

Lab-Assignment-2.2

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Course :Ai Assistant Coding

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

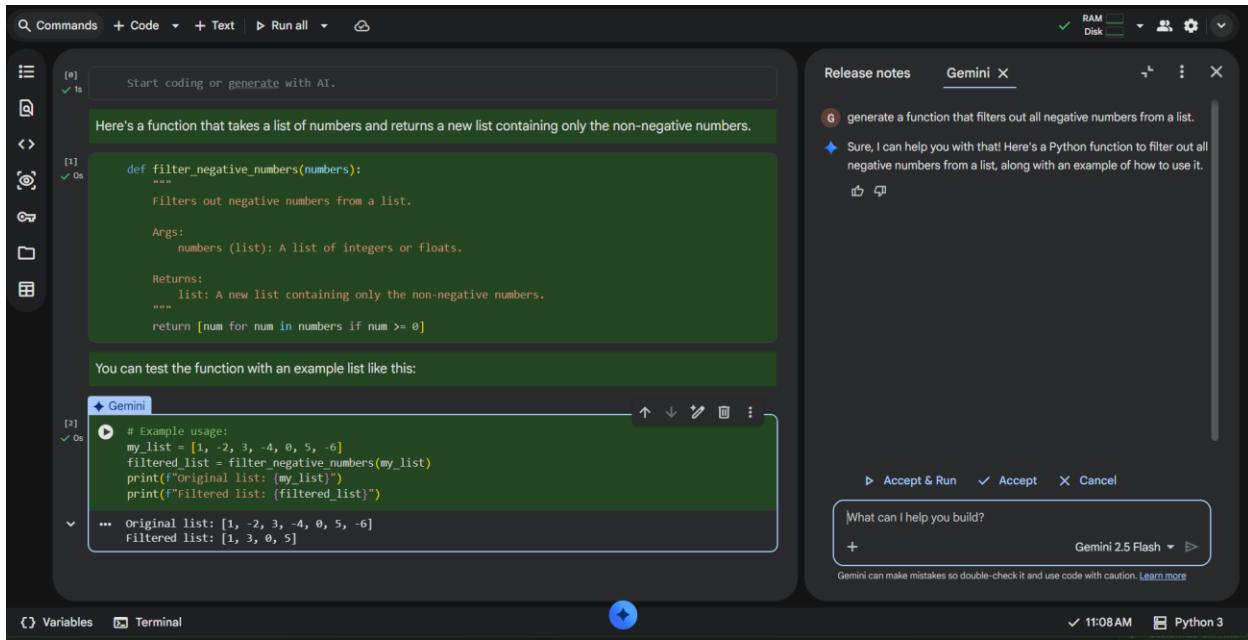
OUTPUT:

Here's a function that takes a list of numbers and returns a new list containing only the non-negative numbers.

```
▶ def filter_negative_numbers(numbers):
    """
    Filters out negative numbers from a list.

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

    Returns:
        list: A new list containing only the non-negative numbers.
    """
    return [num for num in numbers if num >= 0]
```



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,

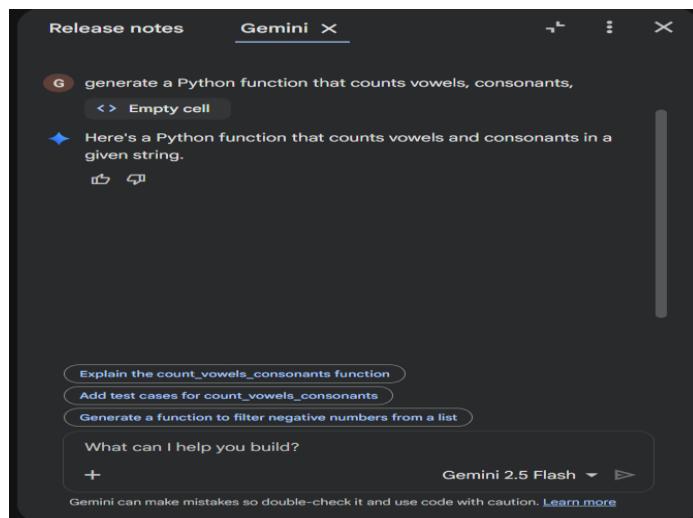
and digits in a string.

