Assignment – 2.2

Name:K.Manideep

Roll Number: 2303A51192

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.

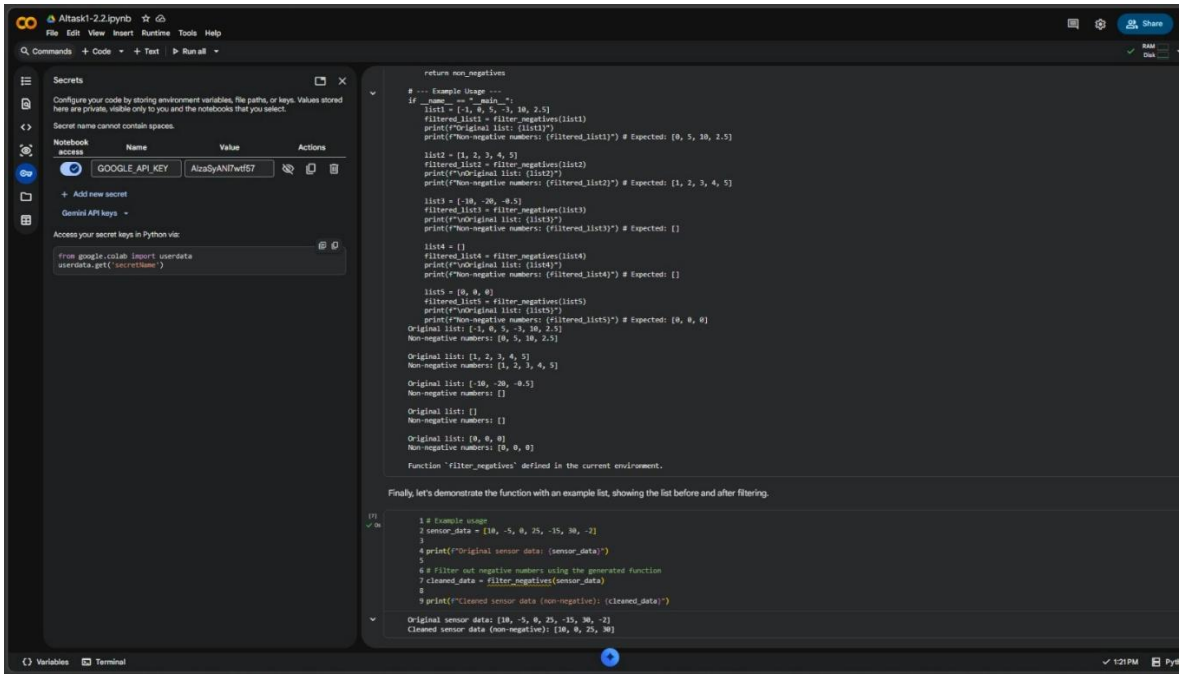
❖ Task:

