

# Python Sequences

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# Objectives

- To understand built-in data sequence types such as Lists, Sets, Tuples and Dictionaries.
- To understand their applications and advantages.
- To understand iterators and constructs that support sequences.
- To learn the different operations that could be performed on these types.

# Lists

- A list is a collection of data elements arranged sequentially.
- They are mutable in nature, in that they can be appended to, and data removed from.
- Lists are enclosed by a pair of squared brackets '[]'
- Lists in Python are heterogeneous. A list can contain any different type of data.
- Lists are especially good for keeping track of things that could change in the course of the program execution.
- A list could be created by a pair of squared-brackets [] or list().

# Creating a List

A list could be created as follows:

```
cities = ['Chicago', 'San Francisco', 'New York']
# A list could also become an
# element of another list
metros = ['Dallas', 'Las Vegas', cities]
print(cities)
['Chicago', 'San Francisco', 'New York']
print(metros)
['Dallas', 'Las Vegas', ['Chicago',
'San Francisco', 'New York']]
```

- Changing the cities list here modifies the metros list as well.
- This is because, cities is just a reference to the block of memory containing "cities list" and changes to it is being reflected in the metros list.

# Data Type Conversions in Lists

Converting a string to a list is easy as follows:

```
language = list('Python')  
print(language)  
['P', 'y', 't', 'h', 'o', 'n']
```

```
# Converting String to List using split()  
birthday = '8/11/2017'  
dob = birthday.split('/')  
print(dob)  
['8', '11', '2017']
```

```
# List can be converted to a String using join()  
statement = ['I', 'love', 'Python']  
sentence = ' '.join(statement)  
print(sentence)  
'I love Python'
```

# Common List Operations

The following are the common operations in List.

- Adding elements to the list using add, append and insert.
- Indexing and Slicing for data retrieval.
- Modifying the list using indexing and Slicing techniques.
- Concatenating Lists.
- Removing items from the list using "del" remove and pop.
- Determining the membership of an item and counting the number of items.
- Searching and Sorting the list.

# More Examples in Lists

More code examples are available at –

<https://github.com/vivek14632/Python-Workshop/tree/master/Introducing%20Python/Chapter%203>

# Tuples

Similar to lists, tuples are sequences of arbitrary items.

- Tuples are the immutable collection sequence types in Python.
- Tuples can't be modified using add, delete, or changing of items once the tuple is created. A tuple is thus a constant list type.
- A tuple can be created using a pair of parenthesis `()`.
- Notice that it is different from how a list can be created by saying `"list()"`.



# Tuple Unpacking

- Multiple variables can be assigned with values at one go using Tuples in Python.
- This underlying implementation has a bigger advantage in Python in a few operations such as swapping two/more variables.
- In other programming languages, particularly statically-typed language, it is more complicated than how it's done in Python.
- Without the use of a temporary variable, unlike in other languages, in Python, two variables can be swapped as follows:

```
a , b = b , a
```

# Summary

- We understood what sequences are in Python.
- We extensively experimented with Python's sequential data types such as Lists and Tuples.
- We learned the difference between these two sequence types and how they help us in different situations.
- We understood and worked with the different methods that these two structures provide.