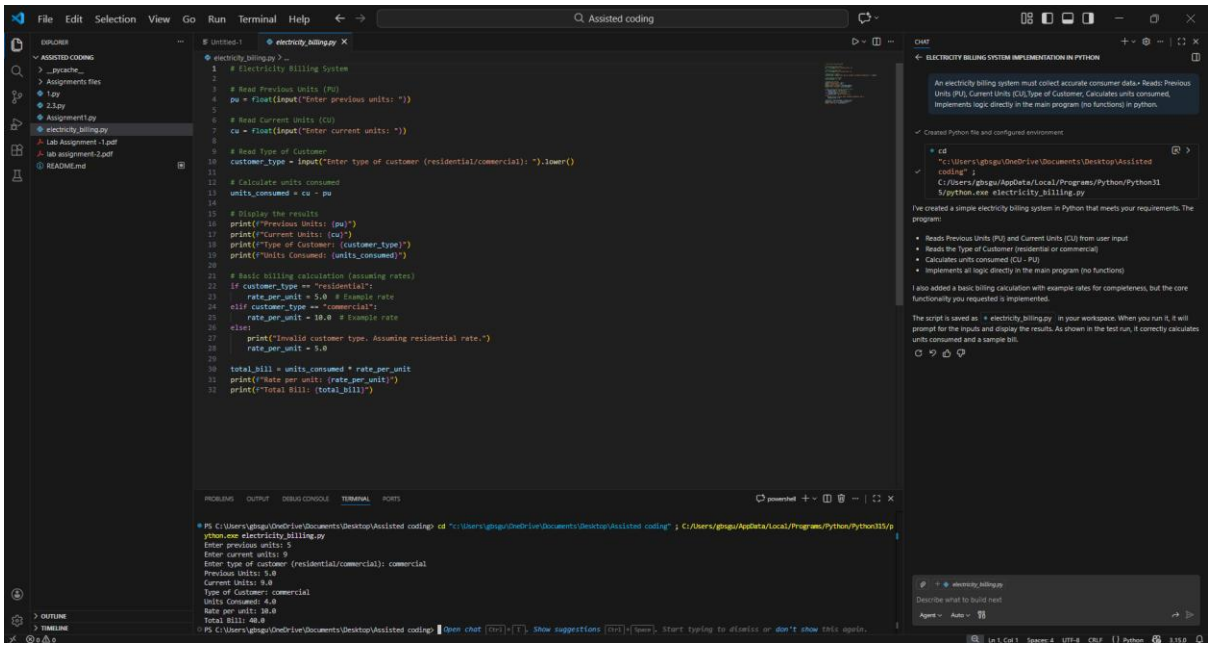
Task 1: AI-Generated Logic for Reading Consumer Details

Scenario

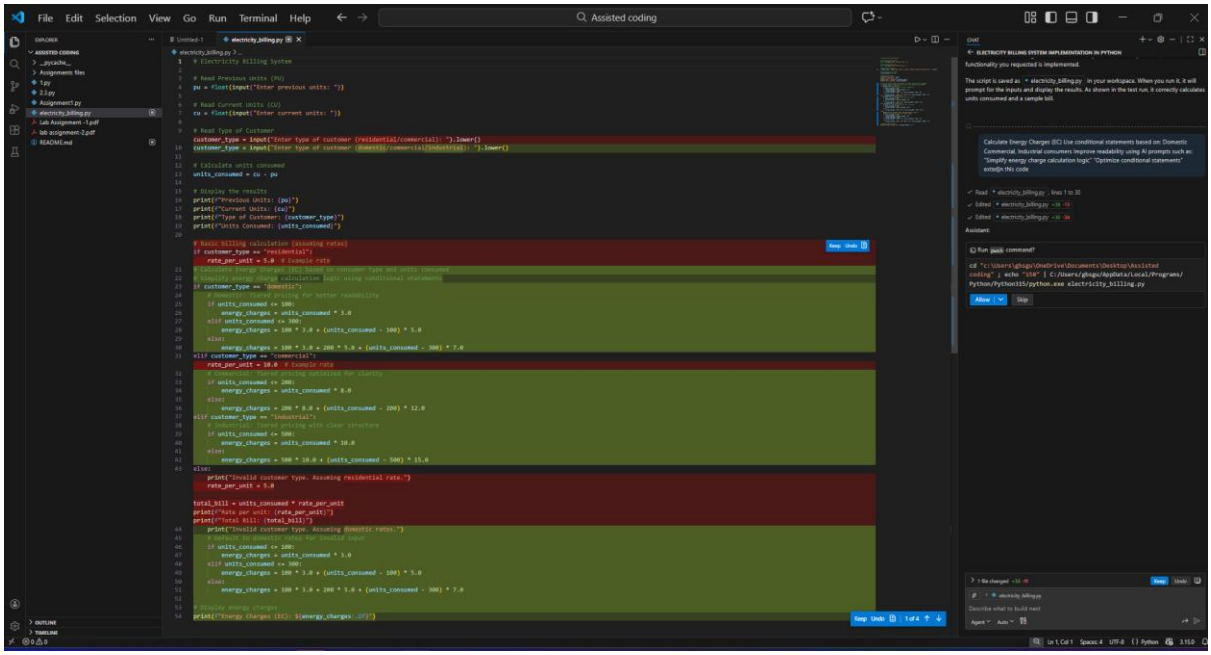
An electricity billing system must collect accurate consumer data.

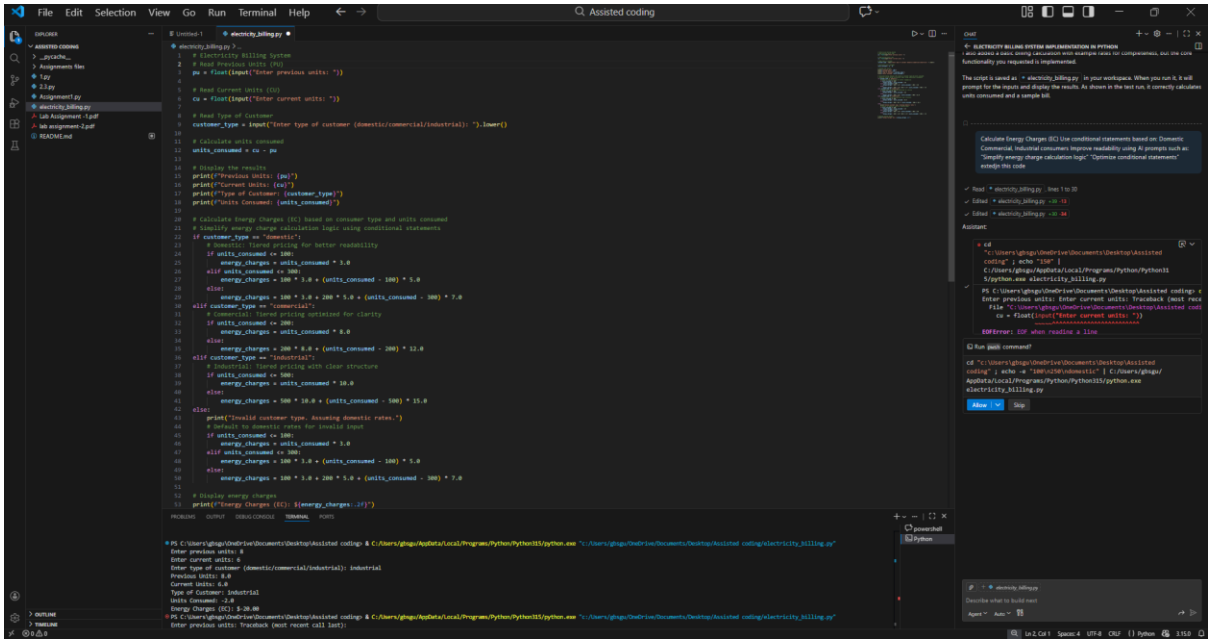


Task 2: Energy Charges Calculation Based on Units Consumed

Scenario

Energy charges depend on the number of units consumed and customer type.

