Chapter 4 – Lists and Tuples

Lists in Python

Python lists are containers used to store a collection of values, which can be of any data type.

List Indexing

You can access elements in a list using indexing, similar to strings.

```
l1 = [7, 9, "shivam"]
print(l1[0])  # Output: 7
print(l1[1])  # Output: 9
print(l1[2])  # Output: "shivam"
# print(l1[70])  # Error: Index out of range
print(l1[0:2])  # Output: [7, 9] (list slicing)
```

List Methods

Here are some common list methods and their usage:

```python
l1 = [1, 8, 7, 2, 21, 15]

l1.sort()  # Sorts the list in ascending order
print(l1)  # Output: [1, 2, 7, 8, 15, 21]

l1.reverse()  # Reverses the list
print(l1)  # Output: [15, 21, 8, 7, 2, 1]

l1.append(8)  # Adds 8 at the end of the list
print(l1)  # Output: [15, 21, 8, 7, 2, 1, 8]

l1.insert(3, 8)  # Inserts 8 at index 3
print(l1)  # Output: [15, 21, 8, 8, 7, 2, 1, 8]

print(l1.pop(2))  # Removes and returns the element at index 2
# Output: 8
print(l1)  # Updated list: [15, 21, 8, 8, 7, 2, 1, 8]

l1.remove(21)  # Removes the first occurrence of 21 from the list
print(l1)  # Output: [15, 8, 8, 7, 2, 1, 8]
```

Tuples in Python

A tuple is an immutable data type in Python, which means its values cannot be changed after creation.

Creating Tuples

```python
a = ()  # An empty tuple
b = (1,)  # A tuple with only one element (needs a comma)
c = (1, 7, 2)  # A tuple with more than one element
```

Tuple Methods

Here are some common tuple methods:

```python
a = (1, 7, 2, 1)

print(a.count(1))  # Returns the number of times 1 occurs in the tuple
# Output: 2

print(a.index(1))  # Returns the index of the first occurrence of 1 in the tuple
# Output: 0
```

Summary

- **Lists**: Mutable, ordered collections that can store elements of different data types.
- **Tuples**: Immutable, ordered collections that also can store elements of different data types.