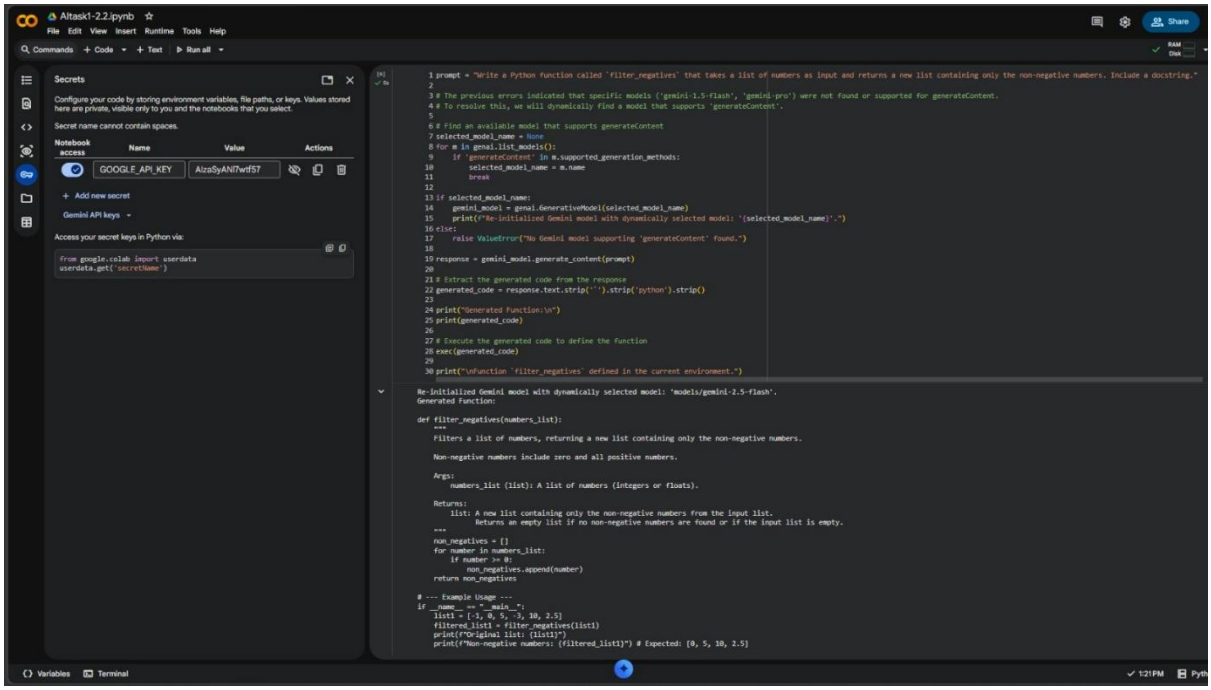
Use Gemini in Colab to generate a function that filters out all negative numbers from a list.

❖ Expected Output:

