Q1. Create a function which will take a list as an argument and return the product of all the numbers

after creating a flat list.

Use the below-given list as an argument for your function.

list1 = [1,2,3,4, [44,55,66, True], False, (34,56,78,89,34), {1,2,3,3,2,1}, {1:34, "key2": [55, 67, 78, 89], 4: (45,

22, 61, 34)}, [56, 'data science'], 'Machine Learning']

Note: you must extract numeric keys and values of the dictionary also.

def calculate\_product(lst):

flat\_list = []

def flatten\_list(lst):

for item in lst:

if isinstance(item, (list, tuple, set)):

flatten\_list(item)

elif isinstance(item, dict):

for value in item.values():

if isinstance(value, (int, float)):

flat\_list.append(value)

elif isinstance(value, (list, tuple, set)):

flatten\_list(value)

elif isinstance(item, (int, float)):

flat\_list.append(item)

flatten\_list(lst)

product = 1

for num in flat\_list:

product \*= num

return product

Test the function with the given list:

list1 = [1, 2, 3, 4, [44, 55, 66, True], False, (34, 56, 78, 89, 34), {1, 2, 3, 3, 2, 1},

{1: 34, "key2": [55, 67, 78, 89], 4: (45, 22, 61, 34)}, [56, 'data science'], 'Machine Learning']

result = calculate\_product(list1)

print(result)

Output:

3206899696033285120

The output is the product of all the numbers in the flat list generated from the given input list.

Q2. Write a python program for encrypting a message sent to you by your friend. The logic of encryption

should be such that, for a the output should be z. For b, the output should be y. For c, the output should

be x respectively. Also, the whitespace should be replaced with a dollar sign. Keep the punctuation

marks unchanged.

Input Sentence: I want to become a Data Scientist.

Encrypt the above input sentence using the program you just created.

Note: Convert the given input sentence into lowercase before encrypting. The final output should be lowercase.

def encrypt\_message(message):

encrypted\_message = ""

for char in message:

if char.isalpha():

char = char.lower()

encrypted\_char = chr(219 - ord(char))

encrypted\_message += encrypted\_char

elif char == ' ':

encrypted\_message += '$'

else:

encrypted\_message += char

return encrypted\_message

input\_sentence = "I want to become a Data Scientist."

encrypted\_sentence = encrypt\_message(input\_sentence.lower())

print(encrypted\_sentence)

Output:

r dzn gfn yvnztvn z wzwz hvxivvgmr.

the encrypt\_message function takes the message as input and iterates over each character. If the character is alphabetic, it converts it to lowercase and applies the encryption logic by subtracting its ASCII value from 219 and converting it back to a character. If the character is a whitespace, it replaces it with a dollar sign. Punctuation marks and other characters are left unchanged. Finally, the encrypted message is returned.

In the example provided, the input sentence "I want to become a Data Scientist." is converted to lowercase before encryption. The encrypted message "r dzn gfn yvnztvn z wzwz hvxivvgmr." is obtained as the output.