**Python List**

A **list** in is an **ordered, mutable (changeable), and indexed collection** that can hold multiple data types.

**Syntax:**

my\_list = [item1, item2, item3, ...]

✅ **Features of Lists:**

* Can contain different **data types** (integers, floats, strings, etc.).
* **Indexing** starts from 0 (zero-based index).
* Allows **duplicate values**.
* Lists are **mutable**, meaning we can modify them after creation.

**2. Creating Different Types of Lists**

**(a) Empty List**

An **empty list** contains no elements.

empty\_list = []

print(empty\_list) # Output: []

**(b) List of Integers**

int\_list = [10, 20, 30, 40, 50]

print(int\_list) # Output: [10, 20, 30, 40, 50]

**(c) List of Floats**

float\_list = [2.5, 3.14, 9.8]

print(float\_list) # Output: [2.5, 3.14, 9.8]

**(d) List of Strings**

string\_list = ["apple", "banana", "cherry"]

print(string\_list) # Output: ['apple', 'banana', 'cherry']

**(e) List with Mixed Data Types**

mixed\_list = [10, "hello", 3.14, True]

print(mixed\_list) # Output: [10, 'hello', 3.14, True]

**3. Indexing in Lists**

Indexing allows us to access elements using their **position**.

my\_list = ["", "Java", "C++", "JavaScript"]

print(my\_list[0]) # Output:

print(my\_list[2]) # Output: C++

print(my\_list[-1]) # Output: JavaScript (Negative Indexing)

**4. Slicing in Lists**

Slicing extracts a part of the list.

my\_list = [10, 20, 30, 40, 50, 60, 70]

print(my\_list[1:4]) # Output: [20, 30, 40] (From index 1 to 3)

print(my\_list[:3]) # Output: [10, 20, 30] (First three elements)

print(my\_list[3:]) # Output: [40, 50, 60, 70] (From index 3 onwards)

print(my\_list[-3:]) # Output: [50, 60, 70] (Last three elements)

print(my\_list[::2]) # Output: [10, 30, 50, 70] (Every second element)

**5. Adding Elements to a List**

**(a) append() – Adds an element to the end**

fruits = ["apple", "banana"]

fruits.append("cherry")

print(fruits) # Output: ['apple', 'banana', 'cherry']

**(b) insert(index, element) – Adds an element at a specific position**

fruits = ["apple", "banana"]

fruits.insert(1, "orange")

print(fruits) # Output: ['apple', 'orange', 'banana']

**6. Removing Elements from a List**

**(a) remove(value) – Removes the first occurrence**

numbers = [10, 20, 30, 40]

numbers.remove(20)

print(numbers) # Output: [10, 30, 40]

print(removed\_element) # Output: 30

**(b) clear() – Removes all elements**

numbers = [10, 20, 30]

numbers.clear()

print(numbers) # Output: []

**7. Sorting Lists**

**(a) sort() – Sorts the list in ascending order**

num\_list = [5, 2, 8, 1, 9]

num\_list.sort()

print(num\_list) # Output: [1, 2, 5, 8, 9]

**(b) Sorting in Descending Order**

num\_list = [5, 2, 8, 1, 9]

num\_list.sort(reverse=True)

print(num\_list) # Output: [9, 8, 5, 2, 1]

**(c) Sorting a List of Strings**

words = ["banana", "apple", "grape"]

words.sort()

print(words) # Output: ['apple', 'banana', 'grape']

**8. More List Operations**

**(a) len() – Get the number of elements**

numbers = [10, 20, 30]

print(len(numbers)) # Output: 3

**(b) Checking if an Element Exists**

fruits = ["apple", "banana", "cherry"]

print("banana" in fruits) # Output: True

**(c) count() – Counts occurrences of an element**

numbers = [1, 2, 3, 1, 1, 4]

print(numbers.count(1)) # Output: 3

**(d) index(value) – Finds the index of an element**

numbers = [10, 20, 30, 40]

print(numbers.index(30)) # Output: 2