➢ Before/after list

➢ Screenshot of Colab execution

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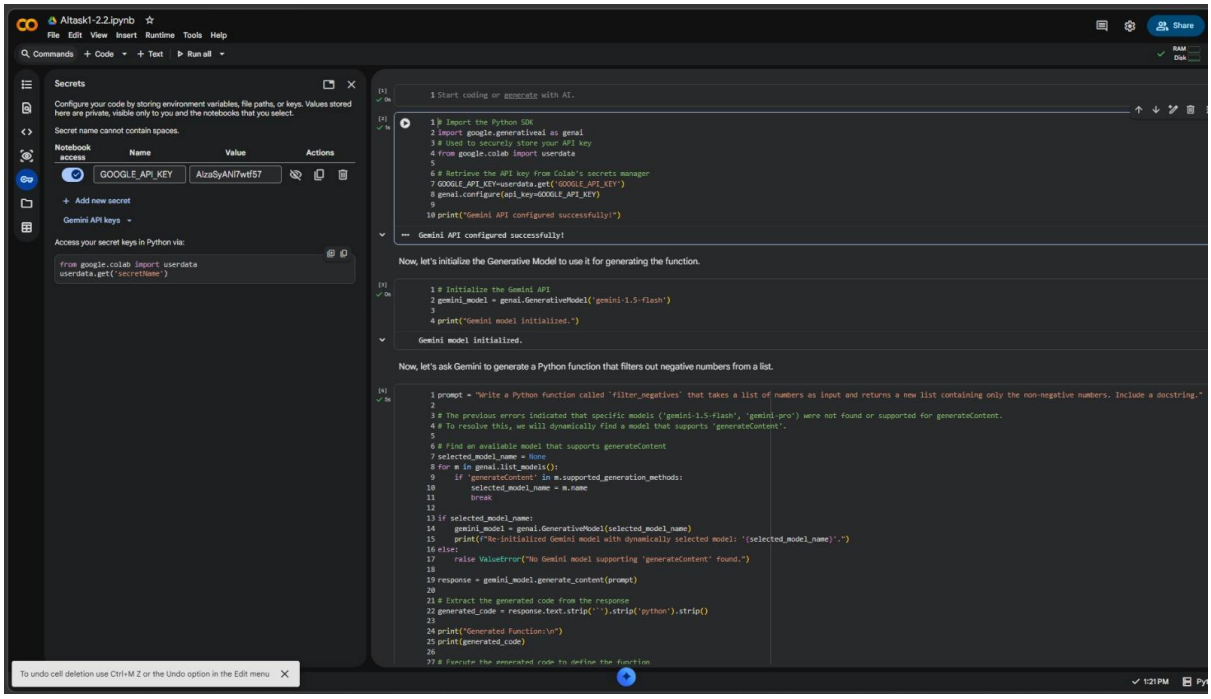
Add new secret
Gemini API keys
Access your secret keys in Python via:
from google.colab import userdata
userdata.get('secretName')
prompt = "Write a Python function called `filter_negatives` that takes a list of numbers as input and returns a new list containing only the non-negative numbers. Include a docstring."
# The previous errors indicated that specific models ('gemini-1.5-flash', 'gemini-pro') were not found or supported for generateContent.
# To resolve this, we will dynamically find a model that supports 'generateContent'.
# Find an available model that supports generateContent
selected_model_name = None
for m in genai.list_models():
if 'generateContent' in m.supported_generation_methods:
selected_model_name = m.name
break
if selected_model_name:
gemini_model = genai.GenerativeModel(selected_model_name)
print(f"Re-initialized Gemini model with dynamically selected model: '{selected_model_name}'.")
else:
raise ValueError("No Gemini model supporting 'generateContent' found.")
response = gemini_model.generate_content(prompt)
# Extract the generated code from the response
generated_code = response.text.strip('`').strip('python').strip()
print("Generated Function:\n")
print(generated_code)
# Execute the generated code to define the function
exec(generated_code)
print("\nFunction `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 = [-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]
