Python Slicing - 29-09-2025

1. What is Slicing?
Slicing means extracting a portion (subsequence) of a sequence in Python.
It works on Strings, Lists, Tuples.

Syntax:
sequence[start:stop:step]
- start: index where slice begins (inclusive, default = 0)
- stop: index where slice ends (exclusive, default = length of sequence)
- step: interval between elements (default = 1)

2. Basic Examples

String:
text = "Python"
text[0:4] -> 'Pyth'
text[:4] -> 'Pyth'
text[2:] -> 'thon'
text[:] -> 'Python'

List:
numbers = [10, 20, 30, 40, 50]
numbers[1:4] -> [20, 30, 40]
numbers[:3] -> [10, 20, 30]
numbers[2:] -> [30, 40, 50]
numbers[:] -> [10, 20, 30, 40, 50]

3. Step Parameter

data = "ABCDEFGHIJ"
data[::2] -> 'ACEGI'
data[1:8:2] -> 'BDFH'

nums = [1,2,3,4,5,6,7,8,9]
nums[::3] -> [1,4,7]

4. Negative Indexing
text = "Python"
text[-3:] -> 'hon'
text[:-3] -> 'Pyt'

5. Negative Steps (Reverse Slicing)
text[::-1] -> 'nohtyP'
text[5:1:-1] -> 'noht'

nums[::-1] -> [5,4,3,2,1]
nums[-1:-4:-1] -> [5,4,3]

6. Out-of-Range Indexing
text[2:100] -> 'thon'

7. Slice Objects
s = slice(1,5,2)
text[s] -> 'yh'

8. Slicing Mutability
nums = [1,2,3,4,5]
nums[1:4] = [20,30,40] -> [1,20,30,40,5]
nums[2:4] = [] -> [1,20,5]

Strings and tuples are immutable.

9. Practical Examples
Reverse a String:
s = "OpenAI"
s[::-1] -> 'IAnepO'

Extract Every 2nd Item from List:
lst = [10,20,30,40,50,60]
lst[::2] -> [10,30,50]

Remove First & Last Character:
word = "Python"
word[1:-1] -> 'ytho'

10. Summary Table

Expression	Meaning
s[start:stop]	Elements from start to stop-1
s[:stop]	Elements from beginning to stop-1
s[start:]	Elements from start to end
s[:]	Copy of sequence
s[::step]	Elements with step interval
s[::-1]	Reversed sequence
s[start:stop:-1]	Elements backwards from start to stop