Data Science Workshop-1 (CSE 2195)

MINOR ASSIGNMENT-4: BUILT-IN DATA STRUCTURES (LIST, TUPLE, SET, DICTIONARY)

1. What is a **List** Object in Python? Write the syntax, how we create a List object? For the following create List object of each scenario and display the output.
   (a) List of vowels.
   (b) List of consonants.
   (c) List of even integers within 1 to 20.
   (d) List of odd integers within 1 to 20.
   (e) List of all subjects in this semester.
   (f) List of all subject codes in this semester.
   (g) List of temperatures from last 10 days.

2. Predict the output of following instructions when typed in Jupyter Notebook Cell and note down every output in your assignment copy.
   (a) listObj = range(15)
   listObj
   list(listObj)
   (b) someList = [”Bob”, ”Joe”, ”Will”, 55, ”Will”, ”XXXXX”, 100.55]
   type(someList)
   someList[0]
   someList[-1]
   someList[3]
   someList[-3]
   someList[2]
   someList[2:5]
   someList[-4:-1]
   someList[:5]
   someList[2:]
   someList[:]
   someList[0:6:2]
   someList[::2]
   someList[::-1]
   someList[1:5:2]
   (c) list1 = [2, 3, 7, None]
   list2 = [”foo”, ”bar”, ”baz”]
   list2 = list1
   list2[2] = ”SampleText”
   list1
   list1[2]
   list2[2]
   list2
   (d) wordList = [’foo’, ’bar’, ’baz’]
   wordList[2] = ”peekaboo”
   wordList
   wordList.append(”dwarf”)
   wordList
   wordList.insert(1, ”red”)

```
wordList
wordList.pop(2)
wordList
wordList.append("foo")
wordList
wordList.remove("foo")
wordList
"dwarf" in wordList
"dwarf" not in wordList
```

(e) [4, None, "foo"] + [7, 8, 2, 3]

```
list1 = [4, None, "foo"] + [7, 8, 2, 3]
list1
x = ['A', ('B', 'C')]
x.extend(list1)
x
list1
a = [7, 2, 5, 1, 3, 73, 51, 7, 3, 9, 11, 1, 1, 10, 9]
a
a.sort()
a
b = ["saw", "small", "He", "foxes", "six"]
b.sort(key=len)
b
b.sort()
b
```

3. Develop Python Programs for the following below scenario.
   (a) Write a Python Program which will prompt user to ask a range of integer(lower limit and higher limit) value. Once you receive the input values from the user programmatically store odd numbers and even numbers into separate list objects and display them as output.
   (b) Write a Python Program which will prompt user to enter a positive integer value. Once you receive the input, find factors of the integer and store into a list objects and display them as output.
   (c) Write a Python Program which will prompt user to enter a range of integer(lower limit and higher limit) value, list down all prime numbers and composite numbers into separate list objects and display them.

4. What is a **Tuple** Object in Python? Write the syntax, how we create a Tuple object? For the following scenario create Tuple object of each scenario and display them as output.
   (a) Tuple of few student's information such as roll number, name, branch, specialization, mobile, email id etc.
   (b) Tuple of few book's information such as ISBN Number, book title, category, author, number of authors etc.
   (c) Tuple of few parts of a vehicle.
   (d) Tuple of few institution details such as name of the institute, departments, no. of students, address etc.
   (e) Create tuple objects from List objects at all scenario in **Question No. 1.**

5. Predict the output of following instructions when typed in Jupyter Notebook Cell and note down every output in your assignment copy.

(a) tupleObj = (4, 5, 6, ”Ram”, ”Hari”, 120.5643)
```
tupleObj
type(tupleObj)
tuple((2, 5, 1, 9, 5, 3, 8))
tuple((4, 5, 6))
x = tuple([2, 5, 1, 9, 5, 3, 8])
x
y = x
type(y)
tupleObj = tuple('string')
tupleObj
```

(b) someList = [”Bob”, ”Joe”, ”Will”, 55, ”Will”, ”XXXXX”, 100.55]
```
someTuple = tuple(someList)
type(someTuple)
someTuple[0]
someTuple[-1]
someTuple[3]
someTuple[-3]
someTuple[2]
someTuple[2:5]
someTuple[-4:-1]
someTuple[:5]
someTuple[2:]
someTuple[:]
someTuple[0:6:2]
someTuple[::2]
someTuple[::-1]
someTuple[1:5:2]
```

(c) nestedTuple = (4, 5, 6), (7, 8)
```
nestedTuple
nestedTuple[1]
tup = tuple(['foo', [1, 2], True])
tup[2] = False
tup[1].append(3)
tup
list2
```

(d) tup = (4, 5, 6)
```
a, b, c = tup
b
tup = 4, 5, (6, 7)
a, b, (c, d) = tup
d
a, b = 1, 2
a, b = b, a
a
b
seq = [(1, 2, 3), (4, 5, 6), (7, 8, 9)]
```

```
for a, b, c in seq:
    print(f'a=a, b=b, c=c')

values = 1, 2, 3, 4, 5
a, b, *rest = values
a
b
rest
```

(e) (4, None, 'foo') + (6, 0) + ('bar',)

```
tuple1 = (4, None, 'foo') + (6, 0) + ('bar',)
tuple1
('foo', 'bar') * 4
a = (1, 7, 2, 7, 2, 2, 7, 3, 7, 4, 7, 7, 2, 7)
a.count(7)
len(a)
```

6. Develop Python Programs for the following below scenario.
   (a) Write a Python Program which will prompt user to ask enter his/her name, department, mobile number, roll number etc. Once you receive the input values from the user programmatically store these values into tuple objects and finally display them as output. Try to enter details for at least 5 objects.
   (b) For all of the questions provided in **Question No. 3**, try to store all those values into Tuple objects display them.