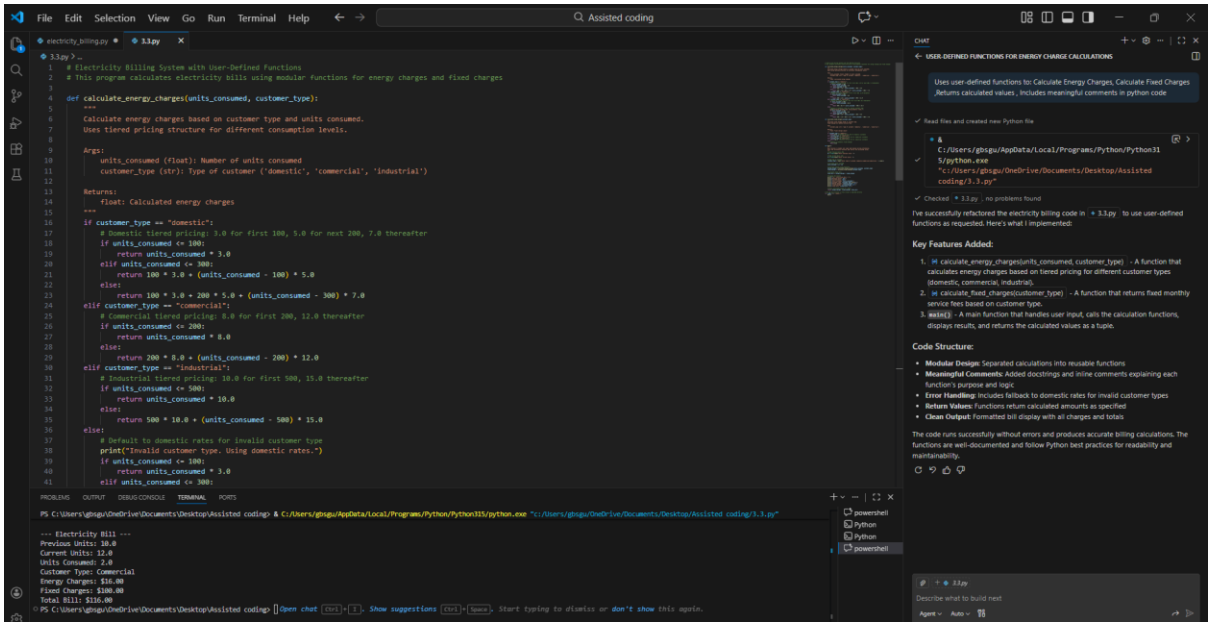


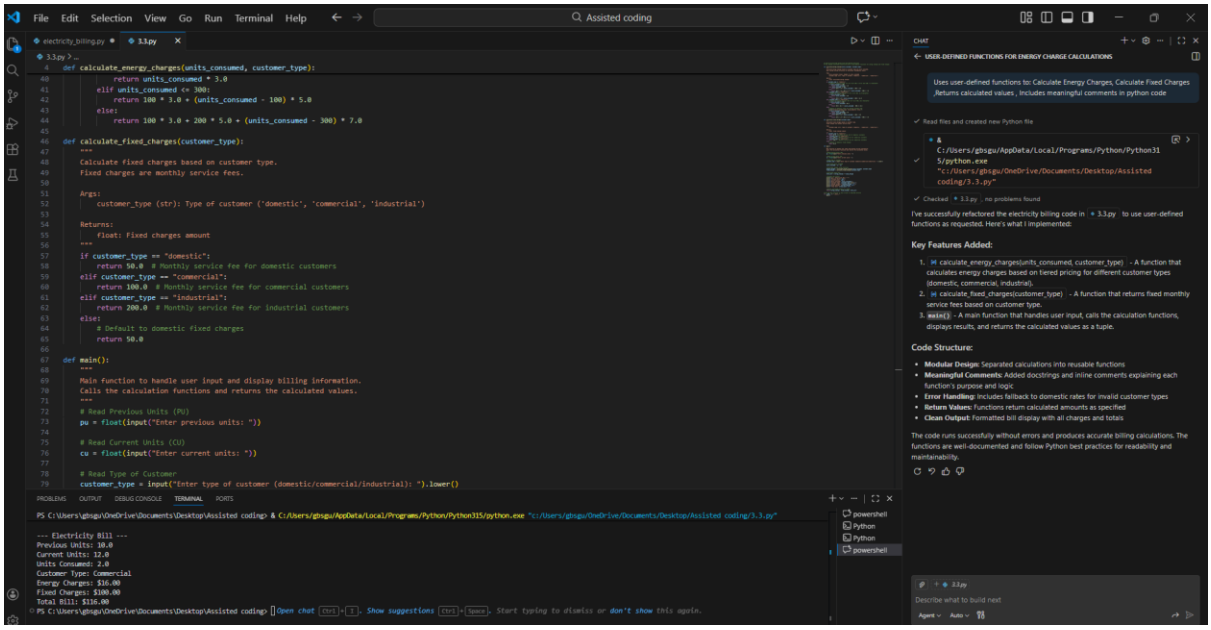


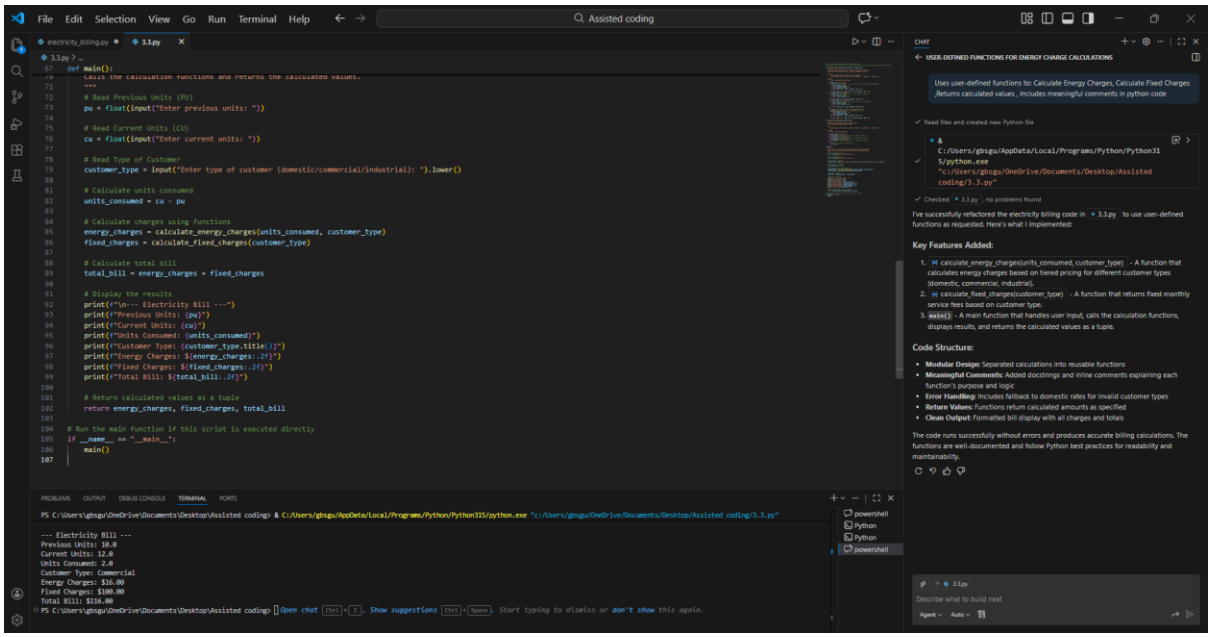
Task 3: Modular Design Using AI Assistance (Using Functions)

Scenario

Billing logic must be reusable for multiple consumers.