❖ Expected Output:

➤ Working function

➤ Sample inputs and outputs

OUTPUT:



```
▶ def count_vowels_consonants(text):
    """
    Counts the number of vowels and consonants in a given string.

    Args:
        text (str): The input string.

    Returns:
        dict: A dictionary containing the counts of 'vowels' and 'consonants'.
    """
    vowels = "aeiouAEIOU"
    vowel_count = 0
    consonant_count = 0

    for char in text:
        if char.isalpha(): # Check if the character is an alphabet
            if char in vowels:
                vowel_count += 1
            else:
                consonant_count += 1

    return {"vowels": vowel_count, "consonants": consonant_count}
```

```
▶ # Example usage:
my_string = "Hello World"
counts = count_vowels_consonants(my_string)
print(f"Original string: '{my_string}'")
print(f"Vowels: {counts['vowels']}")
print(f"Consonants: {counts['consonants']}")

my_string_2 = "Python Programming"
counts_2 = count_vowels_consonants(my_string_2)
print(f"\nOriginal string: '{my_string_2}'")
print(f"Vowels: {counts_2['vowels']}")
print(f"Consonants: {counts_2['consonants']}")

*** Original string: 'Hello World'
Vowels: 3
Consonants: 7

Original string: 'Python Programming'
Vowels: 4
Consonants: 13
```

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.

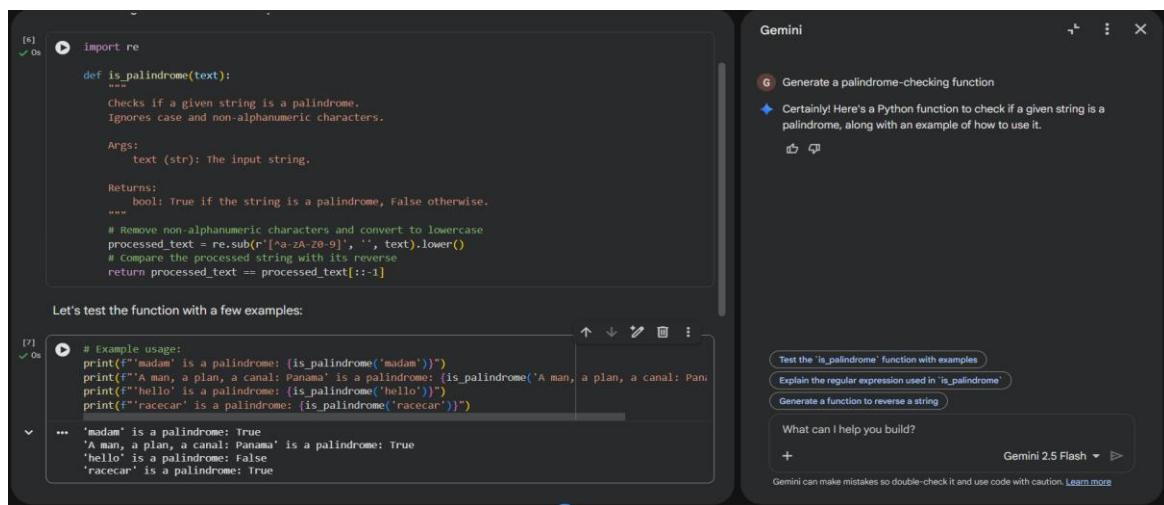
❖ Expected Output:

➤ Side-by-side code comparison

➤ Observations on clarity and structure

Output :

CODE GENERATED BY GEMINI:



The screenshot shows the Gemini AI interface. On the left, a code editor displays a Python function named `is_palindrome`. The function imports `re` and uses regular expressions to remove non-alphanumeric characters from the input string, then converts it to lowercase. It compares the processed string with its reverse. The code includes docstrings explaining the purpose, arguments, and returns. Below the code, examples are shown for strings like "madam", "A man, a plan, a canal: Panama", and "racecar". On the right, the main Gemini interface shows the prompt "Generate a palindrome-checking function" and the generated code. It also features a sidebar with options to test the function with examples, explain regular expressions, generate a reverse function, and a "What can I help you build?" section.