7. What is a **Dictionary** Object in Python? Write the syntax, how we create a Dictionary object? For the following questions create Dictionary object of each scenario and display them as output.
   (a) Dictionary of few peoples as key and their mobile numbers as values(at least for 10 key).
   (b) Dictionary of few books as key and their authors(authors should be a list object) as values.
   (c) Dictionary of different types numbers(such as prime, composite, even, odd etc.) as keys and their examples as values.
   (d) Dictionary of engineering branches as keys and their specializations as values.
   (e) Dictionary of employee ids as keys and their details(as tuple) as values.
   (f) Dictionary of subject code as key and subject details(as list) such as course name, reference book, teacher name, department etc. as values.

8. Predict the output of following instructions when typed in Jupyter Notebook Cell and note down every output in your assignment copy.
   (a) dictObj = {"fruits": ["banana", "apple", "guava", "jackfruit"], "colors": ("red", "blue", "green"), "int": 165, "float": 99.56, "string":"some sample text"}

```
dictObj
type(dictObj)
dict("key":"value")
dictObj[10] = "New added value"
dictObj
dictObj[10]
dictObj["int"]
dictObj["colors"]
dictObj["10"]
dictObj[10]
```

   (b) dictObj2 = {"Bob":10, "Joe":34, "Will":77, "Limba":55, "Will":36, "XXXXX":100}

```
    "Limba" in dictObj2
    55 in dictObj2
    "55" in dictObj2
    "XXXXXX" in dictObj2
    dictObj2["Will"] = '_'.join(["I", "am", "ancient", "10", "years old"])
    dictObj2["Will"]
    dictObj2.pop()
    dictObj2.pop("Will")
    dictObj2
```

(c)
```
list(dictObj.keys())
list(dictObj.values())
list(dictObj.items())
dictObj["iter"] = "INSTITUTE OF TECHNICAL EDUCATION & RESEARCH"
list(dictObj.keys())
list(dictObj.values())
list(dictObj.items())
dictObj
dictObj.update("b": "foo", "c": 12)
dictObj
```

(d)
```
myDict = {}
keyList = range(10)
valueList = ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'G', 'I', 'J']
for key, value in zip(keyList, valueList):
    myDict[key] = value
myDict
```

(e)
```
from collections import defaultdict
words = ["duck", "apple", "dog", "bat", "cat", "cup", "bar", "atom", "book", "dance"]
myDict = defaultdict(list)
for w in words:
    myDict[w[0]].append(w)
myDict
```

9. Develop Python Programs for the following below scenario.
   (a) Write a Python Program which will prompt user to ask enter his/her name, profession, mobile number, employment organization, email id etc. Once you receive the input values from the user programmatically store these values into **Dictionary** objects such as mobile number is the key and other details as tuple object. Try to enter details for at least 7 objects.
   (b) Develop a Python program which will take lower limit +ve integer and higher limit +ve integer values from the user as user input(lower limit should be lesser than the higher limit). Following that calculate factors of those elements within the range and store them as key value pairs(dictionary object) such as the number is the key and factors are as values of a list object and display them.
   (c) Modify the **Question No. (a)** to develop a Python program which will consider name as the key and rest values into tuple as the value. Without using any predefined sort() method use your own logic to sort them based on name and finally display them as output.

10. What is a **Set** Object in Python? Write different syntax, how we create a Set object? For the following questions create Set object of each scenario and display them as output.
    (a) Set of all cricket players currently working in Indian Cricket Team.
    (b) Set of all 3rd semester courses.

(c) Set of all books you are following for this semester.
(d) Set of 10 integer objects(both -ve and +ve) which are divisible by 11.
(e) Set of words containing more than 3 vowels.

11. Predict the output of following instructions when typed in Jupyter Notebook Cell and note down every output in your assignment copy.
(a) A = {5, 3, 1, 4, 4, 2, 3, 4, 5, "5", 2, "2", 7, "1"}
A
B = {"6", 3, 1, 3, "5", "2", 7, "1", 6, "9", 10, 9, "6"}
B
type(A)
type(B)
A.add("55")
A
D = B
D
D == B
D == A
(b) C = A
C.union(D)
C
C.intersection(D)
C
D
C.intersection_update(D)
C
D
C.update(D)
C
(c) C.add(54)
C
C.add("Sample Text")
C
D
C.difference(D)
C
D
C.difference_update(D)
C
D
(d) C.symmetric_difference(D)
C
C.symmetric_difference_update(D)
C
A.issubset(B)
A.issuperset(B)
A.isdisjoint(B)
A
B

(e) X = {1, 2, 3, 4, 2, 3, 5, 6, 1, 2, 9, 8}
X
Y.add(7)
Y.add(100.65)
Y.add("ITER")
Y.add(76.89)
Y
Y | X
Y & X
Y − X
Y ^ X
Y
X
Y | = X
Y & = X
Y
X

12. Develop Python Programs for the following below scenario.
    (a) Write a Python Program which will prompt user to enter 10 different sample inputs like integer/float/string/boolean/list/tuple/set/dictionary objects etc. and store them into a Set object. Find out all **unique characters** present in that set object.
    (b) Develop a Python program which will prompt user to enter 15 positive numbers randomly(repetition allowed) and divide all those **unique numbers** into two different list objects such that one list contains prime numbers and another list contains composite numbers. Finally, display the output.
    (c) Develop a Python script which will prompt the user to enter 10 student details such as roll number, name, Physics Mark, Chemistry Mark, Mathematics mark as tuple objects and display them. Finally update those student details with adding fields such as total mark, average mark, status(pass if average mark is > 60) by adding student details as list of tuples and display the output.

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