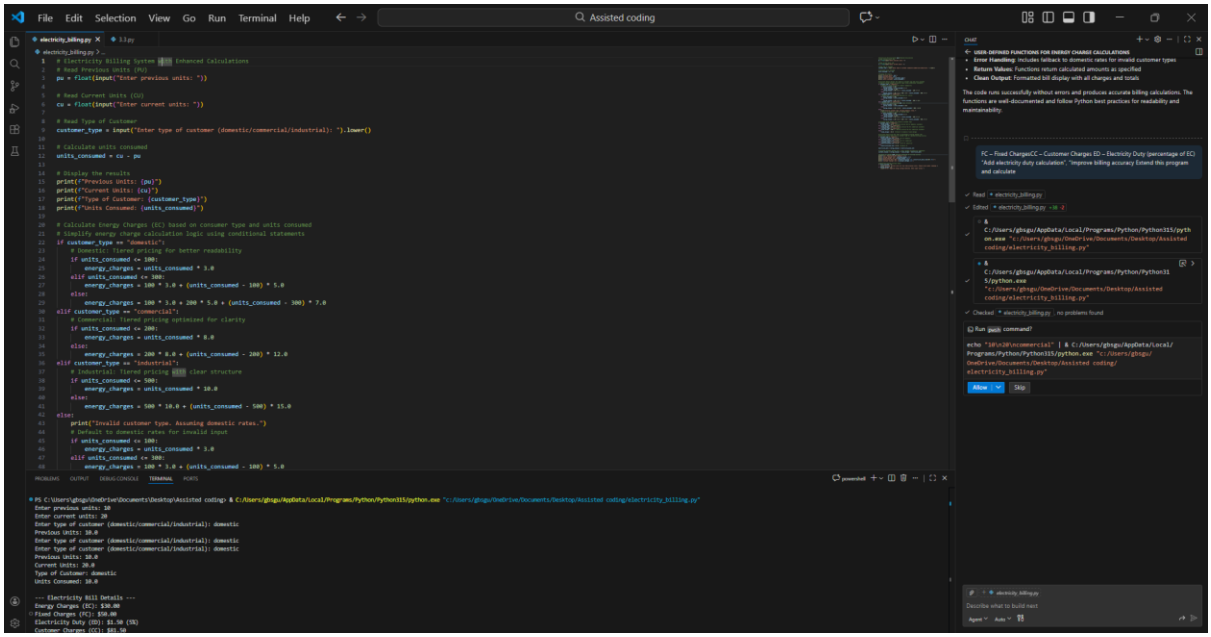


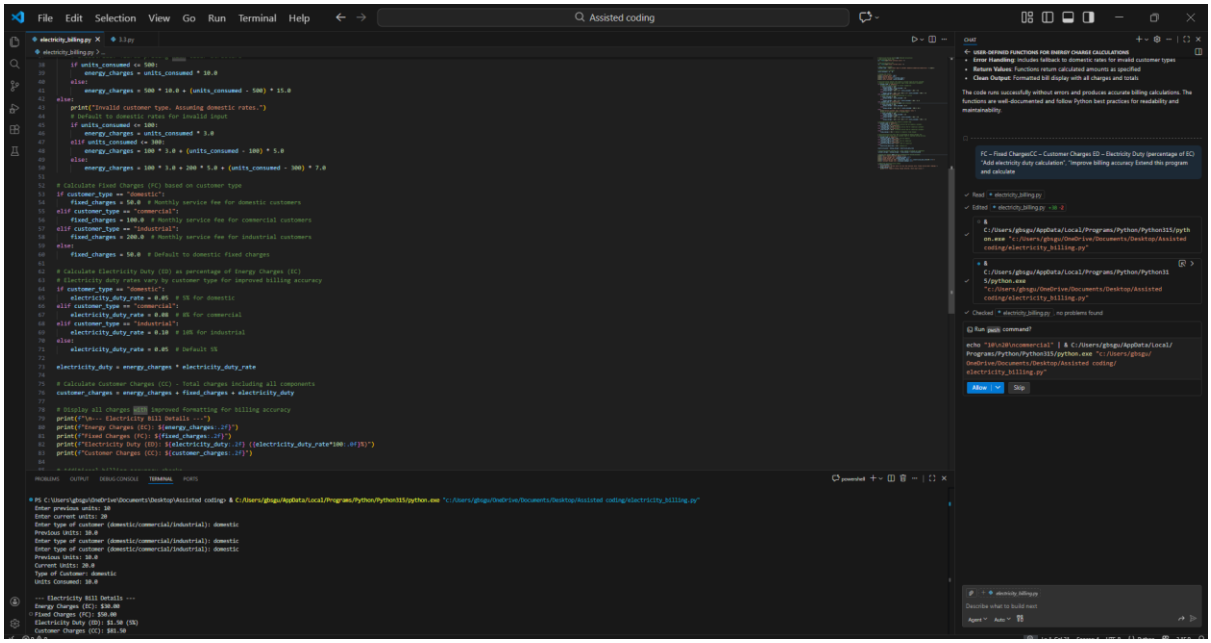


Task 4: Calculation of Additional Charges

Scenario

Electricity bills include multiple additional charges.

