

Assignment – 2.2

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Roll Number: 2303A51184

Batch - 03

AI Assisted Coding

13-01-2026

Task 1: Cleaning Sensor Data

❖ Scenario:

❖ You are cleaning IoT sensor data where negative values are invalid.

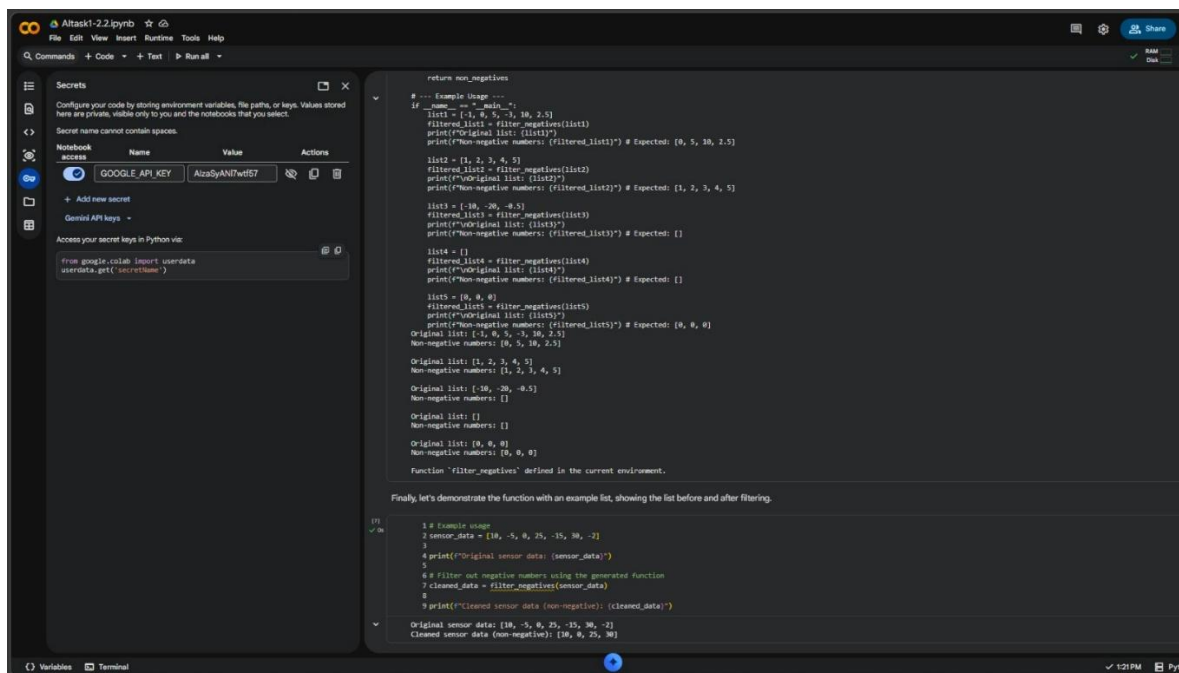
❖ Task:

Use Gemini in Colab to generate a function that filters out all negative numbers from a list.

❖ Expected Output:

➤ Before/after list

➤ Screenshot of Colab execution



```
def filter_negatives(list):  
    """  
    A function that filters out all negative numbers from a list.  
    """  
    non_negative_numbers = []  
    for num in list:  
        if num >= 0:  
            non_negative_numbers.append(num)  
    return non_negative_numbers  
  
# --- Example Usage ---  
if __name__ == '__main__':  
    list1 = [-1, 0, 5, -3, 10, 2.5]  
    filtered_list1 = filter_negatives(list1)  
    print(f"Original list: {list1}")  
    print(f"Non-negative numbers: {filtered_list1}") # Expected: [0, 5, 10, 2.5]  
  
    list2 = [1, 2, 3, 4, 5]  
    filtered_list2 = filter_negatives(list2)  
    print(f"Original list: {list2}")  
    print(f"Non-negative numbers: {filtered_list2}") # Expected: [1, 2, 3, 4, 5]  
  
    list3 = [-10, -20, -0.5]  
    filtered_list3 = filter_negatives(list3)  
    print(f"Original list: {list3}")  
    print(f"Non-negative numbers: {filtered_list3}") # Expected: []  
  
    list4 = []  
    filtered_list4 = filter_negatives(list4)  
    print(f"Original list: {list4}")  
    print(f"Non-negative numbers: {filtered_list4}") # Expected: []  
  
    list5 = [0, 0, 0]  
    filtered_list5 = filter_negatives(list5)  
    print(f"Original list: {list5}")  
    print(f"Non-negative numbers: {filtered_list5}") # Expected: [0, 0, 0]  
  
    Original list: [-1, 0, 5, -3, 10, 2.5]  
    Non-negative numbers: [0, 5, 10, 2.5]  
  
    Original list: [1, 2, 3, 4, 5]  
    Non-negative numbers: [1, 2, 3, 4, 5]  
  
    Original list: [-10, -20, -0.5]  
    Non-negative numbers: []  
  
    Original list: []  
    Non-negative numbers: []  
  
    Original list: [0, 0, 0]  
    Non-negative numbers: [0, 0, 0]  
  
    Function "filter_negatives" defined in the current environment.  
  
Finally, let's demonstrate the function with an example list, showing the list before and after filtering.  
  
In [ ]:  
# Example usage  
1 sensor_data = [10, -5, 0, 25, -15, 30, -2]  
2  
3  
4 print(f"Original sensor data: {sensor_data}")  
5  
6 # Filter out negative numbers using the generated function  
7 cleaned_data = filter_negatives(sensor_data)  
8  
9 print(f"Cleaned sensor data (non-negative): {cleaned_data}")  
  
Original sensor data: [10, -5, 0, 25, -15, 30, -2]  
Cleaned sensor data (non-negative): [10, 0, 25, 30]
```

Altask1-2.2.ipynb

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Secrets

Configure your code by storing environment variables, file paths, or keys. Values stored here are private, visible only to you and the notebooks that you select.

Secret name cannot contain spaces.

Notebook access	Name	Value	Actions
	GOOGLE_API_KEY	AlraSyANi7wdf57	

+ Add new secret

Gemini API keys -

Access your secret keys in Python via:

```
from google.cloud import userdata
userdata.get('secretName')
```

```
1 prompt = "Write a Python function called 'filter_negatives' that takes a list of numbers as input and returns a new list containing only the non-negative numbers. Include a docstring."
2
3 # The previous errors indicated that specific models ('gemini-1.5-flash', 'gemini-pro') were not found or supported for generateContent.
4 # To resolve this, we will dynamically find a model that supports 'generateContent'.
5
6 # Find an available model that supports generateContent
7 selected_model_name = None
8 for m in gemini_list_models():
9     if 'generateContent' in m.supported_generation_methods:
10         selected_model_name = m.name
11         break
12
13 if selected_model_name:
14     gemini_model = gemini.GenerativeModel(selected_model_name)
15     print(f"Re-initialized Gemini model with dynamically selected model: '{selected_model_name}'.")
16 else:
17     raise ValueError("No Gemini model supporting 'generateContent' found.")
18
19 response = gemini_model.generate_content(prompt)
20
21 # Extract the generated code from the response
22 generated_code = response.text.strip().strip('python').strip()
23
24 print("Generated Function:\n")
25 print(generated_code)
26
27 # Execute the generated code to define the function
28 exec(generated_code)
29
30 print(f"Function 'filter_negatives' defined in the current environment.")
31
32 Re-initialized Gemini model with dynamically selected model: 'models/gemini-1.5-flash'.
33 Generated function:
34
35 def filter_negatives(numbers_list):
36     """
37     Filters a list of numbers, returning a new list containing only the non-negative numbers.
38     Non-negative numbers include zero and all positive numbers.
39
40     Args:
41         numbers_list (list): A list of numbers (integers or floats).
42
43     Returns:
44         list: A new list containing only the non-negative numbers from the input list.
45         Returns an empty list if no non-negative numbers are found or if the input list is empty.
46     """
47     non_negatives = []
48     for number in numbers_list:
49         if number >= 0:
50             non_negatives.append(number)
51     return non_negatives
52
53 # --- Example Usage ---
54 if __name__ == "__main__":
55     list1 = [-5, 0, 5, -2, 10, 2.5]
56     filtered_list = filter_negatives(list1)
57     print(f"Original list: {list1}")
58     print(f"Non-negative numbers: {filtered_list}") # Expected: [0, 5, 10, 2.5]
```