CODE GENERATED BY COPILOT :

```
1 #Generate a palindrome check function
2 def is_palindrome(s):
3     # Remove spaces and convert to lowercase
4     s = s.replace(" ", "").lower()
5     # Check if the string is equal to its reverse
6     return s == s[::-1]
7 # Example usage
8 print(is_palindrome("A man a plan a canal Panama")) # Output: True
9 print(is_palindrome("Hello")) # Output: False
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS GITLENS AZURE

PS C:\Users\2303a\OneDrive\Documents\3rd Year\6th sem\AI Assistant coding> & 'c:\Users\2303a\OneDrive\Documents\3rd Year\6th sem\AI Assistant coding\new.py'
True
False

Observations on Clarity

Gemini Code:

- Very clear and well-documented.
- Includes a detailed docstring explaining the function's purpose, arguments, and return value.

Copilot Code:

- Simple and easy to follow, especially for beginners.
 - Uses a short variable name s, which is functional but less descriptive.
 - Output is minimal—just True or False—with context.
-

 **Observations on Structure**

Gemini Code:

- Structured professionally with a reusable function and multiple test cases.
- Handles edge cases by removing non-alphanumeric characters and ignoring case.

Copilot Code:

- Structurally simple and compact.
- Focuses only on removing spaces and converting to lowercase.

Summary

- **Gemini's version** is more comprehensive, polished, and ready for broader use.
 - **Copilot's version** is concise and beginner-friendly, great for learning or quick testing.
-

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.

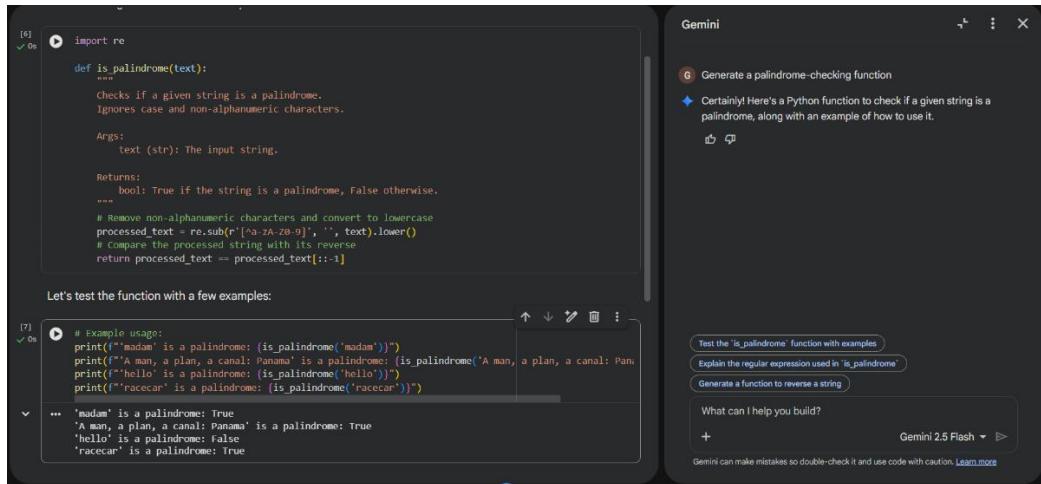
❖ Expected Output:

➤ Code snippet

➤ AI explanation

➤ Student comments on understanding

OUTPUT :



The screenshot shows a Jupyter Notebook interface with two panes. The left pane displays a Python function named `is_palindrome` and some test code. The right pane shows the Gemini AI interface with a generated response about the palindrome function.

Jupyter Notebook Cell (6):

```
import re

def is_palindrome(text):
    """
    Checks if a given string is a palindrome.
    Ignores case and non-alphanumeric characters.

    Args:
        text (str): The input string.