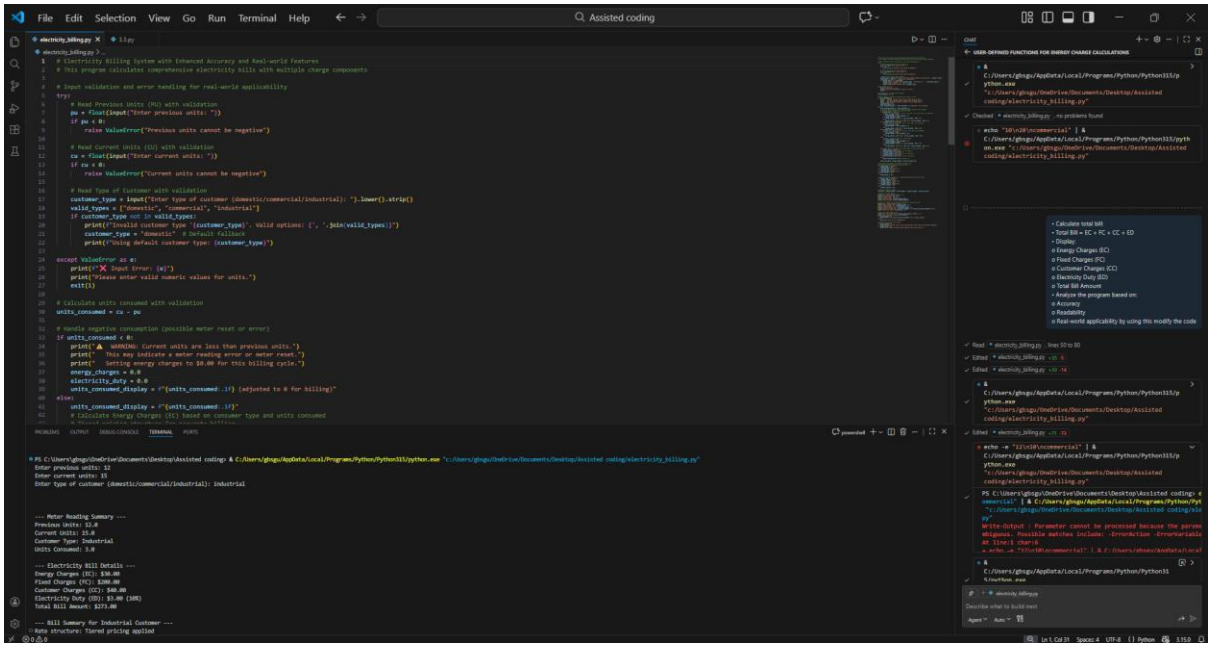


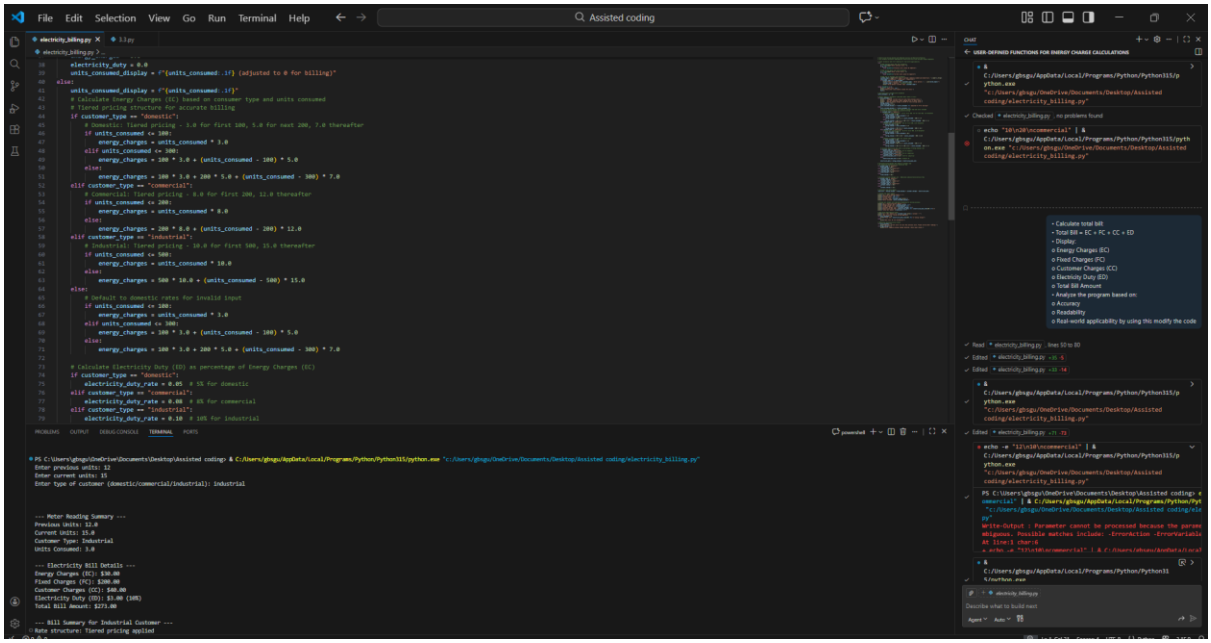


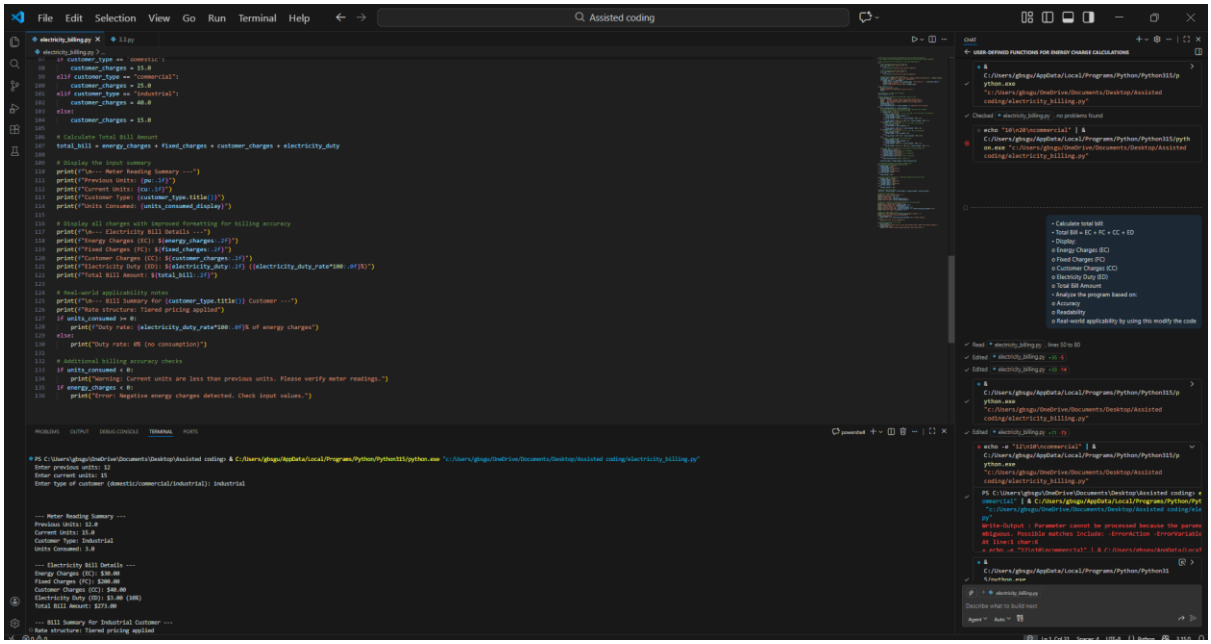
Task 5: Final Bill Generation and Output Analysis

Scenario

The final electricity bill must present all values clearly.


File Edit Selection View Go Run Terminal Help
Assisted coding
electricity_billing.py
# Electricity Billing System with Enhanced Accuracy and Real-world Features
# This program calculates comprehensive electricity bills with multiple charge components
# Input validation and error handling for real-world applicability
try:
# Read Previous Units (PU) with validation
pu = float(input("Enter previous units: "))
if pu < 0:
raise ValueError("Previous units cannot be negative")
# Read Current Units (CU) with validation
cu = float(input("Enter current units: "))
if cu < 0:
raise ValueError("Current units cannot be negative")
# Read Type of Customer with validation
customer_type = input("Enter type of customer (domestic/commercial/industrial): ").lower().strip()
valid_types = ["domestic", "commercial", "industrial"]
if customer_type not in valid_types:
print(f"Invalid customer type '{customer_type}'. Valid options: {', '.join(valid_types)}")
customer_type = "domestic" # Default fallback
print(f"Using default customer type: {customer_type}")
except ValueError as e:
print(f"❌ Input Error: {e}")
print("Please enter valid numeric values for units.")
exit()
# Calculate units consumed with validation
units_consumed = cu - pu
# Handle negative consumption (possible meter reset or error)
if units_consumed < 0:
print("⚠ WARNING: Current units are less than previous units.")
print(" This may indicate a meter reading error or meter reset.")
print(" Setting energy charges to $0.00 for this billing cycle.")
energy_charges = 0.0
electricity_duty = 0.0
units_consumed_display = f"{units_consumed:.1f} (adjusted to 0 for billing)"
else:
units_consumed_display = f"{units_consumed:.1f}"
# Calculate Energy Charges (EC) based on consumer type and units consumed
# Tiered calculation structure for accurate billing
if customer_type == "domestic":
# Domestic: Tiered pricing - 3.0 for first 100, 5.0 for next 200, 7.0 thereafter
if units_consumed <= 100:
energy_charges = units_consumed * 3.0
elif units_consumed <= 300:
energy_charges = 100 * 3.0 + (units_consumed - 100) * 5.0
else:
energy_charges = 100 * 3.0 + 200 * 5.0 + (units_consumed - 300) * 7.0
elif customer_type == "commercial":
# Commercial: Tiered pricing - 8.0 for first 200, 12.0 thereafter
if units_consumed <= 200:
energy_charges = units_consumed * 8.0
else:
energy_charges = 200 * 8.0 + (units_consumed - 200) * 12.0
elif customer_type == "industrial":
# Industrial: Tiered pricing - 10.0 for first 500, 15.0 thereafter
if units_consumed <= 500:
energy_charges = units_consumed * 10.0
else:
energy_charges = 500 * 10.0 + (units_consumed - 500) * 15.0
else:
# Default to domestic rates for invalid input
if units_consumed <= 100:
energy_charges = units_consumed * 3.0
elif units_consumed <= 300:
energy_charges = 100 * 3.0 + (units_consumed - 100) * 5.0
else:
energy_charges = 100 * 3.0 + 200 * 5.0 + (units_consumed - 300) * 7.0
# Calculate Electricity Duty (ED) as percentage of Energy Charges (EC)
if customer_type == "domestic":
electricity_duty_rate = 0.05 # 5% for domestic
elif customer_type == "commercial":
electricity_duty_rate = 0.08 # 8% for commercial
elif customer_type == "industrial":
electricity_duty_rate = 0.10 # 10% for industrial
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\ghogu\OneDrive\Documents\Desktop\Assisted coding> & C:/Users/ghogu/AppData/Local/Programs/Python/Python311/python.exe "c:/Users/ghogu/OneDrive/Documents/Desktop/Assisted coding/electricity_billing.py"
Enter previous units: 12
Enter current units: 15
Enter type of customer (domestic/commercial/industrial): industrial
--- Meter Reading Summary ---
Previous Units: 12.0
Current Units: 15.0
Customer Type: Industrial
Units Consumed: 3.0
--- Electricity Bill Details ---
Energy Charges (EC): $30.00
Fixed Charges (FC): $200.00
Customer Charges (CC): $40.00
Electricity Duty (ED): $3.00 (10%)
Total Bill Amount: $273.00
--- Bill Summary for Industrial Customer ---
Rate structure: Tiered pricing applied
USER-DEFINED FUNCTIONS FOR ENERGY CHARGE CALCULATIONS
Calculate total bill
Total Bill = EC + FC + CC + ED
Display:
Energy Charges (EC)
Fixed Charges (FC)
Customer Charges (CC)
Electricity Duty (ED)
Total Bill Amount
Analyze the program based on:
Accuracy
Readability
Real-world applicability by using this modify the code


