Data Structure

1. Data structure and Algo are 2 differnt terms. Data structure deals with the ways of arranging the data(Array, LL , Queue) whereas, algo deals with the sequence of steps taken to solve any problem statement.

1) Linear DS → Array, Stack, Queue & many more

2) Non-Linear DS → Tree, Graphs

Data arranged in Linear Fashion is Linear DS
Data arranged in Noon Linear Fashion us Non Linear DS

Array is the linear DS where elements are stored in linear fashion having contiguous memory allocation.

Array → continuous manner

	00x500 ↑	00x504 ↑	508 ↑	512 ↑						
	20	11	15	25	65	5	7	21	97	→ arr
index —	0	1	2	3	4	5	6	7	8	

int → 4 Byte

Property :-

↳ Searching *

n = 9

↳ Random access → arr[8]

↳ Print the element present at last position in an array

Random access means we can directly access any elements in one go since the elements are indexed.

arr(n-1) →

Python → Dynamic array

Array ↔ List → different types

Static array

↳ n = 9

↳ define the size of an array prior

Dynamic array → no need to define the size of an array prior

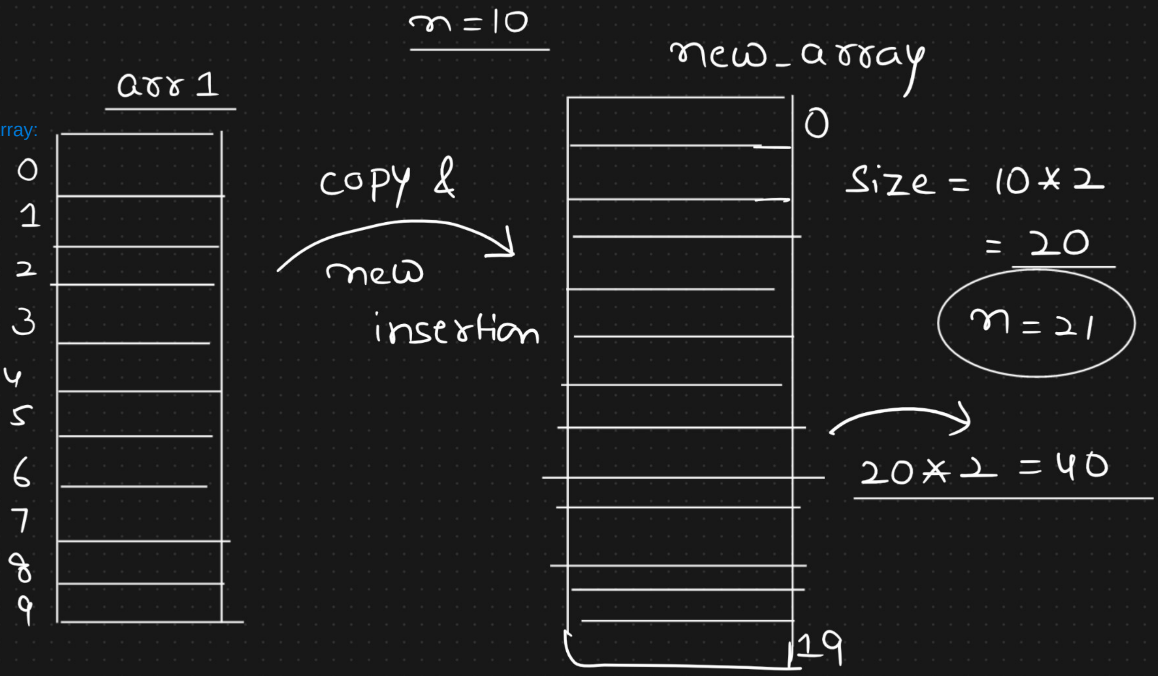
In python we are not provided with the concept of static array instead we are provided with dynamic array in form of list that can take any number if elements without mentioning any size before hand and also can contain both homogenous and heterogenous elements within it.

In static array if we are adding element at 10th index in an array of size 9 then will get an error. But in Python that use dynamic array this will be not the case

n = 10 → Exception (C++, Java)

Explanation of Dynamic Array:

Suppose we are provided with an array of size 10 and there is need to insert an element at 11th index. In Python using dynamic array this can be performed where firstly there will be internal expansion of Size*2 followed by copying the old elements followed by insertion of elements in the said index if index present else again internally expand the array and generate new array of size twice the older.



Abstract Data Types

↳ customized

Two types of datatypes:
1. Primitive: these are predefined like int char, float etc.
2. Abstract: these are customized data types. For example insert(), append(), are some the different methods used in case of List abstract data type.

- List DT ⟹ insert(), remove(), replace()
- Stack DT → Push(), pop(), peek()
- Queue DT
  ↳ enqueue, dequeue()