

Chapter 12 - 7List

Theory:

Lists are ordered, mutable collections that can hold various data types.

Code Example:

```
# -----
# ■ LISTS IN PYTHON
# -----
# ■ A list is a **collection of values** stored in a single variable.
# ■ Lists can hold **different data types** (strings, numbers, booleans, etc.)
# ■ Lists are **mutable**, meaning we can change, add, or remove elements.
# ■ List indexing starts from 0.
# ■ Lists are flexible – we can insert or delete elements from anywhere.
# Example List:
friends = ["apple", "orange", 5, 345.06, False, "akash", "milan"]
# -----
# ■ INDEXING
# -----
print(friends[0]) # Output: 'apple'
# Changing the value at index 0
friends[0] = "grapes"
print(friends[0]) # Output: 'grapes'
# -----
# >■ SLICING
# -----
# Syntax: list[start_index : end_index]
# Includes start_index, excludes end_index
print(friends[0:4]) # Output: ['grapes', 'orange', 5, 345.06]
# -----
# ■■ STRING vs LIST BEHAVIOR
# -----
# ■ Strings are immutable:
# Any method creates a **new** string
# ■ Lists are mutable:
# Most methods modify the **original** list directly
# -----
# ■■ COMMON LIST METHODS
# -----
numbers = [1, 2, 3, 4, 5]
# ■ .append(value) → Adds element to the end
numbers.append(6)
print(numbers) # Output: [1, 2, 3, 4, 5, 6]
# ■ .insert(index, value) → Adds element at specific index
numbers.insert(2, 99) # list.insert(index, value)
# 2-> where to insert , 99 -> what to insert
print(numbers) # Output: [1, 2, 99, 3, 4, 5, 6]
# ■ .extend(iterable) → Adds elements from another list (or iterable)
numbers.extend([10, 11])
print(numbers) # Output: [1, 2, 99, 3, 4, 5, 6, 10, 11]
# ■ .remove(value) → Removes first occurrence of value
numbers.remove(99)
print(numbers) # Output: [1, 2, 3, 4, 5, 6, 10, 11]
# ■ .pop(index) → Removes and returns value at index (default: last)
```

```

last = numbers.pop()
#list.pop() # Removes the last item
#list.pop(index) # Removes the item at the given index
print(last) # Output: 11
print(numbers) # Output: [1, 2, 3, 4, 5, 6, 10]
# ■ .clear() → Removes all elements
# numbers.clear()
# print(numbers) # Output: []
# ■ .sort() → Sorts list in ascending order (modifies original)
nums = [5, 2, 9, 1]
nums.sort()
print(nums) # Output: [1, 2, 5, 9]
# ■ .reverse() → Reverses the list
nums.reverse()
print(nums) # Output: [9, 5, 2, 1]
# ■ .copy() → Returns a new copy of the list
copy_nums = nums.copy()
print(copy_nums) # Output: [9, 5, 2, 1]
# ■ .count(value) → Counts how many times value appears
print(nums.count(5)) # Output: 1
# ■ .index(value) → Returns index of first occurrence
print(nums.index(2)) # Output: 2
# -----
# ■ NOTE:
# - List methods like `append()`, `insert()`, `extend()`, `sort()` modify the original list
# - String methods return a new string

```