

# LIST

It is a collections of items and each item has its own index value.

Index of first item is 0 and the last item is  $n-1$ . Here  $n$  is number of items in a list.

## Indexing of list

|    |    |    |    |    |                |
|----|----|----|----|----|----------------|
| 0  | 1  | 2  | 3  | 4  | index          |
| 80 | 60 | 70 | 85 | 75 | value          |
| -5 | -4 | -3 | -2 | -1 | Negative index |

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- Creating a list
- Lists are enclosed in square brackets [ ] and each item is separated by a comma.
- **Initializing a list-** Passing value in list while declaring list is initializing of a list
- e.g.
  - list1 = ['English', 'Hindi', 1997, 2000]
  - list2 = [11, 22, 33, 44, 55 ]
  - list3 = ["a", "b", "c", "d"]
- **Blank list creation-** A list can be created without element
- e.g.
- List4=[ ]

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## Access Items From A List

List items can be accessed using its index position.

e.g.

```
list =[3,5,9]
```

```
print(list[0])
```

```
print(list[1])
```

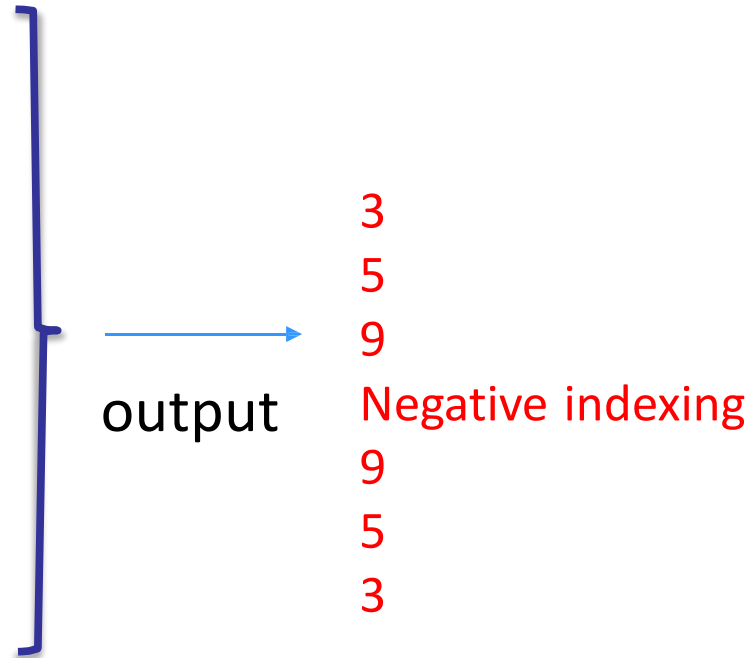
```
print(list[2])
```

```
print('Negative indexing')
```

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

```
print(list[-2])
```

```
print(list[-3])
```



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## Iterating/Traversing Through A List

List elements can be accessed using looping statement.

e.g.

```
list =[3,5,9]
for i in range(0, len(list)):
    print(list[i])
```

Output

3

5

9

# LIST

## Slicing of A List

List elements can be accessed in subparts.

e.g.

```
list = ['I','N','D','I','A']  
print(list[0:3])  
print(list[3:])  
print(list[:])
```

Output

```
['I', 'N', 'D']  
['I', 'A']  
['I', 'N', 'D', 'I', 'A']
```

## Updating / Manipulating Lists

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

```
list = ['English', 'Hindi', 1997, 2000]  
print ("Value available at index 2 : ", list[2])
```

### Output

('Value available at index 2 : ', 1997)

```
list[2:3] = 2001,2002    #list[2]=2001 for single item update  
print ("New value available at index 2 : ", list[2])  
print ("New value available at index 3 : ", list[3])
```

### Output

('New value available at index 2 : ', 2001)

('New value available at index 3 : ', 2002)

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## Add Item to A List

`append()` method is used to add an Item to a List.

```
e.g. list=[1,2]
print('list before append', list)
list.append(3)
print('list after append', list)
```

Output

```
('list before append', [1, 2])
('list after append', [1, 2, 3])
```

**NOTE :-** `extend()` method can be used to add multiple item at a time in list.eg –

```
list.extend([3,4])
```

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## Add Two Lists

e.g.

```
list = [1,2]
```

```
list2 = [3,4]
```

```
list3 = list + list2
```

```
print(list3)
```

OUTPUT

```
[1,2,3,4]
```

# LIST

## Delete Item From A List

```
e.g. list=[1,2,3]
print('list before delete', list)
del list [1]
print('list after delete', list)
```