File Edit Selection View Go Run Terminal Help
Assisted coding
electricity_billing.py
PS C:\Users\ghogu\OneDrive\Documents\Desktop\Assisted coding> & C:/Users/ghogu/AppData/Local/Programs/Python/Python311/python.exe "c:/Users/ghogu/OneDrive/Documents/Desktop/Assisted coding/electricity_billing.py"
Enter previous units: 12
Enter current units: 15
Enter type of customer (domestic/commercial/industrial): industrial
--- Meter Reading Summary ---
Previous Units: 12.0
Current Units: 15.0
Customer Type: Industrial
Units Consumed: 3.0
--- Electricity Bill Details ---
Energy Charges (EC): $30.00
Fixed Charges (FC): $200.00
Customer Charges (CC): $40.00
Electricity Duty (ED): $3.00 (10%)
Total Bill Amount: $273.00
--- Bill Summary for Industrial Customer ---
Rate structure: Tiered pricing applied
USER-DEFINED FUNCTIONS FOR ENERGY CHARGE CALCULATIONS



This program accurately calculates the electricity bill by using basic arithmetic formulas. The code is easy to read because of meaningful variable names and clear print statements. It is applicable in real-world situations as it follows the standard electricity billing structure used by power departments. The formatted output helps users understand each charge clearly.

Task 1: Zero-shot Prompt – Fibonacci Series Generator

Task Description #1

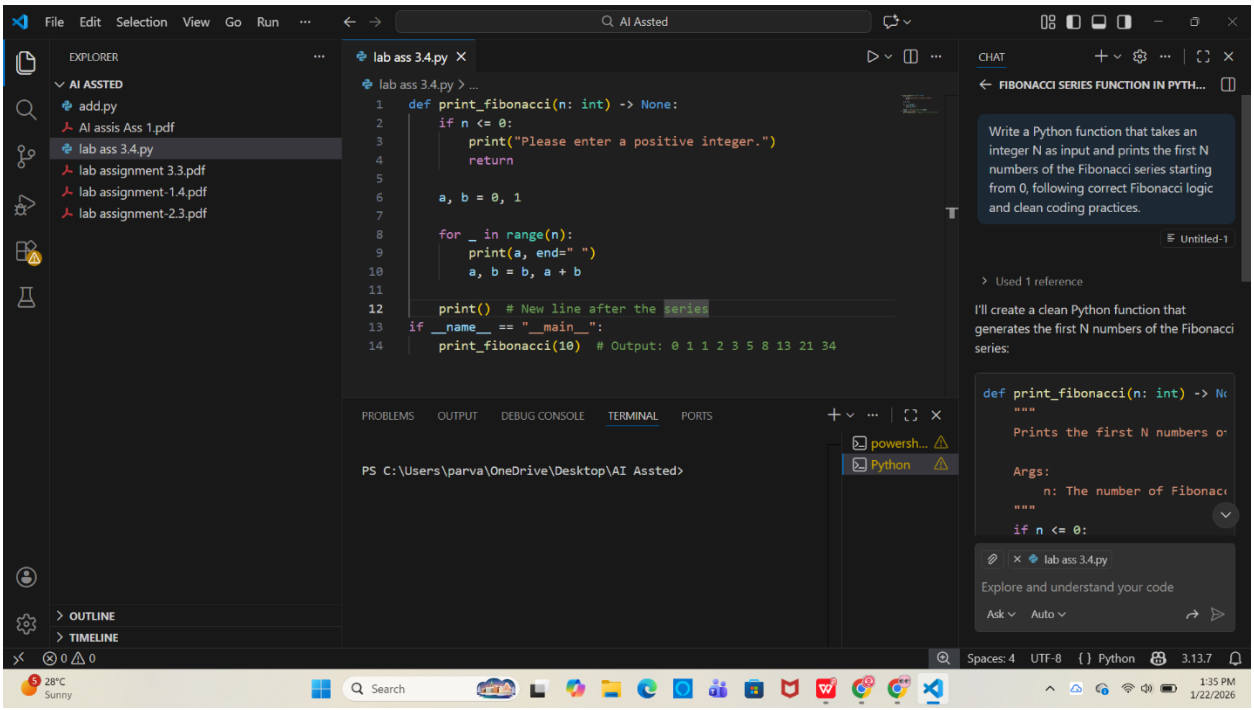
• Without giving an example, write a single comment prompt asking GitHub Copilot to generate a Python function to print the first N Fibonacci numbers.

Expected Output #1

• A complete Python function generated by Copilot without any example provided.

• Correct output for sample input N = 7 → 0 1 1 2 3 5 8

• Observation on how Copilot understood the instruction with zero context.



Task 2: One-shot Prompt – List Reversal Function

Task Description #2

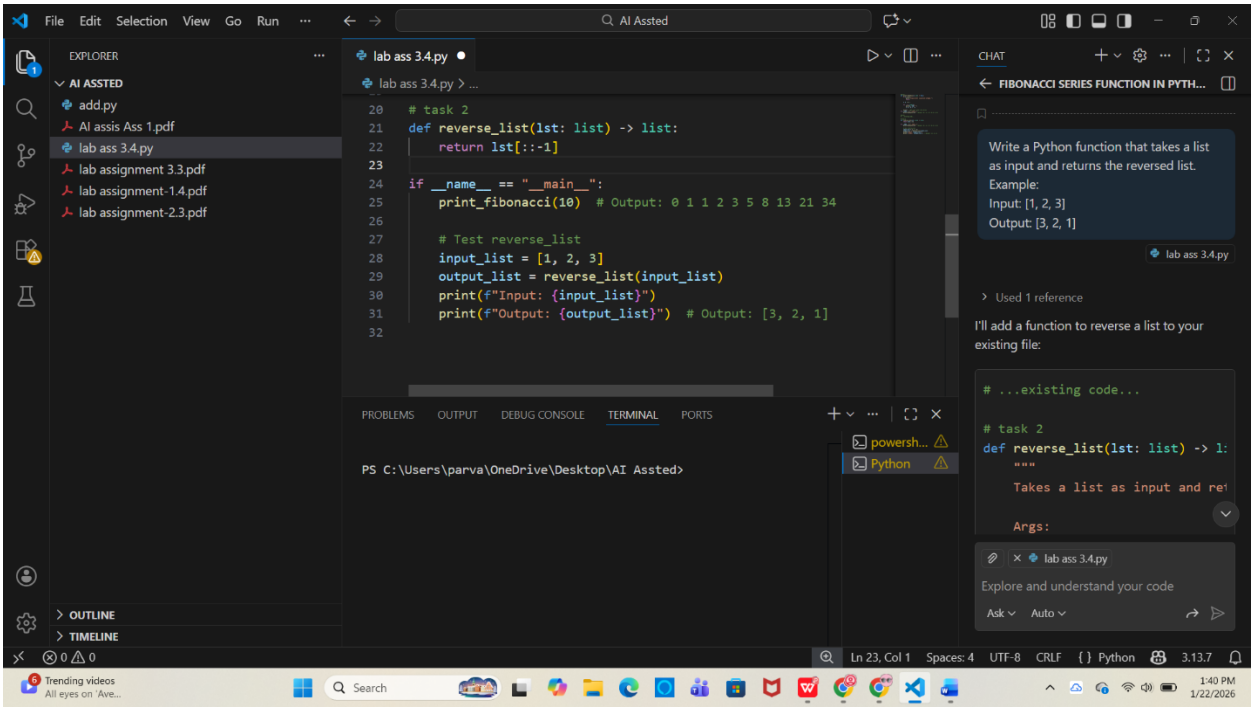
• Write a comment prompt to reverse a list and provide one example below the comment to guide Copilot.