Variables Terminal

12:14 PM Py

Altask1-2.2.ipynb

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Gemini API keys -

Access your secret keys in Python via:

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```

```
1 Start coding or interacting with AI.
2
3 1 Import the Python SDK
4 2 Import google.generativeai as genai
5 3 Use to securely store your API key
6 4 from google.cloud import userdata
7
8 # Retrieve the API key from Colab's secrets manager
9 GOOGLE_API_KEY=userdata.get('GOOGLE_API_KEY')
10 genai.configure(api_key=GOOGLE_API_KEY)
11
12 print("Gemini API configured successfully!")
13
14 Gemini API configured successfully!
15
16 Now, let's initialize the Generative Model to use it for generating the function.
17
18 1 Initialize the Gemini API
19 2 gemini_model = genai.GenerativeModel('gemini-1.5-flash')
20 3
21 4 print("Gemini model initialized.")
22
23 Gemini model initialized.
24
25 Now, let's ask Gemini to generate a Python function that filters out negative numbers from a list.
26
27 1 prompt = "Write a Python function called 'filter_negatives' that takes a list of numbers as input and returns a new list containing only the non-negative numbers. Include a docstring."
28 2
29 3 # The previous errors indicated that specific models ('gemini-1.5-flash', 'gemini-pro') were not found or supported for generateContent.
30 4 # To resolve this, we will dynamically find a model that supports 'generateContent'.
31 5
32 6 # Find an available model that supports generateContent
33 7 selected_model_name = None
34 8 for m in gemini_list_models():
35 9     if 'generateContent' in m.supported_generation_methods:
36 10         selected_model_name = m.name
37 11         break
38 12
39 13 if selected_model_name:
40 14     gemini_model = genai.GenerativeModel(selected_model_name)
41 15     print(f"Re-initialized Gemini model with dynamically selected model: '{selected_model_name}'.")
42 16 else:
43 17     raise ValueError("No Gemini model supporting 'generateContent' found.")
44 18
45 19 response = gemini_model.generate_content(prompt)
46 20
47 21 # Extract the generated code from the response
48 22 generated_code = response.text.strip().strip('python').strip()
49 23
50 24 print("Generated Function:\n")
51 25 print(generated_code)
52 26
53 27 # Execute the generated code to define the function
```

To undo cell deletion use Ctrl+M Z or the Undo option in the Edit menu

12:14 PM Py

Altask1-2.2.py:nb

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```
from google.colab import userdata
userdata.get('secretsname')
```

```
... returns an empty list if no non-negative numbers are found or if the input list is empty.

non_negatives = []
for number in numbers_list:
    if number >= 0:
        non_negatives.append(number)
return non_negatives

# --- Example Usage ---
if __name__ == '__main__':
    list1 = [-4, 0, 5, -3, 10, 2.5]
    filtered_list1 = filter_negatives(list1)
    print(f"Original list: {list1}")
    print(f"Non-negative numbers: {filtered_list1}") # Expected: [0, 5, 10, 2.5]

    list2 = [1, 2, 3, 4, 5]
    filtered_list2 = filter_negatives(list2)
    print(f"Original list: {list2}")
    print(f"Non-negative numbers: {filtered_list2}") # Expected: [1, 2, 3, 4, 5]

    list3 = [-10, -20, -0.5]
    filtered_list3 = filter_negatives(list3)
    print(f"Original list: {list3}")
    print(f"Non-negative numbers: {filtered_list3}") # Expected: []

    list4 = []
    filtered_list4 = filter_negatives(list4)
    print(f"Original list: {list4}")
    print(f"Non-negative numbers: {filtered_list4}") # Expected: []

    list5 = [0, 0, 0]
    filtered_list5 = filter_negatives(list5)
    print(f"Original list: {list5}")
    print(f"Non-negative numbers: {filtered_list5}") # Expected: [0, 0, 0]

