

ASSIGNMENT:2.2

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BATCH-30

TASK-1

PROMPT: generate a function that filters out all negative numbers from a list .(first generate list) CODE:

The screenshot shows a Google Colab notebook titled 'Untitled8.ipynb'. The code cell contains the following Python script:

```
import random

# Generate a list of 10 random integers, including positive, negative, and zero
numbers = [random.randint(-10, 10) for _ in range(10)]
print("Original list:", numbers)

def filter_negative_numbers(input_list):
    """
    Filters out all negative numbers from a given list.

    Args:
        input_list (list): The list of numbers to filter.

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

# Apply the function to the generated list
filtered_numbers = filter_negative_numbers(numbers)
print("Filtered list (non-negative numbers only):", filtered_numbers)
```

The output cell shows the results of running the code:

```
Original list: [-9, -7, 7, -7, -3, -10, -6, 1, -7, 8]
Filtered list (non-negative numbers only): [7, 1, 8]
```

OBSERVATION:

The program uses Python random module to generate a list of ten integers ranging from minus ten to ten so the list may contain negative numbers zero and positive numbers The original list is printed first showing all randomly generated values A function named filter-negative-numbers is defined to remove negative numbers from the list

Inside the function list comprehension is used with the condition num greater than or equal to zero which keeps only zero and positive values The function does not modify the original list instead it returns a new filtered list The filtered list output contains only non-negative numbers proving that the filtering logic works correctly

TASK-2

PROMPT: generate a Python function that counts vowels, consonants, and digits in a string

CODE:

The screenshot shows a Google Colab interface with a code cell containing Python code. The code defines a function `count_chars` that takes a string as input and returns a dictionary with counts of vowels, consonants, and digits. The code includes comments explaining the logic and example usage.

```
[1]: def count_chars(input_string):
    """
    Counts the number of vowels, consonants, and digits in a given string.

    Args:
        input_string (str): The string to analyze.

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

    for char in input_string:
        if char.isalpha(): # Check if the character is an alphabet
            if char in vowels:
                vowel_count += 1
            else:
                consonant_count += 1
        elif char.isdigit(): # Check if the character is a digit
            digit_count += 1

    return {
        "vowels": vowel_count,
        "consonants": consonant_count,
        "digits": digit_count
    }

# Example usage:
my_string = "Hello World 123"
counts = count_chars(my_string)
print("The string '{my_string}' contains:")
print(f" Vowels: {counts['vowels']}")
print(f" Consonants: {counts['consonants']}")
print(f" Digits: {counts['digits']}")
```

OBSERVATION:

The program defines a function named `count_chars` that analyzes a given string. It checks each character in the string one by one using a loop.

If the character is an alphabet it further checks whether it is a vowel or a consonant. Vowels are identified using a predefined string containing both uppercase and lowercase vowels. If the character is a digit it increases the digit count. Special characters, spaces, and symbols are ignored. The function keeps separate counters for vowels, consonants, and digits. It returns the final counts in the form of a dictionary. The example string "Hello World 123" is passed to the function. The output correctly displays the number of vowels, consonants, and digits present in the string.

TASK-3

PROMPT: Generate a palindrome-checking function and compare the results.

CODE:

The screenshot shows a Google Colab notebook interface. The code cell contains two parts. The first part prints the counts of vowels and consonants in the string 'Hello World 123!'. The second part defines a function `is_palindrome` that checks if a given string is a palindrome by removing non-alphanumeric characters, converting it to lowercase, and comparing it with its reverse.

```
File Edit View Insert Runtime Tools Help
Commands + Code + Text | Run all
[4]: print(f" Vowels: {counts['vowels']}")
print(f" Consonants: {counts['consonants']}")
print(f" Digits: {counts['digits']}")

--- The string 'Hello World 123!' contains:
Vowels: 3
Consonants: 7
Digits: 3

[5]: 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, ignoring spaces, punctuation, and case.

    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
    processed_text = ''.join(char.lower() for char in text if char.isalnum())

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

# Test cases
print("Palindrome checker results:")
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("'racecar' is a palindrome: ", is_palindrome('racecar'))
print("'hello' is a palindrome: ", is_palindrome('hello'))
print("'Python' is a palindrome: ", is_palindrome('Python'))
print("'No lemon, no melon' is a palindrome: ", is_palindrome('No lemon, no melon'))

Palindrome checker results:
'madam' is a palindrome: True
'A man, a plan, a canal: Panama' is a palindrome: True
'racecar' is a palindrome: True
'hello' is a palindrome: False
'Python' is a palindrome: False
'No lemon, no melon' is a palindrome: True
```

OBSERVATION:

The program defines a function named `is_palindrome` that checks whether a given string is a palindrome. It first removes all non-alphanumeric characters such as spaces, punctuation, and symbols. All remaining characters are converted to lowercase to ensure case insensitive comparison. The cleaned string is then compared with its reverse using slicing. If both strings are the same, the function returns true; otherwise, it returns false. This approach allows phrases and sentences to be checked correctly, not just single words.

TASK-4

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

CODE:

The screenshot shows a Google Colab notebook titled "Untitled8.ipynb - Colab". A sidebar on the left lists several AI-generated responses. One response, highlighted in blue, asks Gemini to explain a Python function (prime check OR palindrome check) line by line. Gemini has provided a detailed explanation for the "is_palindrome" function. The code is as follows:

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

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

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

```

This is a docstring, which serves as internal documentation for the function. It explains what the function does, its arguments, and what it returns.

The next line of code is annotated with a docstring:

```
processed_text = ''.join(char.lower() for char in text if char.isalnum())
```

This line performs pre-processing on the input string:

- For each character in the string, it filters through each character in the text if char.isalnum().
- Explains a prime check function line by line
- Explains the is_palindrome function with a custom input
- Explains the count_chars function in detail

At the bottom, there's a message: "What can I help you build?" followed by a plus sign, and a note: "Gemini can make mistakes, so double-check it and use code with caution. Learn more".

OBSERVATION:

Explanation:

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

This line defines a function named `is_palindrome` that takes one argument: `text` (which is expected to be a string).

.....

This is a docstring, which provides a brief description of what the function does, its arguments (Args), and what it returns (Returns). It's good practice for documenting code.

`processed_text = ''.join(char.lower() for char in text if char.isalnum())` This is

the core of the pre-processing step:

`for char in text:` It iterates through each character in the input text string.

`if char.isalnum():` It checks if the character is alphanumeric (i.e., a letter or a number). This effectively filters out spaces, punctuation, and other symbols.

`char.lower():` For each alphanumeric character, it converts it to lowercase. This ensures that case doesn't affect the palindrome check (e.g., 'Racecar' should be considered a palindrome).

`'.join(...):` It concatenates all the filtered and lowercased characters back into a single string. The result is stored in the `processed_text` variable.

```
return processed_text == processed_text[::-1]
```

This line performs the actual palindrome check and returns the result:

`processed_text[::-1]`: This creates a reversed version of the `processed_text` string using Python's slicing notation. `[::-1]` means start from the end, go to the beginning, with a step of `-1`.

`processed_text == processed_text[::-1]`: It compares the `processed_text` with its reversed version. If they are identical, the expression evaluates to `True`, indicating it's a palindrome. Otherwise, it evaluates to `False`. `return`: The Boolean result (`True` or `False`) is returned by the function.