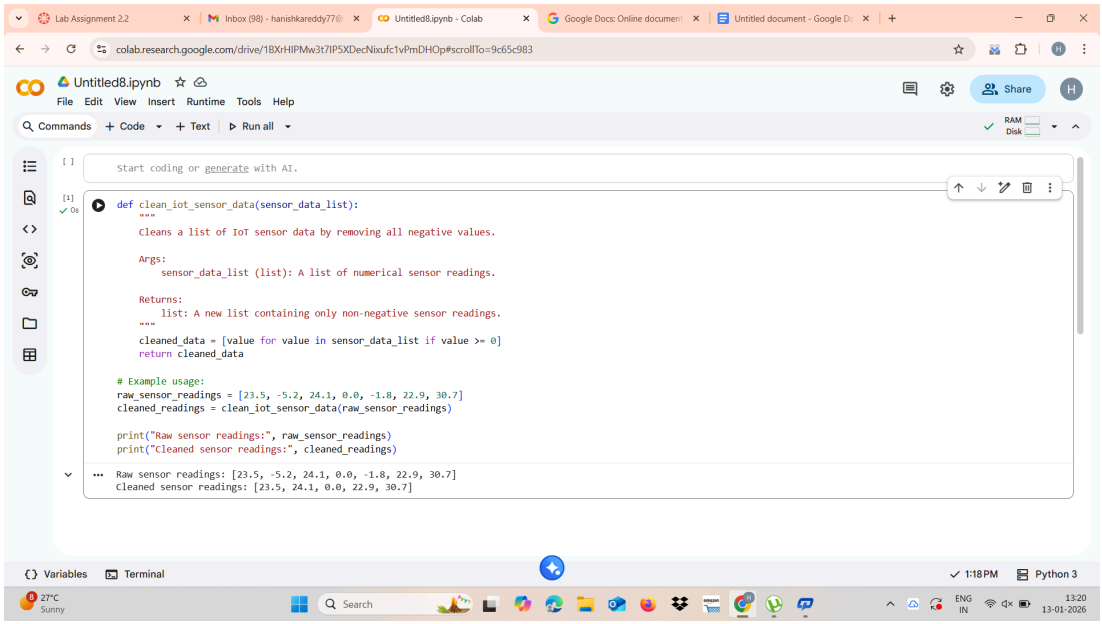
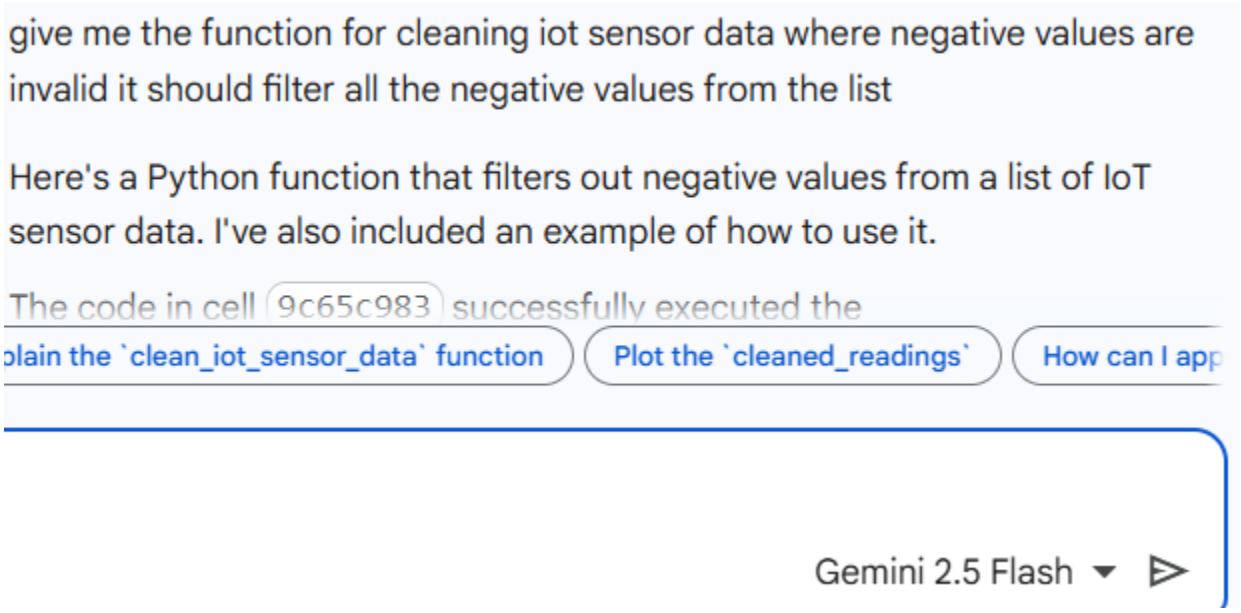
2303A51415
Batch-03
Task 1: Cleaning Sensor Data
❖ Scenario:
❖ You are cleaning IoT sensor data where negative values are invalid.
❖ Task:
Use Gemini in Colab to generate a function that filters out all negative numbers from a list.
❖ Expected Output:
➢ Before/after list
➢ Screenshot of Colab execution





