PYTHON WORKSHEET 2

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# Question 1: Manipulating lists

L = [10, 15, 13, 14, 11]

L.append(50)

L.append(60)

print("List after adding 50 and 60:", L)

L.sort()

print("List sorted in ascending order:", L)

L.sort(reverse=True)

print("List sorted in descending order:", L)

if 13 in L:

print("13 is present in the list.")

else:

print("13 is not present in the list.")

print("Number of elements in the list:", len(L))

S = sum(L)

print("Sum of all elements in the list:", S)

odd\_total = 0

for value in L:

if value % 2 != 0:

odd\_total += value

print("Sum of odd elements:", odd\_total)

even\_total = 0

for value in L:

if value % 2 == 0:

even\_total += value

print("Sum of even elements:", even\_total)

print("Largest element in the list:", max(L))

L.clear()

print("List after clearing all elements:", L)

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# Question 2: Sum all elements in a list without using built-in function

list\_a = [10, 20, 30, 40]

sum\_val = 0

for item in list\_a:

sum\_val += item

print("Sum of elements without using sum() function:", sum\_val)

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# Question 3: Multiply all elements in a list without using built-in function

list\_b = [2, 3, 4, 5]

product\_val = 1

for item in list\_b:

product\_val \*= item

print("Product of elements without using a built-in function:", product\_val)

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# Question 4: Create a 3\*4\*6 3D array

r = 3

c = 4

d = 6

array3d = []

for i in range(r):

layer = []

for j in range(c):

row\_list = []

for k in range(d):

row\_list.append('\*')

layer.append(row\_list)

array3d.append(layer)

print("3D array generated successfully. Here's one slice of it:")

print(array3d[0])

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# Question 5: Dictionary manipulation

my\_dict = {1:5, 2:7, 3:6, 4:8, 5:7}

my\_dict[8] = 8.8

print("Dictionary after adding new entry:", my\_dict)

my\_dict[9] = 9.9

print("Dictionary after adding another entry:", my\_dict)

if 8 in my\_dict:

print("Key 8 is present in the dictionary.")

else:

print("Key 8 is not present in the dictionary.")

if 7 in my\_dict.values():

print("Value 7 is present in the dictionary.")

else:

print("Value 7 is not present in the dictionary.")

my\_dict[3] = 7.1

print("Dictionary after updating value of key 3:", my\_dict)

my\_dict.clear()

print("Dictionary after clearing all elements:", my\_dict)

# ---

# Question 6: Set manipulation

set\_one = {10, 20, 30, 40, 50, 60}

set\_two = {40, 50, 60, 70, 80, 90}

set\_one.add(55)

set\_one.add(66)

print("Set one after adding 55 and 66:", set\_one)

set\_one.remove(10)

set\_one.remove(30)

print("Set one after removing 10 and 30:", set\_one)

intersection\_result = set\_one.intersection(set\_two)

print("Intersection of set one and set two:", intersection\_result)

union\_result = set\_one.union(set\_two)

print("Union of set one and set two:", union\_result)

difference\_result = set\_one.difference(set\_two)

print("Difference set one - set two:", difference\_result)

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# Question 7: Write the following program. (Text is cut off in image)

print("This is a placeholder for Question 7, which is not fully visible.")

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# Question 8: Print 100 random strings

import random

import string

for \_ in range(100):

str\_len = random.randint(6, 8)

random\_str = ''.join(random.choice(string.ascii\_letters) for \_ in range(str\_len))

print(random\_str)

# ---

# Question 9: Check if a number is odd or even

number\_to\_check = int(input("Enter an integer: "))

is\_even\_flag = (number\_to\_check % 2 == 0)

if is\_even\_flag:

print("The number", number\_to\_check, "is even.")

else:

print("The number", number\_to\_check, "is odd.")

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# Question 10: Find how many times substring "Emma" appears

text\_string = "Emma is a good student. Emma likes to read. Emma studies hard."

count\_val = text\_string.count("Emma")

print("The substring 'Emma' appears", count\_val, "times.")

# ---

# Question 11: Create a new list with only odd numbers

original\_numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

odd\_numbers = []

for num\_val in original\_numbers:

if num\_val % 2 != 0:

odd\_numbers.append(num\_val)

print("Original list:", original\_numbers)

print("New list with only odd numbers:", odd\_numbers)

# ---

# Question 12: Robot's legal positions

robot\_positions = [(2, 3), (6, 7), (7, 8)]

valid\_positions = []

for coordinates in robot\_positions:

if coordinates[1] % 2 == 0:

valid\_positions.append(coordinates)

print("Positions with even y-coordinate:", valid\_positions)

# ---

# Question 13: Robot's sensor readings

sensor\_data\_dict = {1: 2.3, 2: 4.5, 3: 1.8, 4: 3.6}

max\_sensor\_val = max(sensor\_data\_dict.values())

print("The maximum sensor value is:", max\_sensor\_val)

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# Question 14: Robot's commands

all\_cmds = ["MOVE", "TURN\_LEFT", "TURN\_RIGHT", "STOP", "DODGE", "JUMP"]

executed\_cmds = ["MOVE", "TURN\_LEFT", "STOP"]

all\_cmds\_set = set(all\_cmds)

executed\_cmds\_set = set(executed\_cmds)

not\_executed\_list = list(all\_cmds\_set.difference(executed\_cmds\_set))

print("Commands not executed:", not\_executed\_list)