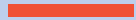


Python Programming

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Lists

Learning outcomes:

Python Lists

Accessing Values in Lists

Updating Lists

Deleting List Elements

Basic List Operations

Built-in List Functions and Methods

List

The list is a most versatile **data type** available in Python which can be written as a list of comma-separated values (items) between square brackets. Important thing about a list is that items in a list need not be of the same type.

A single list may contain **Data Types** like Integers, Strings, as well as Objects. Lists are mutable, and hence, they can be altered even after their creation. List in Python are ordered and have a definite count. The elements in a list are indexed according to a definite sequence and the indexing of a list is done with 0 being the first index.

List

- ❖ Collection of Multiple Data.
- ❖ Holds Multiple Data types.
- ❖ Lists are Mutable.
- ❖ Store multiple data at same time.
- ❖ Creating a list is as simple as putting different comma-separated values between square brackets.

For example:

```
a = [1, 12.5, 'a', "python"]
```

```
list1 = ['physics', 'chemistry', 1997, 2000];
```

Accessing Values in Lists

To access values in lists, use the square brackets for slicing along with the index or indices to obtain value available at that index.

For example:

```
a = [1, 12.5, 'a', "python", "Programming"]  
print(a[1])    # Output is 12.5  
print(a[3])    # Output is python  
print(a[1:4])  # Output is [12.5, 'a', 'python']
```

Accessing Values in Lists

Example:

```
L = [9,18,'Hi',12,"Hello",15.55,'Programming',100,125.5]
```

```
print(L[5])
```

```
print(L[1:5])
```

```
print(L[2:8])
```

```
print(L[2:9:3])
```

```
print(L[-1])
```

```
print(L[-5])
```

How to take every nth-element of a list?

What if we want to have only every 2-nd element of **L**? This is where the *step parameter* comes into play.

Accessing Values in Lists

Example:

```
L = [9,18,'Hi',12,"Hello",15.55,'Programming',100,125.5]
```

```
print(L[0:9:3]) # Here '3' is step parameter
```

Now you also write the above code as

```
print(L[::3])
```

Here both **print(L[0:9:3])** and **print(L[::3])** gives an output as [9, 12, 'Programming']

Accessing Values in Lists

Example:

```
L = [9,18,'Hi',12,"Hello",15.55,'Programming',100,125.5]
print (L[2::2]) # ['Hi', 'Hello', 'Programming', 125.5]
print (L[2::3]) # ['Hi', 15.55, 125.5]
print (L[3::3]) #[12, 'Programming']
print(L[5:-2]) # [15.55, 'Programming']
print(L[-2:-5:-1]) # [100, 'Programming', 15.55]
print(L[-2:-7:-2]) # [100, 15.55, 12]
```

Updating Lists

Lists in Python are **mutable**. All that means is that after defining a list, it is possible to update the individual items in a list.

You can update single or multiple elements of lists by giving the slice on the left-hand side of the assignment operator.

You can also add to elements in a list with the **append()** method.

Updating Lists

Example:

```
z = [30, 17, 40, 2]
```

```
# Update the item at index 1 with the string  
"python"
```

```
z[1] = "Python"
```

```
print(z) # Output->[30, 'Python', 40, 2]
```

```
z.append(100) #Use of append method to add 100
```

```
print(z) # Output->[30, 'Python', 40, 2, 100]
```

Deleting List Elements

To remove a list element, you can use either the *del statement* or *remove()* method.

For Example:

```
b = ['Python', 100, 'Programming', 2, 'is']  
del b[1] # deleting element of 1st index  
print(b) # ['Python', 'Programming', 2, 'is']  
b.remove(2) # Removing the element '2'  
print(b) # ['Python', 'Programming', 'is']
```

Basic List Operations

Lists respond to the **+** and ***** operators much like strings; they mean **concatenation** and **repetition** here too, except that the result is a new list, not a string.

Let's see some of the basic list operations in Python.

Built-in List Functions and Methods

Python includes the following list **functions**:

cmp(list1, list2) : Compares elements of both lists.

Please note **cmp()** does not support in python 3.

len(list): Gives the total length of the list.

max(list):Returns item from the list with max value.

min(list): Returns item from the list with min value.

Let's see the example of list functions.

Built-in List Functions and Methods

Python includes following list **methods**:

list.append(obj): Appends object obj to list

list.count(obj): Returns count of how many times obj occurs in list

list.index(obj): Returns the lowest index in list that obj appears

list.insert(index, obj): Inserts object obj into list at offset index

list.pop(obj=list[-1]) : Removes and returns last object or obj from list

Built-in List Functions and Methods

Python includes following list **methods**:

list.remove(obj): Removes object obj from list

list.reverse(): Reverses objects of list in place

list.sort([func]): Sorts objects of list, use compare func if given

list.extend(seq): Appends the contents of seq to list

Let's see the example of list method.



Thank you