Variables Terminal
1:21PM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Access your secret keys in Python via:
from google.colab import userdata
userdata.get('secretName')
Start coding or generate with AI.
# Import the Python SDK
import google.generativeai as genai
# Used to securely store your API key
from google.colab import userdata
# Retrieve the API key from Colab's secrets manager
GOOGLE_API_KEY=userdata.get('GOOGLE_API_KEY')
genai.configure(api_key=GOOGLE_API_KEY)
print("Gemini API configured successfully!")
Gemini API configured successfully!
Now, let's initialize the Generative Model to use it for generating the function.
# Initialize the Gemini API
gemini_model = genai.GenerativeModel('gemini-1.5-flash')
print("Gemini model initialized.")
Gemini model initialized.
Now, let's ask Gemini to generate a Python function that filters out negative numbers from a list.
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."
# The previous errors indicated that specific models ('gemini-1.5-flash', 'gemini-pro') were not found or supported for generateContent.
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break
if selected_model_name:
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print(f"Re-initialized Gemini model with dynamically selected model: '{selected_model_name}'.")
else:
raise ValueError("No Gemini model supporting 'generateContent' found.")
response = gemini_model.generate_content(prompt)
# Extract the generated code from the response
generated_code = response.text.strip('`').strip('python').strip()
print("Generated Function:\n")
print(generated_code)
# Execute the generated code to define the function
To undo cell deletion use Ctrl+M Z or the Undo option in the Edit menu
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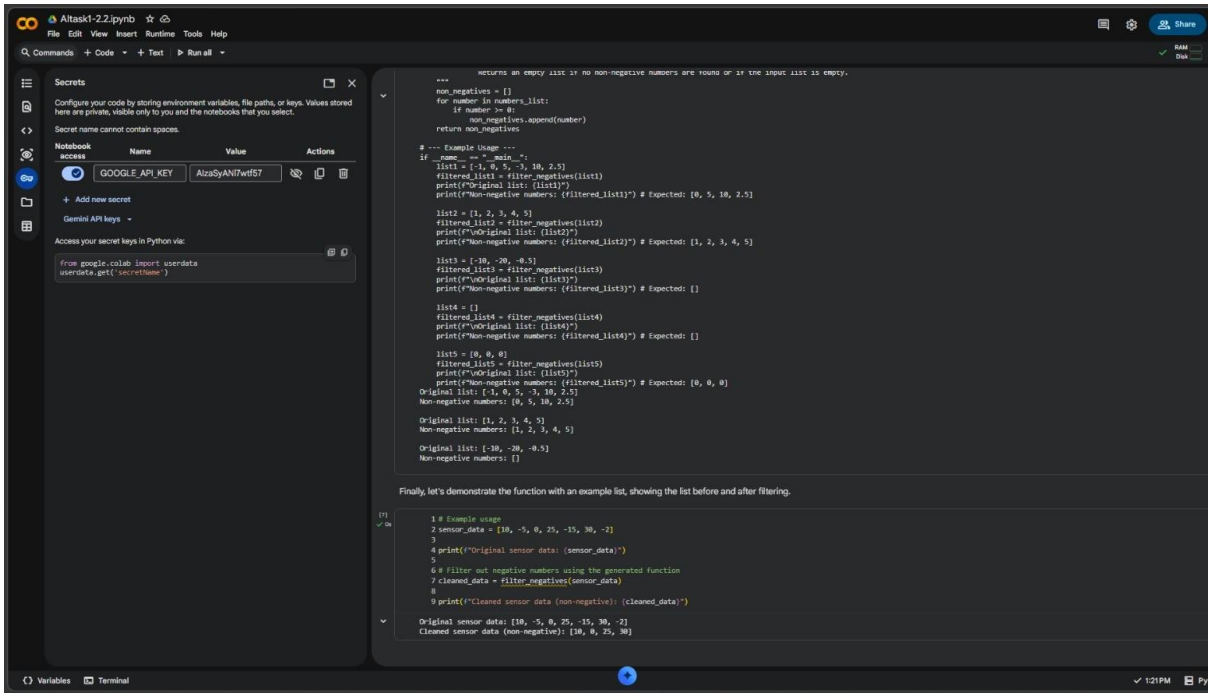
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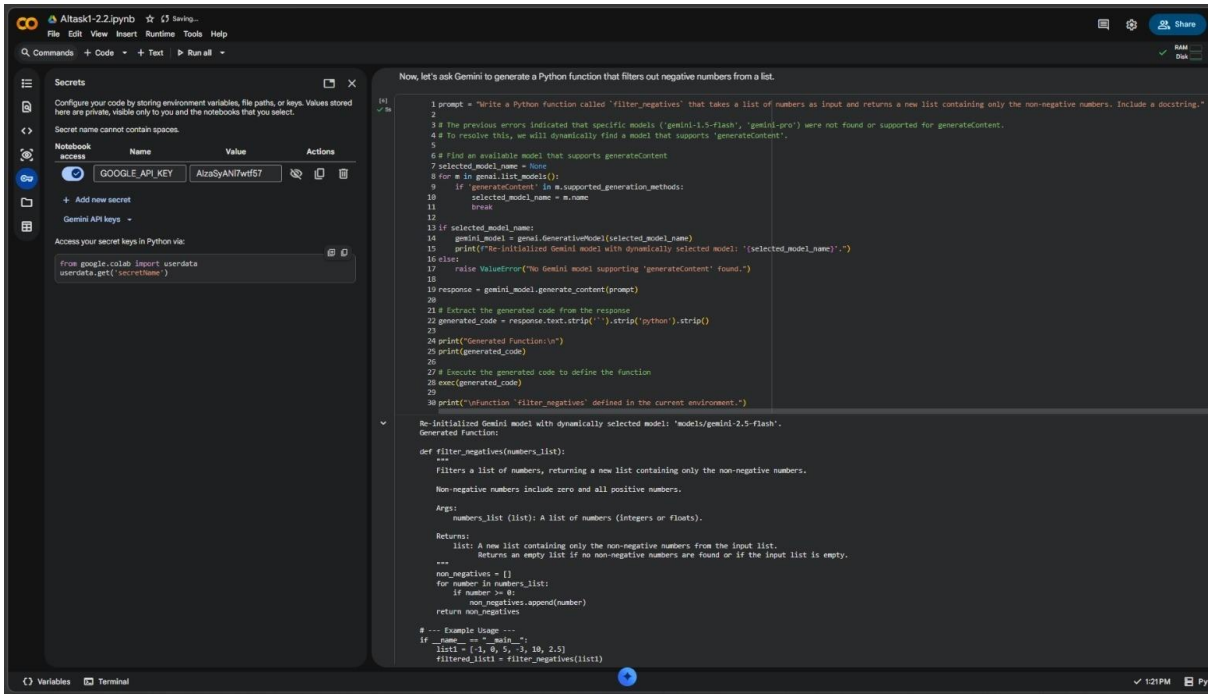
# --- Example Usage ---
if __name__ == "__main__":
list1 = [-1, 0, 5, -3, 10, 2.5]
filtered_list1 = filter_negatives(list1)
print(f"Original list: {list1}")
print(f"Non-negative numbers: {filtered_list1}") # Expected: [0, 5, 10, 2.5]
list2 = [1, 2, 3, 4, 5]
filtered_list2 = filter_negatives(list2)
print(f"\nOriginal 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"\nOriginal list: {list3}")
print(f"Non-negative numbers: {filtered_list3}") # Expected: []
list4 = []
filtered_list4 = filter_negatives(list4)
print(f"\nOriginal list: {list4}")
print(f"Non-negative numbers: {filtered_list4}") # Expected: []
list5 = [0, 0, 0]
filtered_list5 = filter_negatives(list5)
print(f"\nOriginal 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.
# Example usage
sensor_data = [10, -5, 0, 25, -15, 30, -2]
print(f"Original sensor data: {sensor_data}")
# Filter out negative numbers using the generated function
cleaned_data = filter_negatives(sensor_data)
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]
Variables Terminal
1:21PM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Variables Terminal
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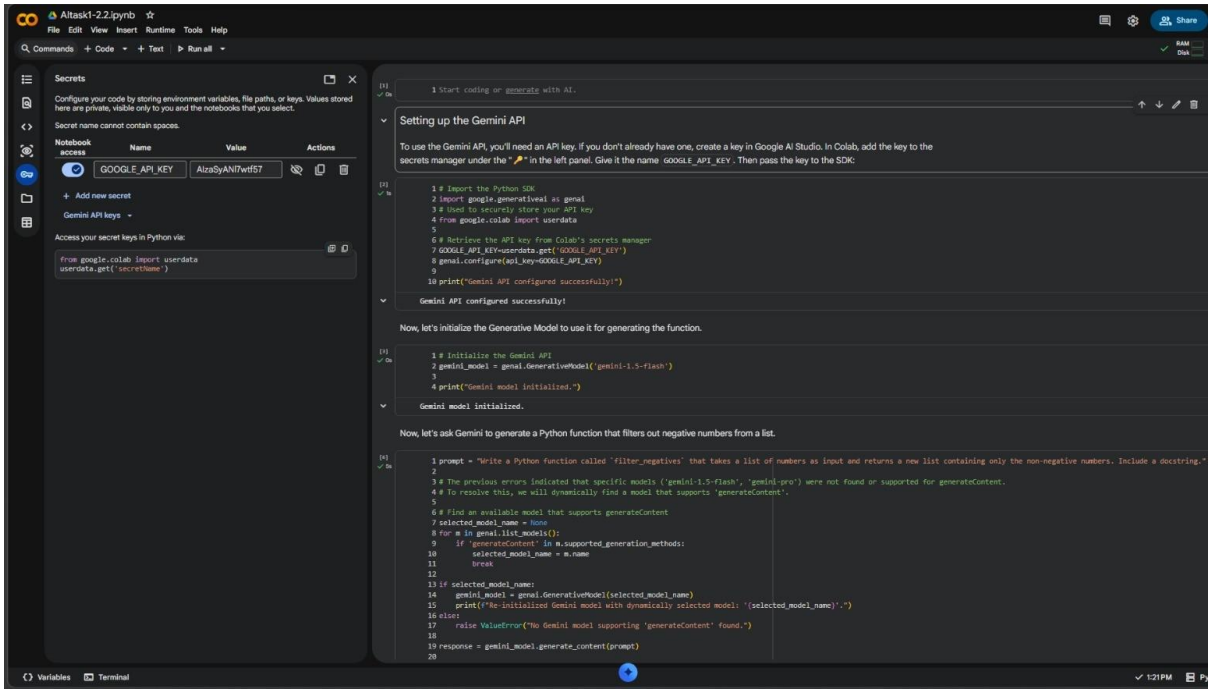