    Original list: [-1, 0, 5, -3, 10, 2.5]
    Non-negative numbers: [0, 5, 10, 2.5]

    Original list: [1, 2, 3, 4, 5]
    Non-negative numbers: [1, 2, 3, 4, 5]

    Original list: [-10, -20, -0.5]
    Non-negative numbers: []

Finally, let's demonstrate the function with an example list, showing the list before and after filtering.

1 # Example usage
2 sensor_data = [10, -5, 0, 25, -15, 30, -2]
3
4 print(f"Original sensor data: {sensor_data}")
5
6 # Filter out negative numbers using the generated function
7 cleaned_data = filter_negatives(sensor_data)
8
9 print(f"Cleaved sensor data (non-negative): {cleaned_data}")

Original sensor data: [10, -5, 0, 25, -15, 30, -2]
Cleaned sensor data (non-negative): [10, 0, 25, 30]
```

Variables Terminal

Altask1-2.2.py:nb

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Genini API keys

Access your secret keys in Python via:

```
from google.colab import userdata
userdata.get('secretsname')
```

```
Now, let's ask Gemini to generate a Python function that filters out negative numbers from a list.

1 prompt = "Write a Python function called 'filter_negatives' that takes a list of numbers as input and returns a new list containing only the non-negative numbers. Include a docstring."
2
3 # The previous errors indicated that specific models ('gemini-1.5-flash', 'gemini-pro') were not found or supported for generateContent.
4 # To resolve this, we will dynamically find a model that supports 'generateContent'.
5
6 # Find an available model that supports generateContent
7 selected_model_name = None
8 for m in genai.list_models():
9     if 'generateContent' in m.supported_generation_methods:
10         selected_model_name = m.name
11         break
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13 if selected_model_name:
14     gemini_model = genai.GenerativeModel(selected_model_name)
15     print(f"Re-initialized Gemini model with dynamically selected model: '{selected_model_name}'.")
16 else:
17     raise ValueError("No Gemini model supporting 'generateContent' found.")
18
19 response = gemini_model.generate_content(prompt)
20
21 # Extract the generated code from the response
22 generated_code = response.text.strip().strip('python').strip()
23
24 print(f"Generated function:\n")
25 print(generated_code)
26
27 # Execute the generated code to define the function
28 exec(generated_code)
29
30 print(f"Function 'filter_negatives' defined in the current environment.")

Re-initialized Gemini model with dynamically selected model: 'models/gemini-2.5-flash'.
Generated function:

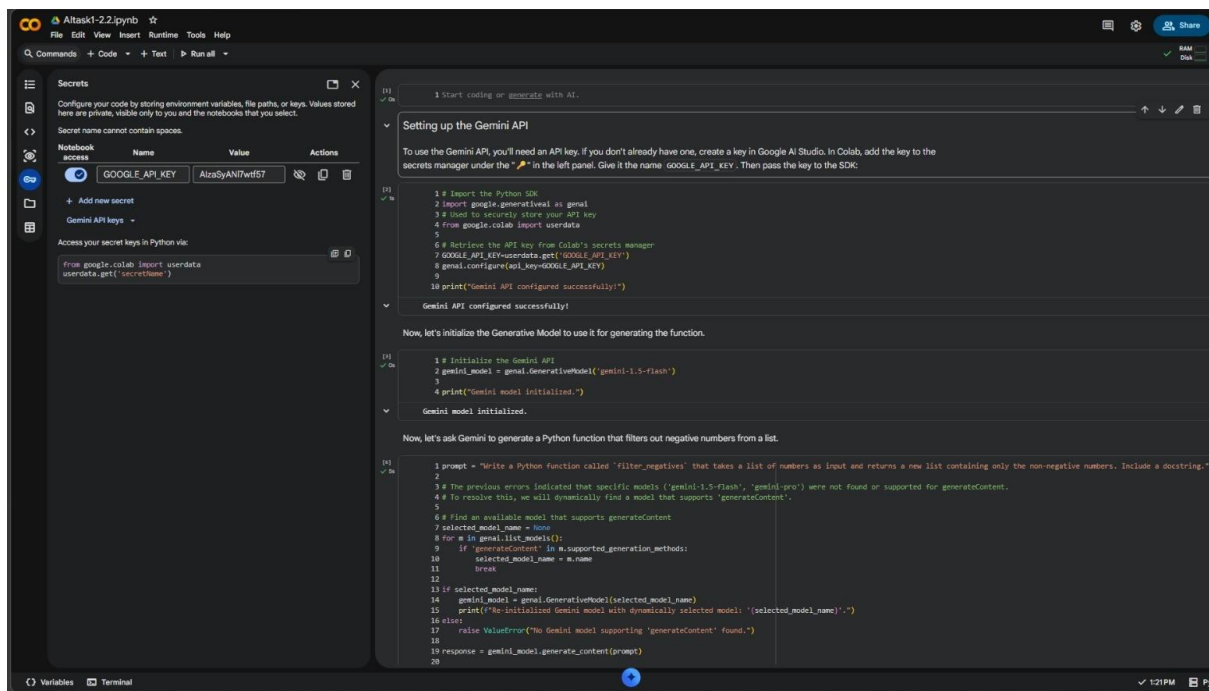
def filter_negatives(numbers_list):
    """
    Filters a list of numbers, returning a new list containing only the non-negative numbers.
    Non-negative numbers include zero and all positive numbers.

    Args:
        numbers_list (list): A list of numbers (integers or floats).

    Returns:
        list: A new list containing only the non-negative numbers from the input list.
        Returns an empty list if no non-negative numbers are found or if the input list is empty.
    """
    non_negatives = []
    for number in numbers_list:
        if number >= 0:
            non_negatives.append(number)
    return non_negatives

