SchoolofComputerScienceandArtificialIntelligence

LabAssignment#2

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Task1:CleaningSensorData

❖ Scenario:YouarecleaningIoTsensordatawherenegativevaluesareinvalid.

❖ Task:UseGeminiinColabtogenerateafunctionthatfiltersoutallnegative numbers from a list.

❖ ExpectedOutput:

➢ Before/afterlist

➢ ScreenshotofColabexecution

Prompt:-

writeaPythonfunctionfilternonnegativethatreturnsanewlistwithonly values greater than or equal to 0, without modifying the original list, for cleaning invalid negative IoT sensor readings.

Code:-

```
C: > AIAC LAB > Assignments Codes > 🐍 Assignment2.py > ...
1    #Task1
2    #write a Python function filter non negative that returns a new list wi
3    def filter_non_negative(sensor_readings):
4        return [reading for reading in sensor_readings if reading >= 0]
5    #Example usage:
6    sensor_data = [23, -5, 12, -1, 0, 45, -10]
7    cleaned_data = filter_non_negative(sensor_data)
8    print("Original sensor data:", sensor_data)
9    print("Cleaned sensor data (non-negative):", cleaned_data)
10
```

Output:-

```
Original sensor data: [23, -5, 12, -1, 0, 45, -10]
Cleaned sensor data (non-negative): [23, 12, 0, 45]
PS C:\Users\shiva>
```

Justification:-

Thisfunction uses alist comprehension to create anew list that includes only the non-negative values from the original list. It does not modify the original list,ensuringthattherawsensordataremainsintactforanyfurtheranalysisor processing.

Task2:StringCharacterAnalysis

❖ Scenario:

Youarebuildingatext-analysisfeature.

❖ Task:

UseGeminitogenerateaPythonfunctionthatcountsvowels,consonants, and
digits in a string.

❖ ExpectedOutput:

➢ Workingfunction

➢ Sampleinputsandoutputs

Prompt:-

write a friendly Python function that takes a text string and returns how many
vowels,consonants,anddigitsitcontains,treatingupperandlowercaseletters the
same.

Code:-

```python
#Task2
# write a Python function that takes a text string and returns how many
def count_characters(text):
    vowels = "aeiouAEIOU"
    vowel_count = 0
    consonant_count = 0
    digit_count = 0
    for char in text:
        if char in vowels:
            vowel_count += 1
        elif char.isalpha():
            consonant_count += 1
        elif char.isdigit():
            digit_count += 1
    return vowel_count, consonant_count, digit_count
#Example usage:
input_text = "Hello World! 123"
vowels, consonants, digits = count_characters(input_text)
print(f"Input text: {input_text}")
print(f"Vowels: {vowels}, Consonants: {consonants}, Digits: {digits}")
```

Output:-

```
Input text: Hello World! 123
Vowels: 3, Consonants: 7, Digits: 3
```

Justification:-Thisfunctioniteratesthrougheachcharacterintheinputstring,
checking if it is a vowel, consonant, or digit, and increments the respective

countersaccordingly.Ittreatsupperandlower caselettersthesame byincludingbothinthevowelsstringandusingisalpha() for consonants.

Task3:PalindromeCheck–Tool Comparison

❖ Scenario:

YoumustdecidewhichAItoolisclearerforstringlogic.

❖ Task:

Generateapalindrome-checkingfunctionusingGeminiandCopilot,then compare the results.

❖ ExpectedOutput:

➢ Side-by-sidecodecomparison

➢ Observationsonclarityandstructure

Prompt:-

writeasimple,readablePythonfunctionispalindromethatreturnsTrueifa stringreadsthesameforwards andbackwardsignoringcaseandspacesand False otherwise.

Code:-

```python
#Task3
#write a simple, readable Python function is palindrome that returns
def is_palindrome(s):
    cleaned = ''.join(c.lower() for c in s if c.isalnum())
    return cleaned == cleaned[::-1]
#Example usage
test_string = "A man a plan a canal Panama"
result = is_palindrome(test_string)
print(f'Is the string "{test_string}" a palindrome? {result}')
```

Output:-

```
Is the string "A man a plan a canal Panama" a palindrome? True
```

Justification:-

This function is simple and readable because it breaks down the problem into clear steps: cleaning the string by removing non-alphanumeric characters and converting to lowercase, then checking if the cleaned string is equal to its reverse.Thismakesiteasyforbeginnerstounderstandhowpalindromeswork.

Task4:CodeExplanationUsing AI

❖ Scenario:

Youarereviewingunfamiliarcodewrittenbyanotherdeveloper.

❖ Task:

AskGeminitoexplainaPythonfunction(primecheckORpalindrome check) line by line.

❖ ExpectedOutput:

➢ Codesnippet

➢ AIexplanation

➢ Studentcommentsonunderstanding

Prompt:-

Pythonfunctioneitheraprime checkerorpalindrome checkerandexplainit line by line in simple, student friendly language, as if teaching a beginner.

Code:-

```python
#Task4
#Python function either a prime checker or palindrome checker and e
def is_prime(n):
    if n < 2:
        return False
    for i in range(2, int(n ** 0.5) + 1):
        if n % i == 0:
            return False
    return True
#Example usage:
number_to_check = 29
is_number_prime = is_prime(number_to_check)
print(f'Is the number {number_to_check} prime? {is_number_prime}')
```

Output:-

```
Is the number 29 prime? True
```

Justification:-

Thefunctionchecksifanumberisprimebyfirsthandlingnumberslessthan2 (which are not prime). Then it iterates from 2 up to the square root of the number, checking for divisibility. If any divisor is found, it returns False; otherwise, it returns True.