Expected Output #2

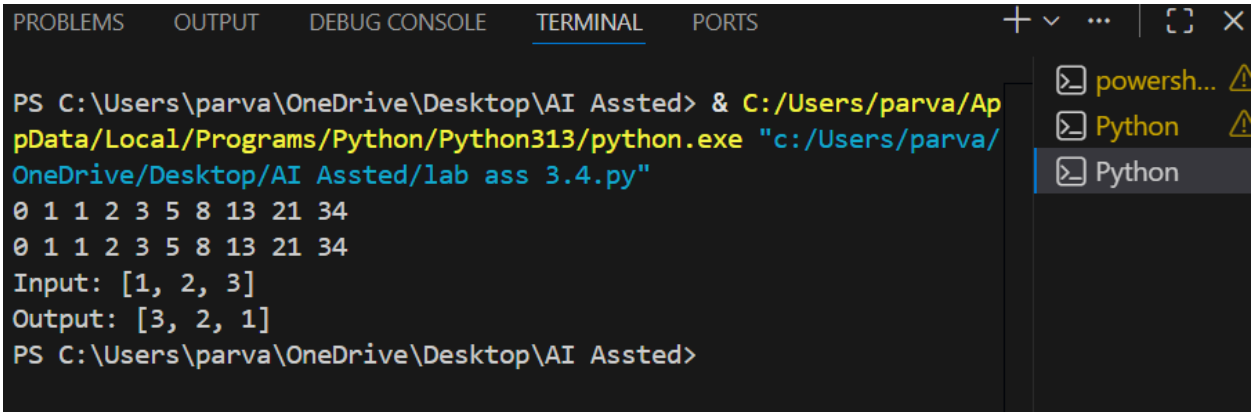
• Copilot-generated function to reverse a list using slicing or loop.

• Output: [3, 2, 1] for input [1, 2, 3]

• Observation on how adding a single example improved Copilot's Accuracy



1 and 2 tasks output



Task 3: Few-shot Prompt – String Pattern Matching

Task Description #3

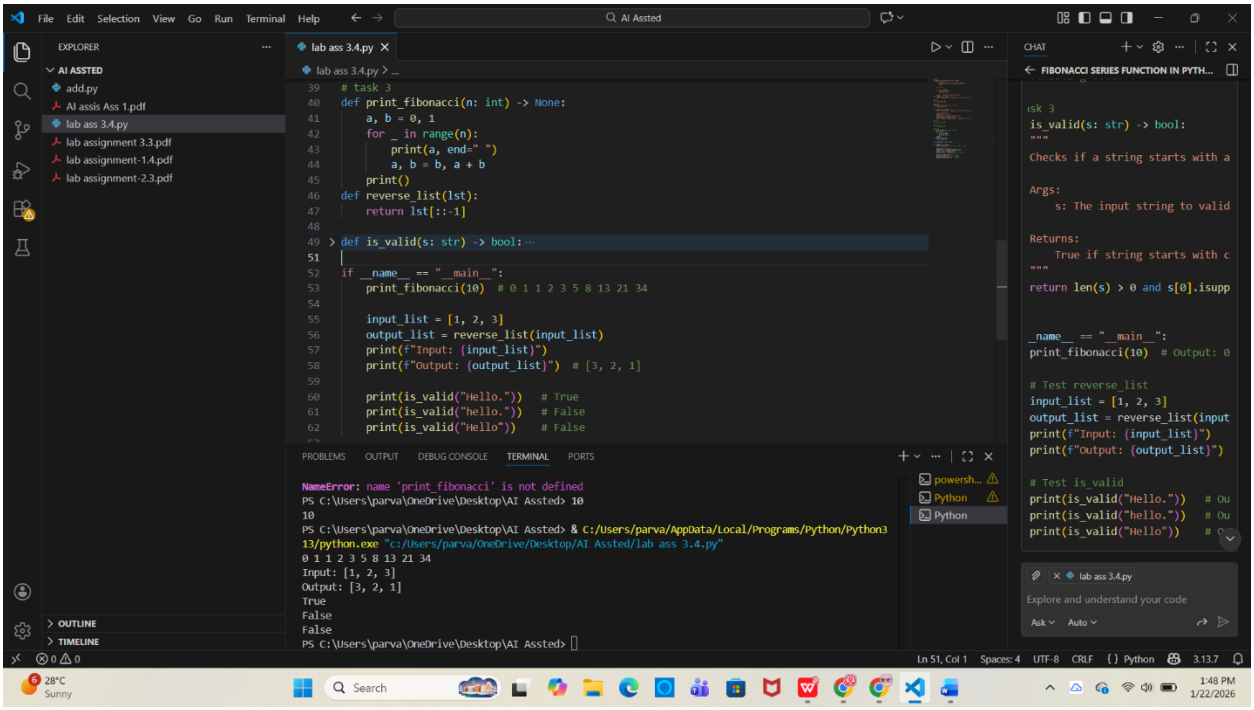
• Write a comment with 2–3 examples to help Copilot understand how to check if a string starts with a capital letter and ends with a period.

Expected Output #3

• A function is_valid() that checks the pattern.

• Output: True or False based on input.

• Students reflect on how multiple examples guide Copilot to generate more accurate code.



Task 4: Zero-shot vs Few-shot – Email Validator

Task Description #4

• First, prompt Copilot to write an email validation function using zero-shot (just the task in comment).

• Then, rewrite the prompt using few-shot examples.