Task 2: String Character Analysis

❖ Scenario:

You are building a text-analysis feature.

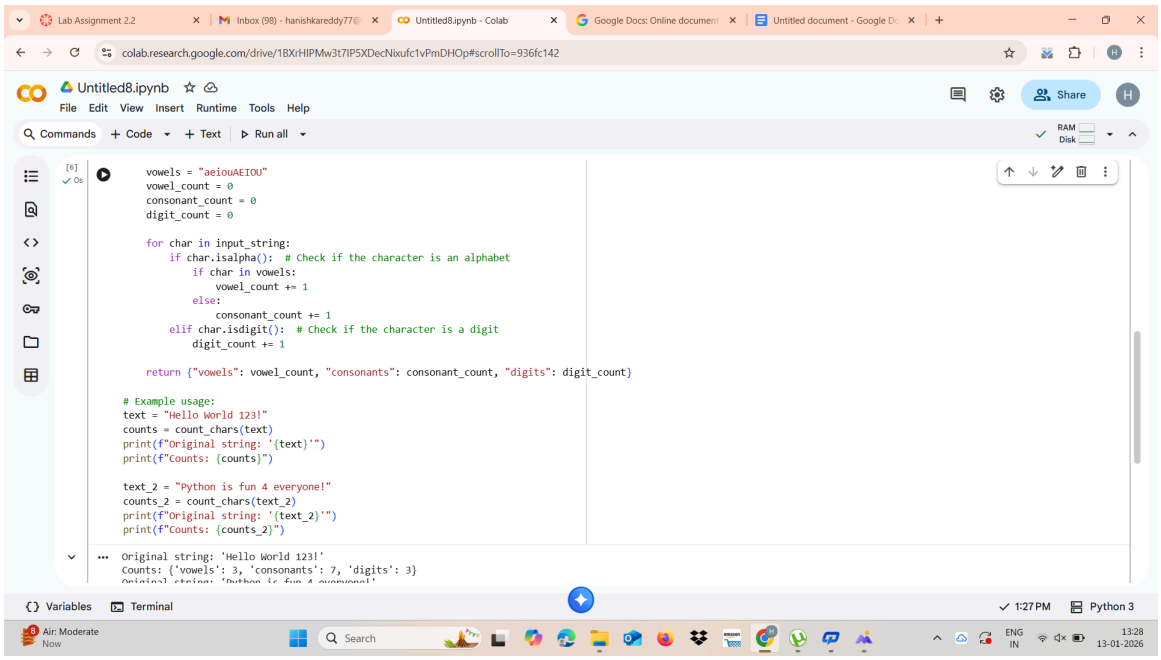
❖ Task:

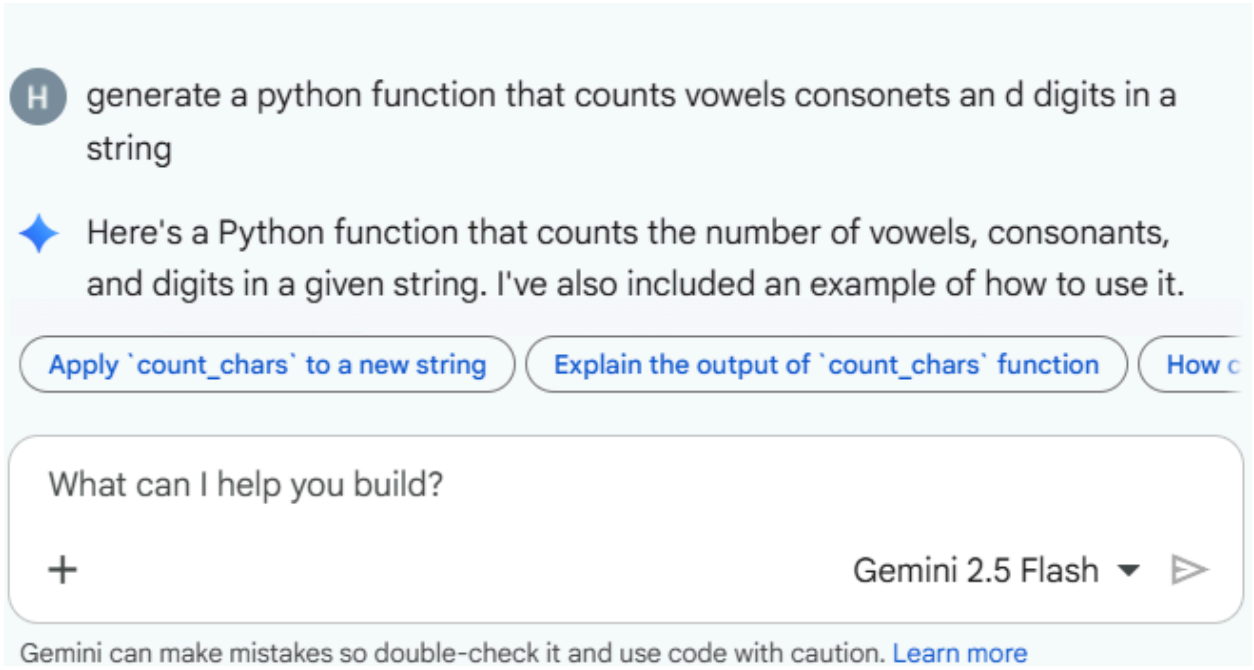
Use Gemini to generate a Python function that counts vowels, consonants, and digits in a string.

❖ 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

CODE

```
import google.generativeai as genai
import google.colab.userdata

try:
    # Configure the genai library with your API key
    GOOGLE_API_KEY = google.colab.userdata.get('GOOGLE_API_KEY')
    genai.configure(api_key=GOOGLE_API_KEY)

    # Initialize the Gemini model
    model = genai.GenerativeModel('gemini-pro')

    print("Gemini API configured and model initialized successfully.")

except google.colab.userdata.SecretNotFoundError:
    print("Error: GOOGLE_API_KEY not found in Colab secrets.")
    print("Please add your GOOGLE_API_KEY to Colab secrets to proceed.")
    print("Steps to add a secret:")
    print("1. Click on the 'key' icon (Secrets) in the left sidebar of
Google Colab.")
    print("2. Click '+ New secret'.")
    print("3. For 'Name', enter 'GOOGLE_API_KEY'.")
    print("4. For 'Value', paste your Gemini API key.")
    print("5. Ensure 'Notebook access' is toggled ON for this notebook.")
except Exception as e:
    # Catch any other unexpected errors during configuration
    print(f"An unexpected error occurred during Gemini API configuration:
{e}")
```

PROMPT

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

"""

palindrome_compare.py

Contains two palindrome checkers:
- gemini_is_palindrome: normalizes Unicode (NFKD), strips non-alphanumerics, compares reversed string
- copilot_is_palindrome: two-pointer scan, compares characters case-insensitively without Unicode normalization

A main() runs several test cases and reports where the functions disagree.
"""
from __future__ import annotations

import re
import unicodedata
from typing import List, Tuple

def gemini_is_palindrome(s: str) -> bool:
    """Gemini-style palindrome checker.

