Experiment no 3

Python Data Types (Lists, Sets, Dictionaries, Tuples)

OBJECTIVES:

- To learn different datatypes of python.
- To learn Lists, Sets, Dictionaries, Tuples and their uses for different problems.

1. LISTS:

Lists are used to store multiple items in a single variable.
Lists are one of 4 built-in data types in Python used to store collections of data, the other 3 are Tuple, Set, and Dictionary, all with different qualities and usage.

Lists are created using square brackets:

```
thislist = ["apple", "banana", "cherry"]
print(thislist)
```

Figure 1: Lists in Python

2. SETS:

Sets are used to store multiple items in a single variable.
A set is a collection which is *unordered*, *unchangeable**, and *unindexed*.
Set *items* are unchangeable, but you can remove items and add new items.

```
thisset = {"apple", "banana", "cherry"}
print(thisset)
```

Figure 2: Sets in Python

2.1 Duplicates Not Allowed

Sets cannot have two items with the same value.

```
thisset = {"apple", "banana", "cherry", "apple"}

print(thisset)
```

Figure 3: Duplicates not allowed

3. DICTIONARIES

- Dictionaries are used to store data values in key:value pairs.
- A dictionary is a collection which is ordered*, changeable and do not allow duplicates.
- Dictionary items are ordered, changeable, and do not allow duplicates.
- Dictionary items are presented in key:value pairs, and can be referred to by using the key name.

```
thisdict = {
  "brand": "Ford",
  "model": "Mustang",
  "year": 1964
}
print(thisdict["brand"])
```

Figure 4: Dictionaries in Python

4. TUPLE

- Tuples are used to store multiple items in a single variable.
- Tuple is one of 4 built-in data types in Python used to store collections of data, the other 3 are List, Set, and Dictionary, all with different qualities and usage.
- A tuple is a collection which is ordered and **unchangeable**.
- Tuples are written with round brackets.

```
mytuple = ("apple", "banana", "cherry")
```

Figure 5: Tuples in Python

```
thistuple = ("apple", "banana", "cherry")
for i in range(len(thistuple)):
  print(thistuple[i])
```

Figure 6: Looping through Tuples in Python

5. ACTIVITIES:

A1) Write a code for lists and also show how to add remove an item in list as well as show the loop through list.
A2) Write a code for sets and also show how to add remove an item in list as well as show the loop through list.
A3) Write a code for dictionaries and also show how to add remove an item in list as well as show the loop through list.
A4) Write a code for tuple and also show how to add remove an item in list as well as show the loop through list.

IMPORTANT: All the activities` code should be attached to the manual before summary section.

Lab Exercise and Summary

Summary should cover Introduction, Procedure, Data Analysis and Evaluation.

Student's Signature:_____ **Date:**_____

LABORATORY SKILLS ASSESSMENT (Psychomotor)

Total Marks:100

Criteria (Max Marks)	Level 1 0% ≤ S < 50%	Level 2 50% ≤ S< 70%	Level 3 70% ≤ S< 90%	Level 4 90%≤ S ≤100%	Score (S)
Procedural Awareness (30)	Selects inappropriate skills and/or strategies Required by the task.	Selects and applies appropriate skills and/or strategies required by the task with major errors.	Selects and applies the appropriate strategies and/or skills specific to the task without significant errors.	Selects and applies appropriate strategies and/or skills specific to the task without any error.	
Practical Implementation (30)	Makes major critical errors in applying procedural knowledge related to python Lists, Sets, Dictionaries, Tuples.	Makes numerous critical errors in applying procedural knowledge related to python Lists, Sets, Dictionaries, Tuples.	Makes some non-critical errors in applying procedural knowledge related to python Lists, Sets, Dictionaries, Tuples.	Applies the procedural knowledge in optimized ways related to python Lists, Sets, Dictionaries, Tuples.	
Use of Tool/Equipment (30)	Uses tools, equipment and materials with limited competence.	Uses tools, equipment and materials with some competence.	Uses tools, equipment and materials with considerable competence.	Uses tools, equipment and materials with a high degree of competence.	
Safety (10)	Requires constant reminders to follow safety procedures.	Requires some reminders to follow safety procedures.	Follows safety procedures with only minimal reminders.	Routinely follows safety procedures.	
				Marks Obtained	

Instructor Name:_____ **Sign:** _____

LABORATORY SKILLS ASSESSMENT (Affective)

Total Marks: 40

Criteria (Max. Marks)	Level 1 0% ≤ S < 50%	Level 2 50% ≤ S < 70%	Level 3 70% ≤ S < 90%	Level 4 90% ≤ S ≤ 100%	Score
Introduction (5)	Very little background information provided or information is incorrect	Introduction is brief with some minor mistakes	Introduction is nearly complete, missing some minor points	Introduction complete and well-written; provides all necessary background principles for the experiment	
Procedure (5)	Many stages of the procedure are not entered on the lab report.	Many stages of the procedure are entered on the lab report.	The procedure could be more efficiently designed but most stages of the procedure are entered on the lab report.	The procedure is well designed and all stages of the procedure are entered on the lab report.	
Data Record (10)	Data is brief and missing significant pieces of information.	Data provides some significant information and has few critical mistakes.	Data is almost complete but has some minor mistakes.	Data is complete and relevant. Tables with units are provided. Graphs are labeled. All questions are answered correctly.	
Data Analysis (10)	Data is presented in very unclear manner.	Data is presented in ways that are not clear enough.	Data is presented in ways that can be understood and interpreted.	Data is presented in ways that best facilitate understanding and interpretation.	
Report Quality (10)	Report contains many errors.	Report is somewhat organized with some spelling or grammatical errors.	Report is well organized and cohesive but contains some grammatical errors.	Report is well organized and cohesive and contains no grammatical errors. Presentation seems polished.	
				Marks Obtained	

LABORATORY SKILLS ASSESSMENT (Cognitive)

Total Marks: 10

(If any) **Marks Obtained**	

Instructor's Signature:_____ **Date:**_____