### Output

```
('list before delete', [1, 2, 3])
('list after delete', [1, 3])
```

```
e.g.
del list[0:2]    # delete first two items
del list        # delete entire list
```

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# LIST

## Basic List Operations

| Python Expression                                          | Results                                   | Description          |
|------------------------------------------------------------|-------------------------------------------|----------------------|
| <code>len([4, 2, 3])</code>                                | 3                                         | <b>Length</b>        |
| <code>[4, 2, 3] + [1, 5, 6]</code>                         | <code>[4, 2, 3, 1, 5, 6]</code>           | <b>Concatenation</b> |
| <code>['cs!'] * 4</code>                                   | <code>['cs!', 'cs!', 'cs!', 'cs!']</code> | <b>Repetition</b>    |
| <code>3 in [4, 2, 3]</code>                                | True                                      | <b>Membership</b>    |
| <code>for x in [4,2,3]:<br/>    print (x,end = ' ')</code> | 4 2 3                                     | <b>Iteration</b>     |

## Important methods and functions of List

| Function               | Description                                               |
|------------------------|-----------------------------------------------------------|
| <b>list.append()</b>   | Add an Item at end of a list                              |
| <b>list.extend()</b>   | Add multiple Items at end of a list                       |
| <b>list.insert()</b>   | insert an Item at a defined index                         |
| <b>list.remove()</b>   | remove an Item from a list                                |
| <b>del list[index]</b> | Delete an Item from a list                                |
| <b>list.clear()</b>    | empty all the list                                        |
| <b>list.pop()</b>      | Remove an Item at a defined index                         |
| <b>list.index()</b>    | Return index of first matched item                        |
| <b>list.sort()</b>     | Sort the items of a list in ascending or descending order |
| <b>list.reverse()</b>  | Reverse the items of a list                               |
| <b>len(list)</b>       | Return total length of the list.                          |
| <b>max(list)</b>       | Return item with maximum value in the list.               |
| <b>min(list)</b>       | Return item with min value in the list.                   |
| <b>list(seq)</b>       | Converts a tuple, string, set, dictionary into list.      |
| <b>count(element)</b>  | Counts number of times an element/object in the list      |

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## Some Programs on List

\* find the largest/max number in a list #Using

sort

```
a=[]
```

```
n=int(input("Enter number of elements:"))
```

```
for i in range(1,n+1):
```

```
    b=int(input("Enter element:"))
```

```
    a.append(b)
```

```
    a.sort()
```

```
    print("Largest element is:",a[n-1])
```

### #using function definition

```
def max_num_in_list( list ):
```

```
    max = list[ 0 ]
```

```
    for a in list: if a > max:
```

```
        max = a
```

```
    return max
```

```
print(max_num_in_list([1, 2, -8,  
0]))
```

```
list1, list2 = [123, 'xyz', 'zara', 'abc'], [456, 700, 200]  
print "Max value element : ", max(list1)  
print "Max value element : ", max(list2) Output  
Max value element : zara Max value element : 700
```

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## Some Programs on List

\* find the mean of a list

```
def Average(lst):    #finding mean of a number return sum(lst) / len(lst)
```

# Driver Code

```
lst = [15, 9, 55, 41, 35, 20, 62, 49]
average = Average(lst)                # Printing average of the list
print("Average of the list =", round(average, 2))
```

Output

Average of the list = 35.75

Note : The inbuilt function `mean()` can be used to calculate the mean( average ) of the list.

e.g. `mean(list)`

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## Some Programs on List

### \* Linear Search

```
list_of_elements = [4, 2, 8, 9, 3, 7]
```

```
x = int(input("Enter number to search: "))
```

```
    found = False
```

```
for i in range(len(list_of_elements)):
```

```
    if(list_of_elements[i] == x):
```

```
        found = True
```

```
        print("%d found at %dth position"%(x,i))
```

```
        break
```

```
if(found == False):
```

```
    print("%d is not in list"%x)
```

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## Some Programs on List

\* Frequency of an element in list

```
import collections
```

```
my_list = [101,101,101,101,201,201,201,201]
```

```
print("Original List : ",my_list)
```

```
ctr = collections.Counter(my_list)
```

```
print("Frequency of the elements in the List : ",ctr)
```

## OUTPUT

Original List : [101, 101,101, 101, 201, 201, 201, 201]

Frequency of the elements in the List : Counter({101: 4, 201:4})

NOTE :SAME CAN BE DONE USING COUNT FUNCTION.E.G.

lst.count(x)