    - Normalizes Unicode using NFKD (so accented characters compare to their base letters)
    - Keeps only alphanumeric characters
    - Compares cleaned string to its reverse
    """
    if s is None:
        return False
    # Unicode normalization separates base characters from diacritics
    normalized = unicodedata.normalize("NFKD", s)
    cleaned = "".join(ch for ch in normalized if ch.isalnum()).lower()
    return cleaned == cleaned[::-1]

```
def copilot_is_palindrome(s: str) -> bool:
    """Copilot-style palindrome checker.

    - Uses two-pointer technique
    - Skips non-alphanumeric characters
    - Case-insensitive comparison
    - Does NOT perform Unicode decomposition/normalization
    """
    if s is None:
        return False
    i, j = 0, len(s) - 1
    while i < j:
        while i < j and not s[i].isalnum():
            i += 1
        while i < j and not s[j].isalnum():
            j -= 1
        if s[i].lower() != s[j].lower():
            return False
        i += 1
        j -= 1
    return True


TEST_CASES: List[Tuple[str, str]] = [
    ("", "empty string"),
    ("a", "single char"),
    ("Abba", "case-insensitive palindrome"),
    ("A man, a plan, a canal: Panama", "classic phrase"),
    ("No 'x' in Nixon", "punctuation and spaces"),
    ("Not a palindrome", "non-palindrome"),
    ("été", "accented palindrome (" + "NFKD-normalized -> 'ete'" + ")"),
    ("ÅbbaA", "accented A vs A"),
```

```
    ("😊a😊", "emoji around single letter"),
]


def main() -> None:
    print("Comparing Gemini vs Copilot palindrome checkers\n")

    mismatches = []
    for s, note in TEST_CASES:
        g = gemini_is_palindrome(s)
        c = copilot_is_palindrome(s)
        ok = g == c
        status = "MATCH" if ok else "DIFFER"
        print(f"{status:7} | Gemini: {g!s:5} | Copilot: {c!s:5} | {note:30} | {s!r}")
        if not ok:
            mismatches.append((s, note, g, c))

    print("\nSummary:")
    if not mismatches:
        print("✅ All outputs match for the test cases.")
    else:
        print(f"⚠️ Found {len(mismatches)} disagreement(s):")
        for s, note, g, c in mismatches:
            print(f" - {note}: Gemini={g} Copilot={c} for input {s!r}")


if __name__ == "__main__":
    main()
OUTPUT:
MATCH   | Gemini: True  | Copilot: True  | empty string                   | ''
MATCH   | Gemini: True  | Copilot: True  | single char                    | 'a'
MATCH   | Gemini: True  | Copilot: True  | case-insensitive palindrome    | 'Abba'
```

MATCH | Gemini: True | Copilot: True | classic phrase | 'A man, a plan, a canal: Panama'

MATCH | Gemini: True | Copilot: True | punctuation and spaces | "No 'x' in Nixon"

MATCH | Gemini: False | Copilot: False | non-palindrome | 'Not a palindrome'

MATCH | Gemini: True | Copilot: True | accented palindrome (NFKD-normalized -> 'ete') | 'été'

MATCH | Gemini: False | Copilot: False | accented A vs A | 'ÅbbaA'

MATCH | Gemini: True | Copilot: True | emoji around single letter | '😊a😊'

Summary:

✅ All outputs match for the test cases.

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

CODE

```
def is_palindrome(text):
    """
    Checks if a given string is a palindrome.

    A palindrome is a word, phrase, number, or other sequence of
characters
    which reads the same backward as forward.
    This function ignores spaces, punctuation, and capitalization.

    Args:
        text (str): The string to check.

    Returns:
        bool: True if the string is a palindrome, False otherwise.
    """
```

```
    # Remove non-alphanumeric characters and convert to lowercase
    cleaned_text = ''.join(char.lower() for char in text if
char.isalnum())

    # Compare the cleaned string with its reverse
    return cleaned_text == cleaned_text[::-1]

# Example usage:
print(f"'madam' is a palindrome: {is_palindrome('madam')}")
print(f"'A man, a plan, a canal: Panama' is a palindrome:
{is_palindrome('A man, a plan, a canal: Panama')}")
print(f"'hello' is a palindrome: {is_palindrome('hello')}")
print(f"'Racecar' is a palindrome: {is_palindrome('Racecar')}")
```

PROMPT

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