

# Python Lists - Complete Guide

What is a List in Python?

- A list is a mutable, ordered, indexed collection that allows duplicate values.
- Lists can store different data types.

Example:

```
my_list = [10, "hello", 3.14, True]
```

Indexing and Slicing:

```
lst = [1, 2, 3, 4, 5]
```

```
lst[0] -> 1
```

```
lst[-1] -> 5
```

```
lst[1:4] -> [2, 3, 4]
```

```
lst[::-1] -> [5, 4, 3, 2, 1]
```

List Methods:

- `append(x)`, `insert(i,x)`, `extend(iterable)`
- `remove(x)`, `pop([i])`, `clear()`
- `index(x)`, `count(x)`
- `sort()`, `reverse()`, `copy()`
- `len()`, `sum()`, `min()`, `max()`

List Operations:

- Concatenation: `[1,2] + [3,4] -> [1,2,3,4]`
- Repetition: `[1] * 3 -> [1,1,1]`
- Membership: `2 in [1,2,3] -> True`

List Comprehension:

```
squares = [x*x for x in range(5)] -> [0,1,4,9,16]
```

Nested List:

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

```
matrix[0][1] -> 2
```

Interview Questions:

1. What is a list?
2. Difference between list and tuple?
3. Difference between append and extend?
4. How to remove duplicates?
5. How to flatten a nested list?
6. How to find common elements in two lists?
7. Difference: List vs Array vs Set vs Tuple?

Practice:

- Reverse a list
- Merge two sorted lists
- Frequency of elements

Summary:

- Lists are mutable, ordered.
- Master slicing, comprehensions, methods like append, extend, pop.
- Know differences from tuple/set.