Task 2: String Character Analysis

❖ Scenario:

You are building a text-analysis feature.

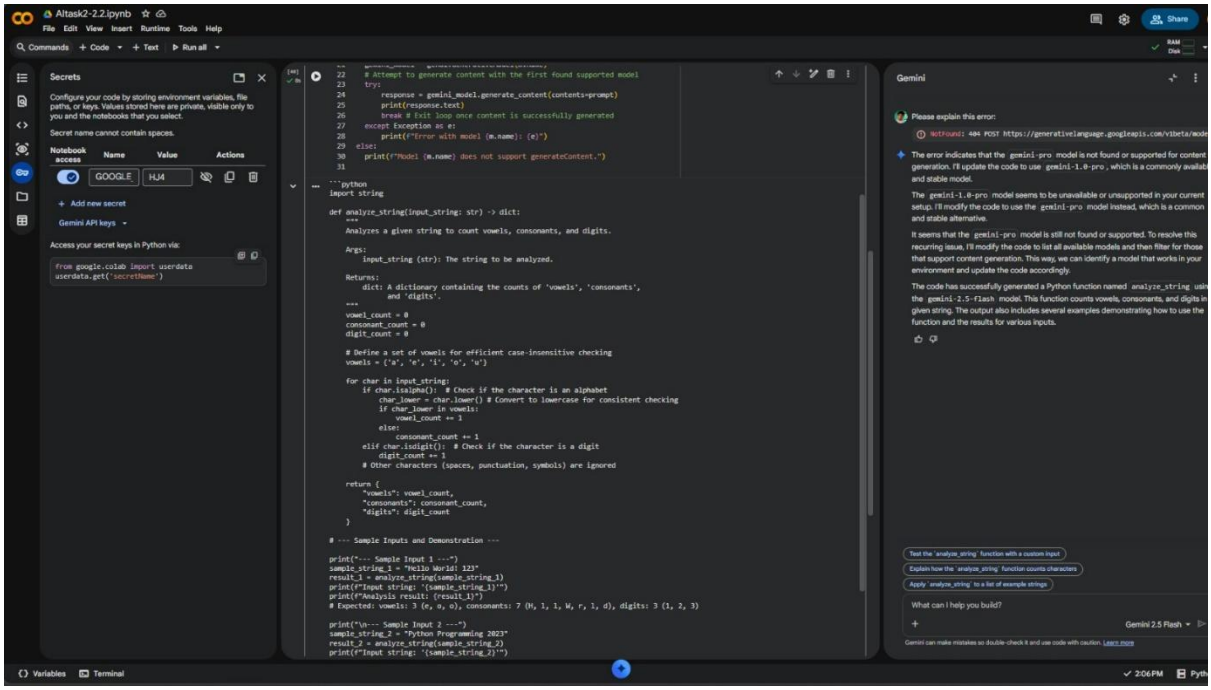
❖ Task:

