8Assignment #6 – Lecture 6: Python Data Structures and Exception Handling

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Question 1 – Create and Display Data Structures

Write a simple Python program that creates and displays specific values in all major Python data structures.

Tasks:

1. Create the following:

    o   **List: [10, 20, 30, 40, 50]**

    o   **Tuple: ("Ali", "Sara", "Omar")**

    o   **Dictionary: {"Name": "Hany", "Age": 42, "Department": "Computer Science"}**

    o   **Set: {2, 4, 6, 8}**

    o   **NumPy Array: [1, 3, 5, 7, 9]**

2. Print all data structures clearly, each with a proper label.

3. Perform one operation on each:

    o   **Add a new number to the list.**

    o   **Count how many times a name appears in the tuple.**

    o   **Add a new key–value pair "Job": "Professor" in the dictionary.**

    o   **Check whether the number 4 exists in the set.**

    o   **Compute and print the sum of all elements in the NumPy array.**

4. Display all updated structures after performing the operations.

Question 2 – Rewrite this code and print the obtained output of each code snippet

Task 1: Adding and subtracting two 1D arrays

```python
# 5-  Numpy arrays 1D and 2D ( the same type)

import numpy as np

arr1 = np.array([1,2,3,4,5,10])

print(arr1.dtype)

print(arr1.shape)

arr2 = np.array([1,2,3,4,5, 10])

print(arr1.shape)
print(arr2.shape)
arr_s = arr1 + arr2

arr_sub = arr1 - arr2

print(arr_s)
print(arr_sub)
```

Task 2: Converting Array from type to another type

```python
#
arr2 = np.array([1,2,3,4,5, 10])
arr3 = arr2.astype(float)
print(arr3)
print(arr3.dtype)
```

Task 3: Array reshaping from 1D to 2D

```python
arr4 = np.array([1,2,4,1,4,10])
print(arr4.shape)

arr5= arr4.reshape(2,3)
print (arr5)
print(arr5.shape)
```

Task 4: Operation on Arrays

```python
arr1 = np.array([1,2,3,4,5,10])

print(arr1.sum())
print(arr1.mean())
print(arr1.max())
print(arr1.min())

print(arr1[0])

print(arr1[-1])

# Loop for all element s
for item in arr1:
    print(item)



for i in range(0, len(arr1)):
    print(arr1[i])
```
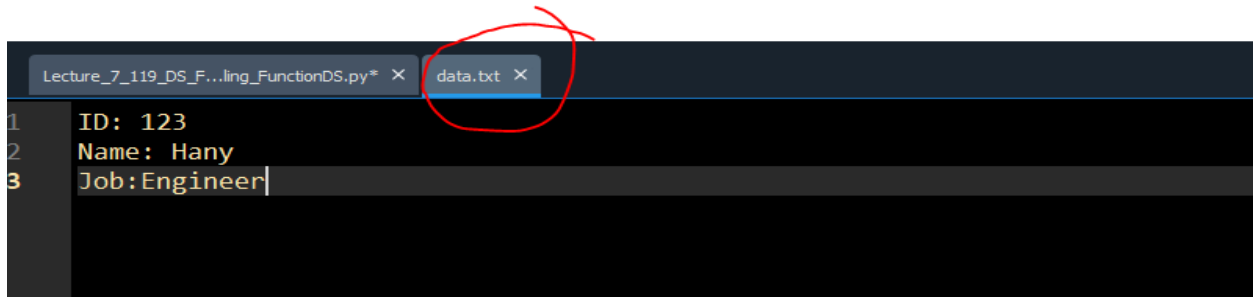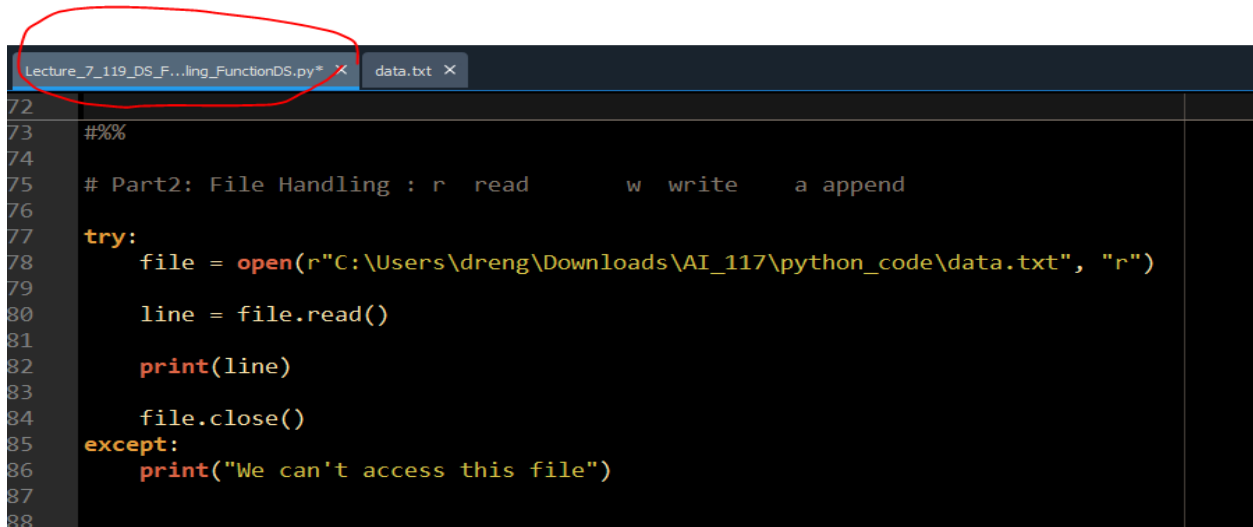
Task 6: Open a file data.txt on your hard-disk for read:

Data.txt file:

```
Lecture_7_119_DS_F...ling_FunctionDS.py*  ×    data.txt  ×
1    ID: 123
2    Name: Hany
3    Job:Engineer
```

Open the file for read

```
Lecture_7_119_DS_F...ling_FunctionDS.py*  ×    data.txt  ×
72
73    #%%
74
75    # Part2: File Handling : r   read        w   write      a append
76
77    try:
78        file = open(r"C:\Users\dreng\Downloads\AI_117\python_code\data.txt", "r")
79
80        line = file.read()
81
82        print(line)
83
84        file.close()
85    except:
86        print("We can't access this file")
87
88
```

Open the file for append

```
#%%


try:
    file = open(r"C:\Users\dreng\Downloads\AI_117\python_code\data.txt", "a")

    file.write("\n HHHHHHHHHHHHHHHHHHH")
    file.close()


except:
    print("We can't access this file")
```

Open the File for writing

```
#%%

try:
    file = open(r"C:\Users\dreng\Downloads\AI_117\python_code\data.txt", "w")

    file.write("\n HHHHHHHHHHHHHHHHHHHH")
    file.close()


except:
    print("We can't access this file")
```