

## List Data Structure

If we want to represent a group of individual objects as a single entity where insertion order preserved and duplicates are allowed, then we should go for List.

insertion order preserved.

duplicate objects are allowed

heterogeneous objects are allowed.

List is dynamic because based on our requirement we can increase the size and decrease the size.

In List the elements will be placed within square brackets and with comma separator.

We can differentiate duplicate elements by using index and we can preserve insertion order by using index. Hence index will play very important role.

Python supports both positive and negative indexes. +ve index means from left to right where as negative index means right to left

### Accessing elements of List:

We can access elements of the list either by using index or by using slice operator(:)

### List vs mutability:

Once we create a List object, we can modify its content. Hence List objects are mutable.

### Important functions of List:

#### 1. To get information about list:

##### 1. len():

returns the number of elements present in the list

##### 2. count():

It returns the number of occurrences of specified item in the list

##### 3. index() function:

returns the index of first occurrence of the specified item.

## II. Manipulating elements of List:

### 1. append() function:

We can use append() function to add item at the end of the list.

### 2. insert() function:

To insert item at specified index position

### 3. extend() function:

To add all items of one list to another list

### 4. remove() function:

We can use this function to remove specified item from the list. If the item is present multiple times then only first occurrence will be removed.

### 5. pop() function:

It removes and returns the last element of the list.

This is only function which manipulates list and returns some element.

### Note:

1. pop() is the only function which manipulates the list and returns some value
2. In general we can use append() and pop() functions to implement stack data structure by using list, which follows LIFO (Last In First Out) order.

In general we can use pop() function to remove last element of the list. But we can use to remove elements based on index.

`n.pop(index)` ==> To remove and return element present at specified index.

`n.pop()` ==> To remove and return last element of the list

## III. Ordering elements of List:

### 1. reverse():

We can use to reverse() order of elements of list.

## 2. sort() function:

In list by default insertion order is preserved. If want to sort the elements of list according to default natural sorting order then we should go for sort() method.

## To sort in reverse of default natural sorting order:

We can sort according to reverse of default natural sorting order by using reverse=True argument.

## Aliasing and Cloning of List objects:

The process of giving another reference variable to the existing list is called aliasing.

The process of creating exactly duplicate independent object is called cloning.

We can implement cloning by using slice operator or by using copy() function

## Using Mathematical operators for List Objects:

We can use + and \* operators for List objects.

## clear() function:

We can use clear() function to remove all elements of List.

## Nested Lists:

Sometimes we can take one list inside another list. Such type of lists are called nested lists.

## List Comprehensions:

It is very easy and compact way of creating list objects from any iterable objects(like list,tuple,dictionary,range etc) based on some condition.

### Syntax:

list=[expression for item in list if condition]