

LISTS IN PYTHON

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- A list is an ordered collection of items (elements).
- Items in a list are separated by commas and enclosed in square brackets [].
- List items can be of any data type and can be changed (mutable).

1 INTRODUCTION

- Lists are used to store multiple items in a single variable.
- Lists are mutable (changeable).

Example:

```
lst = [10, 20, "hello", 3.5, True]
print(lst)
# Output: [10, 20, 'hello', 3.5, True]
```

2 INDEXING

- Indexing starts from 0.

Example:

```
lst = [10, 20, 30, 40, 50]
Index: 0 1 2 3 4
-ve Index: -5 -4 -3 -2 -1
lst[0] # 10
lst[2] # 30
lst[-1] # 50 (last element)
lst[-3] # 30
```

3 LIST OPERATIONS

(A) Concatenation (+)

Example:

```
a = [1, 2, 3]
b = [4, 5, 6]
c = a + b
print(c) # [1, 2, 3, 4, 5, 6]
```

(B) Repetition (*)

Example:

```
lst = [1, 2, 3]
print(lst * 3)
# [1, 2, 3, 1, 2, 3, 1, 2, 3]
```

(C) Membership (in, not in)

Example:

```
lst = [10, 20, 30, 40]
print(20 in lst) # True
print(50 not in lst) # True
```

(D) Slicing

Example:

```
lst = [10, 20, 30, 40, 50]
print(lst[1:4]) # [20, 30, 40]
print(lst[:3]) # [10, 20, 30]
print(lst[2:]) # [30, 40, 50]
print(lst[-3:-1]) # [30, 40]
```

(E) Traversing a List using Loops

Example:

```
lst = [10, 20, 30, 40]
for item in lst:
    print(item, end = " ")
# Output: 10 20 30 40
```

Lists are ordered, changeable and allow duplicate values.

4 BUILT-IN FUNCTIONS / METHODS OF LISTS

No.	Method / Function	Description	Example	Output
1	len(lst)	Returns number of elements in list	len([1, 2, 3, 4])	4
2	list(iterable)	Converts iterable (string, tuple, etc.) to list	list("abc")	['a', 'b', 'c']
3	append(x)	Adds an element x at the end	[1, 2].append(3)	[1, 2, 3]
4	extend(iterable)	Adds all elements of iterable at the end	[1, 2].extend([3, 4])	[1, 2, 3, 4]
5	insert(i, x)	Inserts x at index i	[10, 30].insert(1, 20)	[10, 20, 30]
6	count(x)	Returns count of x in list	[1, 2, 2, 3].count(2)	2
7	index(x)	Returns first index of x	[5, 6, 7].index(6)	1
8	remove(x)	Removes first occurrence of x	[1, 2, 3, 2].remove(2)	[1, 3, 2]
9	pop([i])	Removes & returns item at index i (last item if not given)	lst = [1, 2, 3]; lst.pop()	3
10	reverse()	Reverses the list (in place)	lst = [1, 2, 3]; lst.reverse()	[3, 2, 1]
11	sort()	Sorts the list in ascending order (in place)	lst = [3, 1, 2]; lst.sort()	[1, 2, 3]
12	sorted(iterable)	Returns a new sorted list (does not change original)	sorted([3, 1, 2])	[1, 2, 3]
13	min(lst)	Returns minimum value	min([4, 2, 7])	2
14	max(lst)	Returns maximum value	max([4, 2, 7])	7
15	sum(lst)	Returns sum of all numeric items	sum([1, 2, 3, 4])	10

Remember

- append() adds one item.
- extend() adds multiple items.
- sort() changes original list.
- sorted() creates a new list.

5 NESTED LISTS

- A list inside another list.
- Access using multiple indexes.

Example:

```
matrix = [[1, 2, 3],
           [4, 5, 6],
           [7, 8, 9]]
```

```
matrix[0][0] → 1
matrix[1][2] → 6
matrix[2][1] → 8
```

6 SUGGESTED PROGRAMS

(A) Max, Min and Mean of Numbers in a List

Example:

```
lst = [10, 20, 30, 40, 50]
mx = max(lst)
mn = min(lst)
mean = sum(lst) / len(lst)
print("Max =", mx)
print("Min =", mn)
print("Mean =", mean)
# Output:
# Max = 50 Min = 10 Mean = 30.0
```

(B) Linear Search in a List of Numbers

Example:

```
lst = [12, 23, 34, 45, 56]
key = 34
found = False
for i in range(len(lst)):
    if lst[i] == key:
        found = True
        print(key, "found at index", i)
        break
if not found:
    print(key, "not found in list")
# Output: 34 found at index 2
```

(C) Count Frequency of Elements in a List

Example:

```
lst = [4, 2, 4, 5, 2, 4, 3, 2]
freq = {}
for item in lst:
    if item in freq:
        freq[item] += 1
    else:
        freq[item] = 1
for k, v in freq.items():
    print(k, "→", v)
# Output:
# 4 → 3
# 2 → 3
# 5 → 1
# 3 → 1
```

Exam Tip

Practice list methods by writing small programs daily. This builds speed!

Key Points:

- ✓ Lists are mutable and ordered.
- ✓ Use index starting from 0.
- ✓ Many powerful built-in methods make coding easy.
- ✓ Use loops to process list elements.

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