    Returns:
        bool: True if the string is a palindrome, False otherwise.
    """
    # Remove non-alphanumeric characters and convert to lowercase
    processed_text = re.sub(r'[^\w]', '', text).lower()
    # Compare the processed string with its reverse
    return processed_text == processed_text[::-1]

Let's test the function with a few examples:
```

Jupyter Notebook Cell (7):

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


... 'madam' is a palindrome: True
'A man, a plan, a canal: Panama' is a palindrome: True
'hello' is a palindrome: False
'racecar' is a palindrome: True
```

Gemini Response:

G Generate a palindrome-checking function
G Certainly! Here's a Python function to check if a given string is a palindrome, along with an example of how to use it.

AI Explanation :

G Explain the code line by line

◆ Certainly! Let's break down the palindrome-checking code line by line.

Cell b252d9a5 : The `is_palindrome` function

```
import re
```

This line imports the `re` module, which provides regular expression operations. It's used here to remove non-alphanumeric characters from the input string.

```
def is_palindrome(text):
```

This defines a function named `is_palindrome` that takes one argument, `text`, which is expected to be a string.

```
    """
```

```
    Checks if a given string is a palindrome.
```

```
    Ignores case and non-alphanumeric characters.
```

Args:

```
    text (str): The input string.
```

Returns:

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

This is a docstring that explains what the `is_palindrome` function does, its arguments (`Args`), and what it returns (`Returns`). It specifies that the function checks for palindromes, ignoring case and non-alphanumeric characters.

```
# Remove non-alphanumeric characters and convert to lowercase
processed_text = re.sub(r'[^\w\-\s]', '', text).lower()
```

This is the core processing step:

- `re.sub(r'[^\w\-\s]', '', text)`: This uses a regular expression to find all characters in the `text` string that are *not* alphanumeric (i.e., not a letter from 'a' to 'z' or 'A' to 'Z', or a digit from '0' to '9') and replaces them with an empty string, effectively removing them.
- `.lower()`: After removing non-alphanumeric characters, this converts the entire resulting string to lowercase. This ensures that the palindrome check is case-insensitive (e.g., 'Racecar' becomes 'racecar'). The result is stored in the `processed_text` variable.

```
# Compare the processed string with its reverse
return processed_text == processed_text[::-1]
```

This line checks if `processed_text` is equal to its reverse:

- `processed_text[::-1]`: This is a Python slice operation that creates a reversed copy of the `processed_text` string.
- `==`: This operator compares the `processed_text` with its reversed version. If they are identical, the string is a palindrome, and the expression evaluates to `True`; otherwise, it's `False`. This boolean result is then returned by the function.

Cell 01b3b2d9 : Example Usage

Cell 01b3b2d9 : Example Usage

```
# Example usage:
```

This is a comment indicating that the following lines demonstrate how to use the `is_palindrome` function.

```
print(f"'madam' is a palindrome: {is_palindrome('madam')}")
```

This line calls `is_palindrome` with the string 'madam'. The result (`True`) is then embedded into an f-string and printed to the console.

```
print(f"'A man, a plan, a canal: Panama' is a palindrome: {is_palindrome('A man, a plan, a canal: Panama')}")
```

This line calls `is_palindrome` with a classic palindrome phrase. The function will first process this string to 'amanaplanacanalpanama' (removing spaces, punctuation, and converting to lowercase) before checking if it's a palindrome. The result (`True`) is printed.

```
print(f"'hello' is a palindrome: {is_palindrome('hello')}")
```

This line calls `is_palindrome` with 'hello'. Since 'hello' is not the same as 'olleh', it will return `False`, which is then printed.

```
print(f"'racecar' is a palindrome: {is_palindrome('racecar')}")
```

This line calls `is_palindrome` with 'racecar'. Since 'racecar' is the same as its reverse, it will return `True`, which is then printed.

These example calls demonstrate how the function handles different inputs, including simple words, phrases with punctuation and mixed casing, and both palindromic and non-palindromic strings.

Clear Understanding:

- “*The explanation was very clear. I now understand how regular expressions are used to clean the string.*”
 - “*I get why .lower() is important — it makes the check case-insensitive.*”
 - “*The slicing trick [::-1] for reversing a string is neat, I hadn’t seen that before.*”
 - “*The examples helped me see how the function works with both simple words and complex phrases.*”
-