# --- Example Usage ---
if __name__ == '__main__':
    list1 = [-4, 0, 5, -3, 10, 2.5]
    filtered_list1 = filter_negatives(list1)
```

Variables Terminal



Task 2: String Character Analysis

❖ Scenario:

You are building a text-analysis feature.

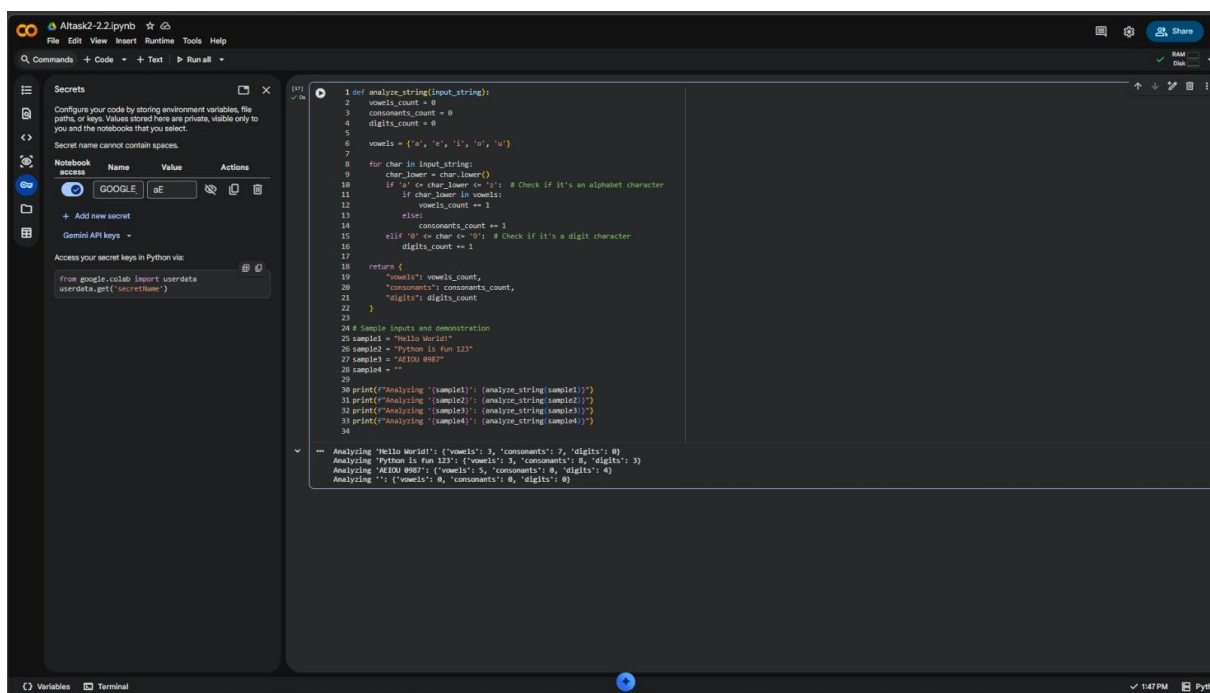
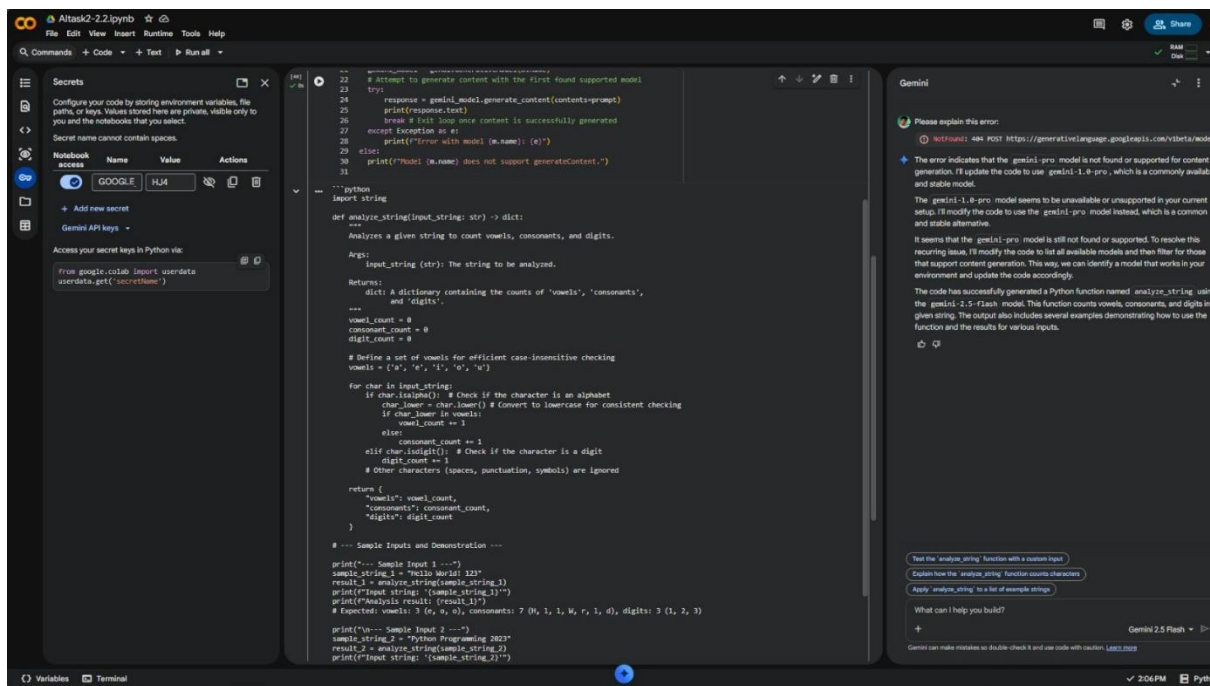
❖ Task:

Use Gemini to generate a Python function that counts vowels, consonants, and digits in a string.

❖ Expected Output:

➤ Working function

➤ Sample inputs and outputs



Task 3: Palindrome Check – Tool Comparison

❖ Scenario:

You must decide which AI tool is clearer for string logic.

❖ **Task:**

Generate a palindrome-checking function using Gemini and Copilot, then compare the results.

❖ **Expected Output:**

- Side-by-side code comparison
- Observations on clarity and structure

Feature	Google Gemini (Colab)	GitHub Copilot / Cursor AI
Logic Approach	Often uses <code>string == string[::-1]</code> (slicing) for simplicity.	Often provides more "robust" versions, sometimes using <code>reversed()</code> or loops.
Documentation	Provides conversational explanations and usage examples.	Provides inline docstrings and focuses on integration within the IDE.
Conciseness	Very concise, aims for readability.	Aims for production-readiness (handling edge cases like spaces/case).

Task 4: Code Explanation Using AI

❖ **Scenario:**

You are reviewing unfamiliar code written by another developer.

❖ **Task:**

Ask Gemini to explain a Python function (prime check OR palindrome check) line by line.

❖ Expected Output:

➤ Code snippet

➤ AI explanation

➤ Student comments on understanding

