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DAY-3

LECTURE NO 3

PROGRAMMING

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WHAT IS A LIST?

- A list stores a group of values.
- It is changeable (mutable).
- It can contain:
  - Integers (87)
  - Strings ("Karan")
  - Floats (99.5)
  - Even mixed types together.

```
marks = [87, 64, 33, 95, 76]
student = ["Karan", 85, "Delhi"]
```

- You can access each item by its index (starting from 0):
- Change an item: student[0] = "Arjun" ✅
- Find list size: len(student)

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LIST SLICING

Slicing lets you access a range of elements.

Syntax:

list_name[start : end]

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LIST METHODS (FUNCTIONS)

01

.append(el)

Adds an element at the end

02

.insert(index, el)

Inserts an element at a specific index

03

.sort()

Sorts the list in ascending order

04

.sort(reverse=True)

Sorts in descending order

05

.reverse()

Reverses the entire list

06

.remove(el) and .pop(index)

Removes the first occurrence of the element
Removes the element at the index

```
nums = [2, 1, 3]
nums.append(4)          # [2, 1, 3, 4]
nums.insert(1, 100)     # [2, 100, 1, 3, 4]
nums.sort()             # [1, 2, 3, 4, 100]
nums.reverse()          # [100, 4, 3, 2, 1]
nums.pop(2)             # Removes element at index 2
```

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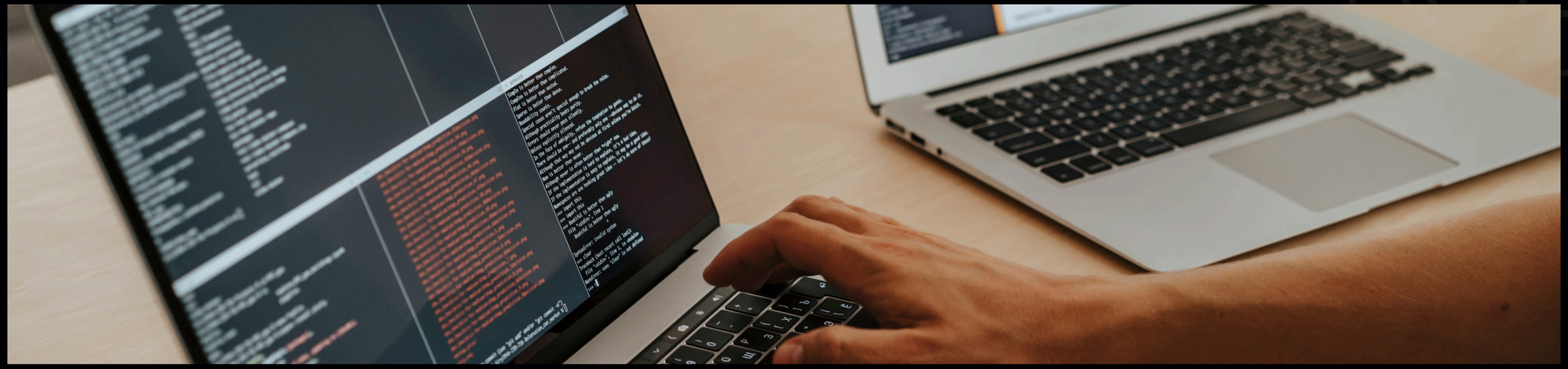

TUPLES IN PYTHON

A tuple is similar to a list, but it's immutable (you can't change it after creation).

Example:

```
tup = (87, 64, 33, 95, 76)
tup[0] = 43  # ✗ This will give an error!
```

Creating Tuples:

```
tup1 = ()          # empty tuple
tup2 = (1,)        # single-element tuple (must include comma!)
tup3 = (1, 2, 3)   # multiple elements
```

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TUPLE METHODS (FUNCTIONS)

01

.index(el)

Finds the index of the first occurrence of the element

02

.count(el)

Counts how many times the element appears

EXAMPLE:

```
tup = (2, 1, 3, 1)
tup.count(1)    # Output: 2
tup.index(1)    # Output: 1
```


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PRACTICE QUESTIONS

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EASY (BASIC UNDERSTANDING)

1. Create a list of your 5 favorite fruits.
2. Access the 3rd element from a list [5, 10, 15, 20].
3. Change the first value of a list from 10 to 100.
4. Use len() to find the number of items in [4, 7, 1, 2].
5. Create a tuple with the elements: "Python", 3.10, True.
6. Add an element "banana" to a list using .append().
7. Sort the list [3, 1, 4, 2] in ascending order.
8. Remove the element 4 from the list [4, 5, 6].
9. Reverse the list [1, 2, 3].
10. Count how many times 2 appears in (2, 2, 3, 4).

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MEDIUM (LOGIC & METHODS)

1. Write a program to take 5 names from user and store in a list.
2. Slice and print only first 3 values from a list of 5 numbers.
3. Create a tuple with numbers and print the 2nd to 4th values.
4. Check if a word is palindrome using a list.
5. Use .insert() to add "grape" at index 1 in a fruit list.
6. Sort a list in descending order using .sort(reverse=True).
7. Use .pop() to remove the 2nd item from a list.
8. Count number of B grades in this tuple: ("B", "A", "B", "C").
9. Check if a value exists in a list using in.
10. Take 3 numbers from user and print their average.

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HARD (CONCEPTUAL MASTERY)

1. Check if a list is a palindrome without using slicing.
2. Create a list from user input and remove duplicates.
3. Merge two lists and sort them together.
4. Create a program that counts vowels in a list of strings.
5. Take names and scores, and store them in a nested list.
6. Reverse a tuple using slicing.
7. Simulate stack operations using .append() and .pop().
8. Write a function to count how many elements are integers in a mixed list.
9. From a list of numbers, separate even and odd numbers into different lists.
10. Take a list of student marks, and print highest, lowest, and average marks.

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THANK YOU