| Experiment No. 3 |
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| To explore basic data types of python like strings, list, dictionaries and tuples |
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**Experiment No. 3**

**Title:** To explore basic data types of python like strings, list, dictionaries and tuples.

**Aim:** To study and explore basic data types of python like strings, list, dictionaries and tuples.

**Objective:** To introduce basic data types of python

**Theory:**

Lists: are just like dynamic sized arrays, declared in other languages (vector in C++ and ArrayList in Java). Lists need not be homogeneous always which makes it a most powerful tool in Python.

Tuple: A Tuple is a collection of Python objects separated by commas. In someways a tuple is similar to a list in terms of indexing, nested objects and repetition but a tuple is immutable unlike lists that are mutable.

Set: A Set is an unordered collection data type that is iterable, mutable and has no duplicate elements. Python’s set class represents the mathematical notion of a set.

Dictionary: in Python is an unordered collection of data values, used to store data values like a map, which unlike other Data Types that hold only single value as an element, Dictionary holds key:value pair. Key value is provided in the dictionary to make it more optimized.

List, Tuple, Set, and Dictionary are the data structures in python that are used to store and organize the data in an efficient manner.

| **List** | **Tuple** | **Set** | **Dictionary** |
| --- | --- | --- | --- |
| List is a non-homogeneous data structure which stores the elements in single row and multiple rows and columns | Tuple is also a non-homogeneous data structure which stores single row and multiple rows and columns | Set data structure is also non-homogeneous data structure but stores in single row | Dictionary is also a non-homogeneous data structure which stores key value pairs |
| List can be represented by [ ] | Tuple can be represented by  ( ) | Set can be represented by { } | Dictionary  can be represented by { } |
| List allows duplicate elements | Tuple allows duplicate elements | Set will not allow duplicate elements | Set will not allow duplicate elements but keys are not duplicated |
| List can use nested among all | Tuple can use nested among all | Set can use nested among all | Dictionary can use nested among all |
| Example: [1, 2, 3, 4, 5] | Example: (1, 2, 3, 4, 5) | Example: {1, 2, 3, 4, 5} | Example: {1, 2, 3, 4, 5} |
| List can be created using **list()**function | Tuple can be created using **tuple()** function. | Set can be created using **set()** function | Dictionary can be created using **dict()**function. |
| List is mutable i.e we can make any changes in list. | Tuple  is immutable i.e we can not make any changes in tuple | Set is mutable i.e we can make any changes in set. But elements are not duplicated. | Dictionary is mutable. But Keys are not duplicated. |
| List is ordered | Tuple is ordered | Set is unordered | Dictionary is ordered |
| Creating an empty list  l=[] | Creating an empty Tuple  t=() | Creating a set  a=set()    b=set(a) |  |

**Code:**#  List

my\_list = [1, 2, 3, 4, 5]

print("List elements:", my\_list)

my\_list[2] = 10

print("Modified list:", my\_list)

my\_list.append(6)

print("List after adding element:", my\_list)

my\_list.remove(4)

print("List after removing element:", my\_list)

#  Tuple

my\_tuple = (1, 2, 3, 4, 5)

print("Tuple elements:", my\_tuple)

# Set

my\_set = {1, 2, 3, 4, 5}

print("Set elements:", my\_set)

my\_set.add(6)

print("Set after adding element:", my\_set)

my\_set.remove(4)

print("Set after removing element:", my\_set)

# Dictionary

my\_dict = {'name': 'Anjali', 'age': 20, 'city': 'Mumbai'}

print("Dictionary elements:", my\_dict)

my\_dict['age'] = 21

print("Updated dictionary:", my\_dict)

my\_dict['gender'] = 'Female'

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

my\_dict.pop('city')

print("Dictionary after removing element:", my\_dict)

**Output:**

List elements: [1, 2, 3, 4, 5]

Modified list: [1, 2, 10, 4, 5]

List after adding element: [1, 2, 10, 4, 5, 6]

List after removing element: [1, 2, 10, 5, 6]

Tuple elements: (1, 2, 3, 4, 5)

Set elements: {1, 2, 3, 4, 5}

Set after adding element: {1, 2, 3, 4, 5, 6}

Set after removing element: {1, 2, 3, 5, 6}

Dictionary elements: {'name': 'Anjali', 'age': 20, 'city': 'Mumbai'}

Updated dictionary: {'name': 'Anjali', 'age': 21, 'city': 'Mumbai'}

Dictionary after adding element: {'name': 'Anjali', 'age': 21, 'city': 'Mumbai', 'gender': 'Female'}

Dictionary after removing element: {'name': 'Anjali', 'age': 21, 'gender': 'Female'}

**Conclusion:**

The Python program meticulously explores and implements core data structures: lists, tuples, dictionaries, and sets. Each data type's distinct characteristics, such as ordering, mutability, and uniqueness, are effectively demonstrated. Through various operations like appending, removing, and inserting, the script illustrates practical usage scenarios for each data structure. This comprehensive study enhances understanding of Python's foundational data types and their versatile applications in programming.