```
C:\Users> cd > AppData\Local> Packages > 5319275A.WhatsAppDesktop_cvg1qvgaygm > LocalState > sessions > CBF976C8D93CAF1F8438D7A26384F8B9EDC9C > transfers > 2026-02 > @ assign-22303A5111B-copilotay > ...
1 | # Test: is_palindrome Check
2 | def is_palindrome(s):
3 |     cleaned = ''.join(c.lower() for c in s if c.isalnum())
4 |     return cleaned == cleaned[::-1]
5 | # Test cases
6 | print(is_palindrome("a man a plan a canal Panama")) # True
7 | print(is_palindrome("race a car")) # False
8 | # Comparison: Gemini AI vs Copilot
9 | # Coding Performance:
10 | - Copilot is generally better integrated into IDEs for fast code suggestions and developer workflows.
11 | - Gemini can generate code too, but tends to be slower and broader-focused rather than as tightly embedded into editor workflows.
12 | Winner for pure coding speed: Copilot
13 |
14 | # Context & Reasoning:
15 | - Gemini excels at deep reasoning, large context understanding (docs + code + research), and handling multimodal inputs like images/diagrams.
16 | - Copilot is optimized for shorter, code-centric tasks within text editors.
17 | Winner for complex tasks: Gemini
18 |
19 | # Integration & Workflow:
20 | - Copilot works directly in popular editors with minimal setup.
21 | - Gemini can integrate through CLI or APIs and into Google's ecosystem, but isn't as IDE-native by default (though integrations are growing).
22 | Winner for seamless coding experience: Copilot
23 |
24 | # Multimodal & General Intelligence:
25 | - Gemini supports multimodal input (text, visuals) and broader tasks like research, explanations, documentation, strategy, etc.
26 | - Copilot focuses on code generation and in-editor support only.
27 | Winner for versatility: Gemini
28 |
29 | # Pricing & Value
30 |
31 | - Copilot is usually around $10/mo for individuals and integrated deeply with GitHub tools.
32 | - Gemini varies by plan but often comes bundled with Google services (Cloud, Workspace), and free tiers like Gemini CLI offer generous daily usage.
33 | Winner depends on budget & ecosystem needs
34 |
35 | # So Which One Is Better?
36 | Use Case / Better Choice:
37 | - Daily coding, fast suggestions inside your editor: GitHub Copilot
38 | - Complex tasks: reasoning, docs, long projects, multimodal input: Google Gemini
39 | - Working within GitHub & developer workflow: Copilot
40 | - Handling diverse non-code tasks or big context workflows: Gemini
41 |
42 | # Many developers actually use both:
43 | - Copilot for IDE coding speed.
44 | - Gemini for deep questions, research, design docs, and multimodal tasks.
45 |
46 | # Quick Summary
47 |
48 | - Copilot: Best code-focused assistant with strong editor integration and real-time code generation.
49 | - Gemini: Best general AI partner for big-picture thinking, multimodal understanding, and broad tasks beyond code.
```