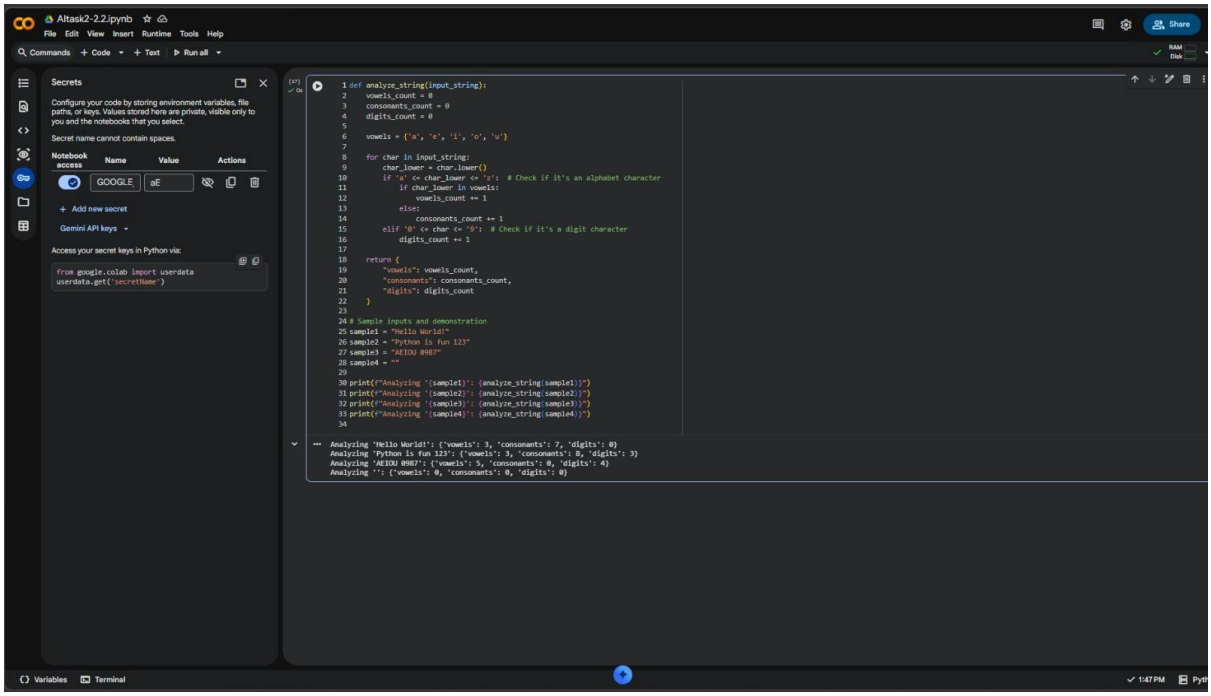
Use Gemini to generate a Python function that counts vowels, consonants, and digits in a string.

❖ 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 `string == string[::-1]` (slicing) for simplicity.	Often provides more "robust" versions, sometimes using `reversed()` 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**

```
#Task 3: Palindrome Check
def is_palindrome(s):
    cleaned = ''.join(c.lower() for c in s if c.isalnum())
    return cleaned == cleaned[::-1]
# Test cases
print(is_palindrome("A man a plan a canal Panama"))  # True
print(is_palindrome("race a car"))  # False
Comparison: Gemini AI vs Copilot:.
1.Coding Performance:
->Copilot is generally better integrated into IDEs for fast code suggestions and developer workflows.
->Gemini can generate code too, but tends to be slower and broader-focused rather than as tightly embedded into editor workflows.
Winner for pure coding speed -> Copilot

2.Context & Reasoning:
->Gemini excels at deep reasoning, large context understanding (docs + code + research), and handling multimodal inputs like images/diagrams.
->Copilot is optimized for shorter, code-centric tasks within text editors.
Winner for complex tasks -> Gemini

3.Integration & Workflow:
->Copilot works directly in popular editors with minimal setup.
->Gemini can integrate through CLI or APIs and into Google's ecosystem, but isn't as IDE-native by default (though integrations are growing).
Winner for seamless coding experience -> Copilot

4.Multimodal & General Intelligence:
->Gemini supports multimodal input (text, visuals) and broader tasks like research, explanations, documentation, strategy, etc.
->Copilot focuses on code generation and in-editor support only.
Winner for versatility -> Gemini

5.Pricing & Value

->Copilot is usually around $10/mo for individuals and integrated deeply with GitHub tools.
->Gemini varies by plan but often comes bundled with Google services (Cloud, Workspace), and free tiers like Gemini CLI offer generous daily usage.
Winner depends on budget & ecosystem needs

6.So Which One Is Better?
Use Case    Better Choice:
->Daily coding, fast suggestions inside your editor GitHub Copilot
->Complex tasks -> reasoning, docs, long projects, multimodal input  Google Gemini
->Working within GitHub & developer workflow    Copilot
->Handling diverse non-code tasks or big context workflows  Gemini

7.Many developers actually use both:
->Copilot for IDE coding speed,
->Gemini for deep questions, research, design docs, and multimodal tasks.

8.Quick Summary

->Copilot -> Best code-focused assistant with strong editor integration and real-time code generation.
->Gemini -> Best general AI partner for big-picture thinking, multimodal understanding, and broad tasks beyond code.
```