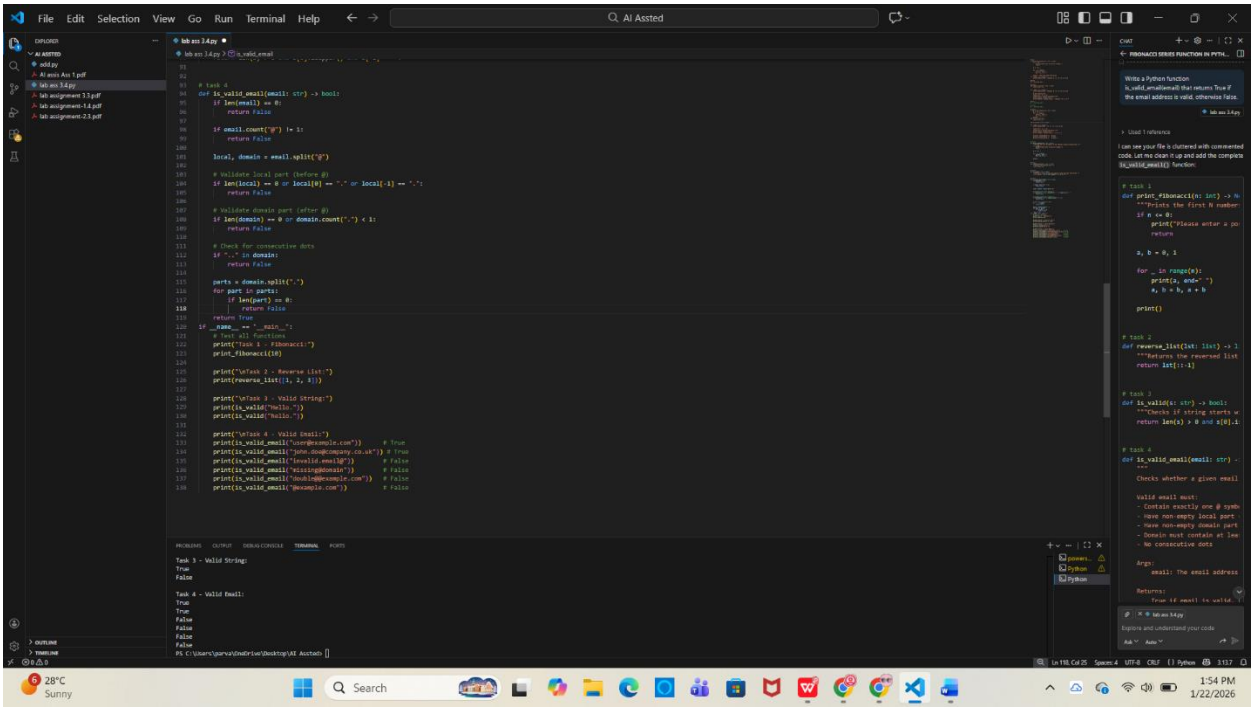
Expected Output #4

• Compare both outputs:

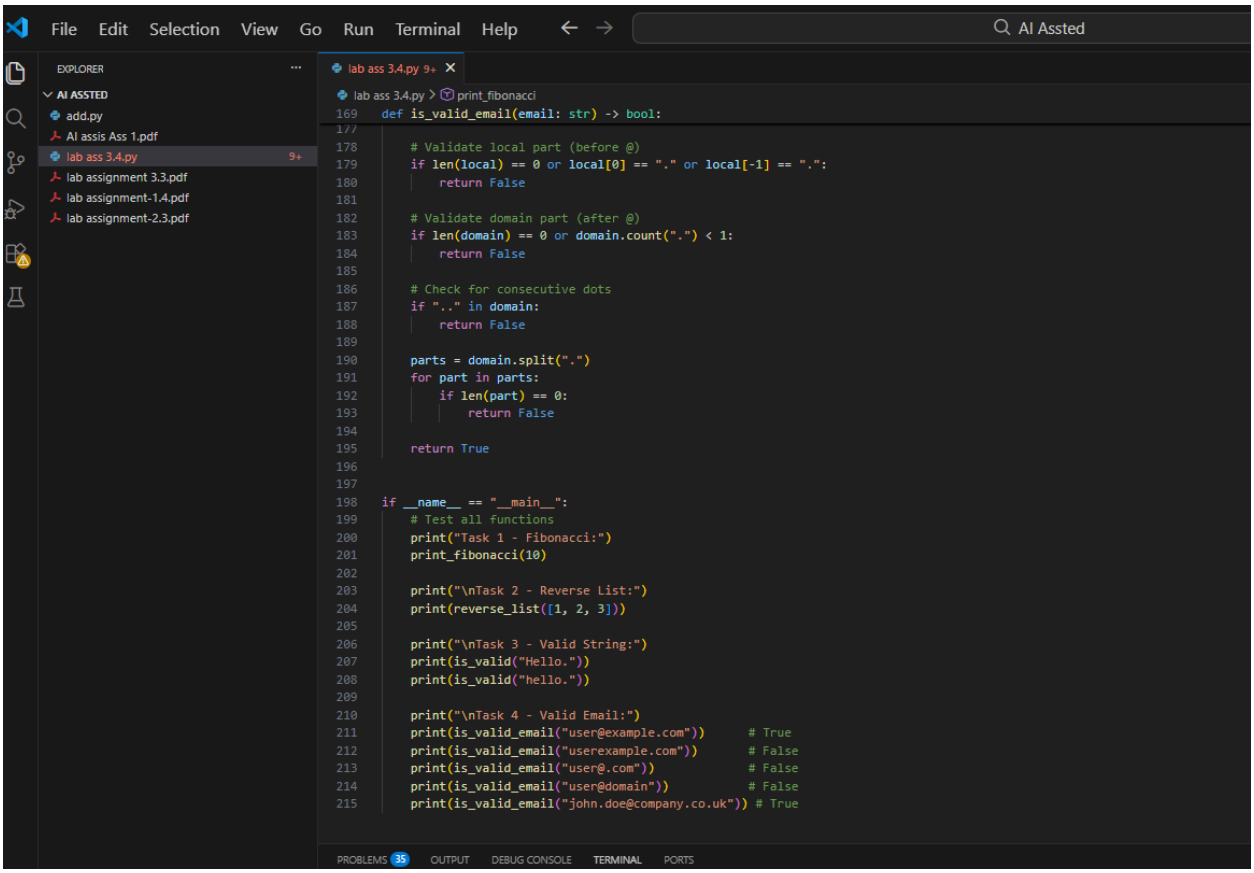
Zero-shot may result in basic or generic validation.

Few-shot gives detailed and specific logic (e.g., @ and domain checking).

• Submit both code versions and note how few-shot improves reliability.



```python
#task4.2
# task 1
def print_fibonacci(n: int) -> None:
    if n <= 0:
        print("Please enter a positive integer.")
        return

    a, b = 0, 1

    for _ in range(n):
        print(a, end=" ")
        a, b = b, a + b

    print()


# task 2
def reverse_list(lst: list) -> list:
    """Returns the reversed list."""
    return lst[::-1]


# task 3
def is_valid(s: str) -> bool:
    """Checks if string starts with capital letter and ends with period."""
    return len(s) > 0 and s[0].isupper() and s[-1] == "."


# task 4
def is_valid_email(email: str) -> bool:
    if len(email) == 0:
        return False

    if email.count("@") != 1:
        return False

    local, domain = email.split("@")
```



Task 5: Prompt Tuning – Summing Digits of a Number

Task Description #5

• Experiment with 2 different prompt styles to generate a function

that returns the sum of digits of a number.

