St. Francis Institute of Technology, Mumbai-400 103
Department Of Information Technology

A.Y. 2023-2024
Class: SE-ITA/B, Semester: IV
Subject: **Python Lab**

Experiment – 1: Python Data Types

Aim: To implement a Python program for the following data types:

a. Write a Python program to demonstrate numeric data types.
b. Write a Python program to demonstrate any 10 methods of List.
c. Write a Python program to demonstrate working on tuples and any methods of Tuple.
d. Write a Python program to demonstrate any 10 methods of Dictionary.

1. **Objectives:** After performing this experiment, a student will be able to write a basic Python program using Python data types like Numeric, Sequences, Sets and Dictionaries.

2. **Prerequisite:** Python basics

3. **Requirements:** PC, Python 3.9, Windows 10/ MacOS/ Linux, IDLE IDE

4. **Pre-Experiment Exercise:**

5. **Theory:**

A data type represents the type of data stored into a variable or memory. The datatypes which are already available in Python are called built-in data types. The datatypes created by the programmer is called user-defined datatypes.

The built-in data types are as follows:

- **Numeric**: The numeric data types represents numbers. There are three sub categories of numeric data types
- **int** : int are positive or negative whole numbers with no decimal point. Integers in Python 3 are of unlimited size.
- **float** : represent real numbers and are written with a decimal point dividing the integer and the fractional parts. Floats may also be in scientific notation, with E or e indicating the powerof 10 (2.5e2 = 2.5 x 10^2 = 250).
- **complex** : are of the form a + bJ, where a and b are floats and J (or j) represents the squareroot of -1 (which is an imaginary number). The real part of the number is a, and theimaginary part is b. Complex numbers are not used much in Python programming.
- **Sequences:** A sequence represents a group of elements or items. There are six types of sequences in Python.
- **str:** represents string datatype which is string of characters. Strings are constructed by using single or double quotes.
- **bytes:** represents a group of byte numbers. A byte is any positive number between 0 to 255.
- **Byte array:** similar to array of bytes. But the difference is array of bytes cannot be modified but byte array type array can be modified.

- **List:** represents a group of elements. Lists can grow dynamically in memory. Lists are represented using square brackets and its elements are separated by commas.
- **Tuple:** contains a group of elements which can be of different types. The elements in the tuple are separated by commas and enclosed in parenthesis. Whereas the elements of a list can be modified, it is not possible to modify the tuple elements. A tuple can be treated as a read-only list.
- **range:** represents a sequence of numbers. The numbers in the range are not modifiable.
- **Sets:** A set is an unordered, mutable collection of elements. Common uses include membership testing, removing duplicates from a sequence, and computing standard math operations on sets such as intersection, union, difference *etc.* To create a set, elements separated by commas are entered using curly braces. the same notation is used in Python.
  - **frozenset:** is similar to set except elements of frozenset cannot be modified.
  - **Dictionary**: represents a group of elements arranged in the form of key value pairs. In the dictionary, the first element is considered as a 'key' and the immediate next value is considered as its 'value'. The key and its value is separated by a colon. All the key value pairs are inserted in curly braces. Various methods are available to access and process the elements of a dictionary.

6. Laboratory Exercise

A. Procedure

i. Open IDE for Python programming
ii. Open new Python file from menu file-new
iii. Type Python code with proper syntax
iv. Save file with .py extension
v. Execute the command statements inside the saved file using cntr+enter key and explore results in other windows of IDE.
vi. Add relevant comments in your programs and execute the code.

Test it for various cases.

a. Write a Python program to demonstrate numeric data types.
b. CODE:

7. Post-Experiments Exercise:

A. Extended Theory:

a. How can we determine the datatype of any python variable?
b. List down various naming conventions in Python.

B. Post Lab Program:

a. Write a Python program to implement three different syntaxes of range function.
b. Write a Python program to implement any 10 methods of Set.

C. Conclusion:

1. Write what was performed in the program (s).
2. What is the significance of program (s)?

D. References:

[1] Dr. R. Nageswara Rao," Core Python Programming" , Dreamtech Press, Wiley Publication
[2] https://www.pythonforbeginners.com/