Style 1: Generic task prompt

Style 2: Task + Input/Output example

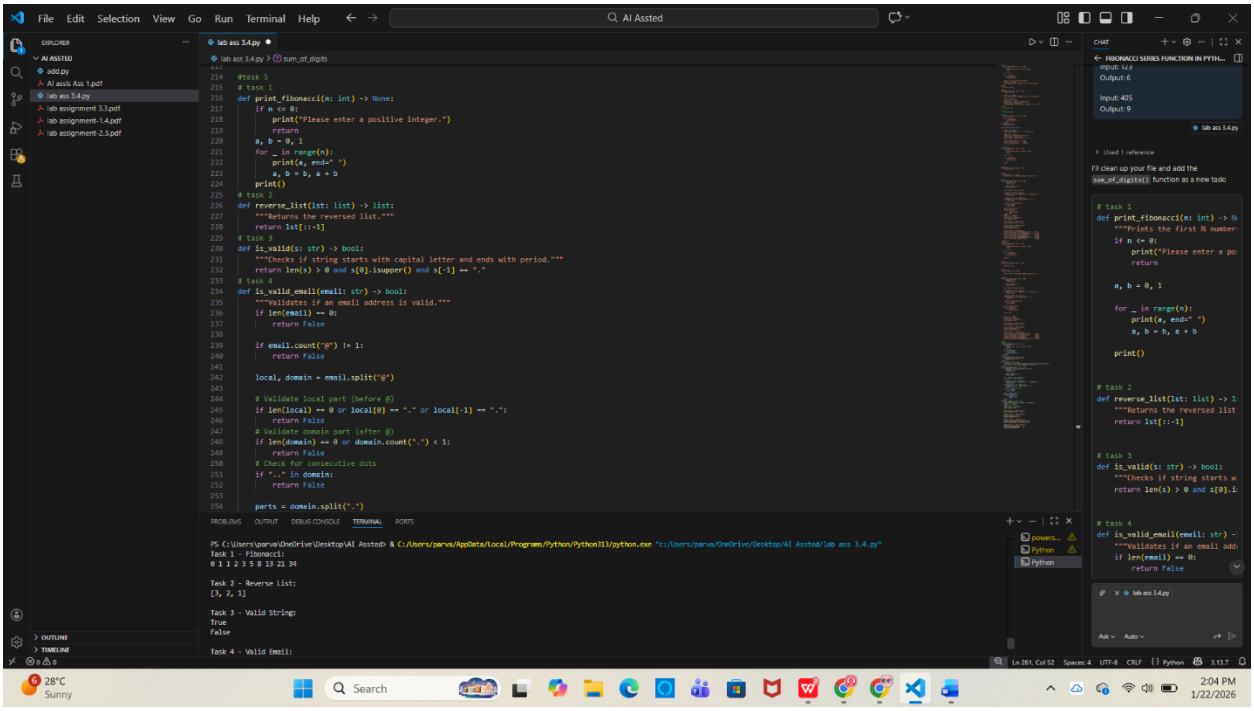
Expected Output #5

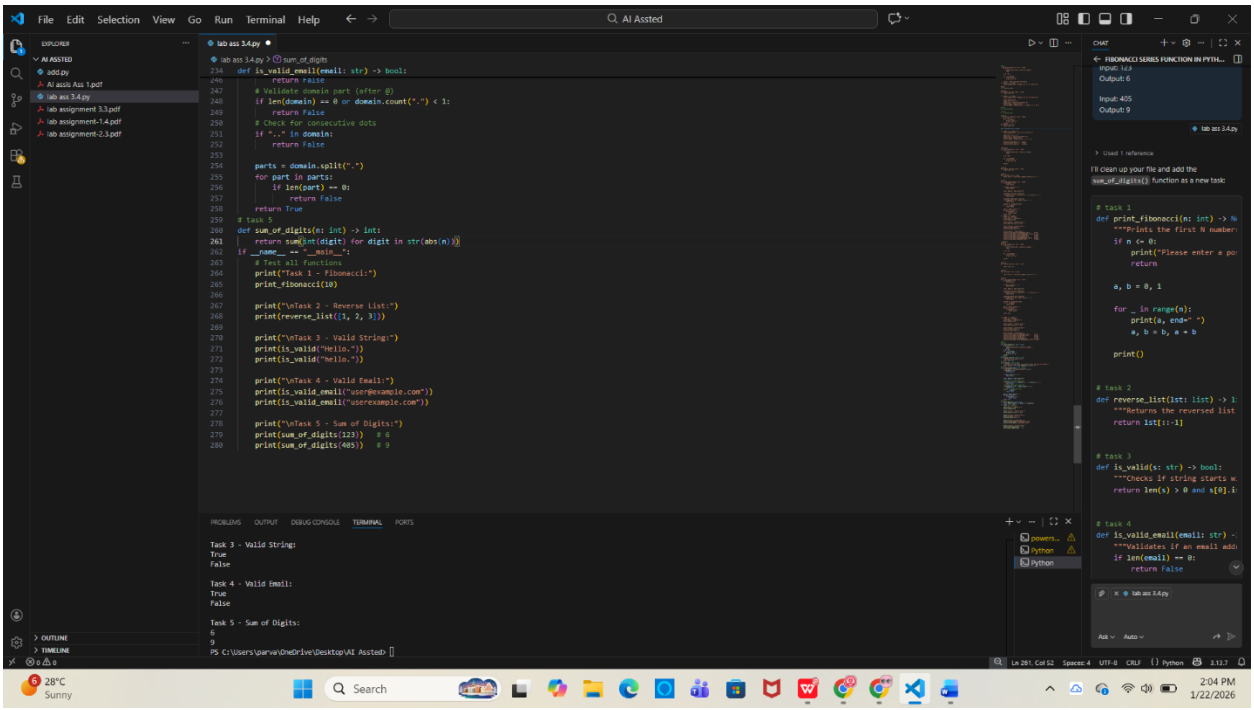
• Two versions of the sum_of_digits() function.

• Example Output: sum_of_digits(123) → 6

• Short analysis: which prompt produced cleaner or more

optimized code and why?


File Edit Selection View Go Run Terminal Help
AI Assted
lab ass 3.4.py
#task 5
# task 1
def print_fibonacci(n: int) -> None:
if n <= 0:
print("Please enter a positive integer.")
return
a, b = 0, 1
for _ in range(n):
print(a, end=" ")
a, b = b, a + b
print()
# task 2
def reverse_list(lst: list) -> list:
"""Returns the reversed list."""
return lst[::-1]
# task 3
def is_valid(s: str) -> bool:
"""Checks if string starts with capital letter and ends with period."""
return len(s) > 0 and s[0].isupper() and s[-1] == "."
# task 4
def is_valid_email(email: str) -> bool:
"""Validates if an email address is valid."""
if len(email) == 0:
return False
if email.count("@") != 1:
return False
local, domain = email.split("@")
# Validate local part (before @)
if len(local) == 0 or local[0] == "." or local[-1] == ".":
return False
# Validate domain part (after @)
if len(domain) == 0 or domain.count(".") < 1:
return False
# Check for consecutive dots
if ".." in domain:
return False
parts = domain.split(".")
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
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/lab ass 3.4.py"
Task 1 - Fibonacci:
0 1 1 2 3 5 8 13 21 34
Task 2 - Reverse List:
[3, 2, 1]
Task 3 - Valid String:
True
False
Task 4 - Valid Email:
CHAT
FIBONACCI SERIES FUNCTION IN PYTH...
Output: 6
Input: 405
Output: 9
lab ass 3.4.py
Used 1 reference
I'll clean up your file and add the sum_of_digits() function as a new task:
28°C
Sunny
Search
2:04 PM
1/22/2026


File Edit Selection View Go Run Terminal Help
AI Assted
lab ass 3.4.py
def is_valid_email(email: str) -> bool:
return False
# Validate domain part (after @)
if len(domain) == 0 or domain.count(".") < 1:
return False
# Check for consecutive dots
if ".." in domain:
return False
parts = domain.split(".")
for part in parts:
if len(part) == 0:
return False
return True
# task 5
def sum_of_digits(n: int) -> int:
return sum(int(digit) for digit in str(abs(n)))
if __name__ == "__main__":
# Test all functions
print("Task 1 - Fibonacci:")
print_fibonacci(10)
print("\nTask 2 - Reverse List:")
print(reverse_list([1, 2, 3]))
print("\nTask 3 - Valid String:")
print(is_valid("Hello."))
print(is_valid("hello."))
print("\nTask 4 - Valid Email:")
print(is_valid_email("user@example.com"))
print(is_valid_email("userexample.com"))
print("\nTask 5 - Sum of Digits:")
print(sum_of_digits(123)) # 6
print(sum_of_digits(405)) # 9
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Task 3 - Valid String:
True
False
Task 4 - Valid Email:
True
False
Task 5 - Sum of Digits:
6
9
PS C:\Users\parva\OneDrive\Desktop\AI Assted>
CHAT
FIBONACCI SERIES FUNCTION IN PYTH...
Output: 6
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Output: 9
lab ass 3.4.py
Used 1 reference
I'll clean up your file and add the sum_of_digits() function as a new task:
28°C
Sunny
Search
2:04 PM
1/22/2026