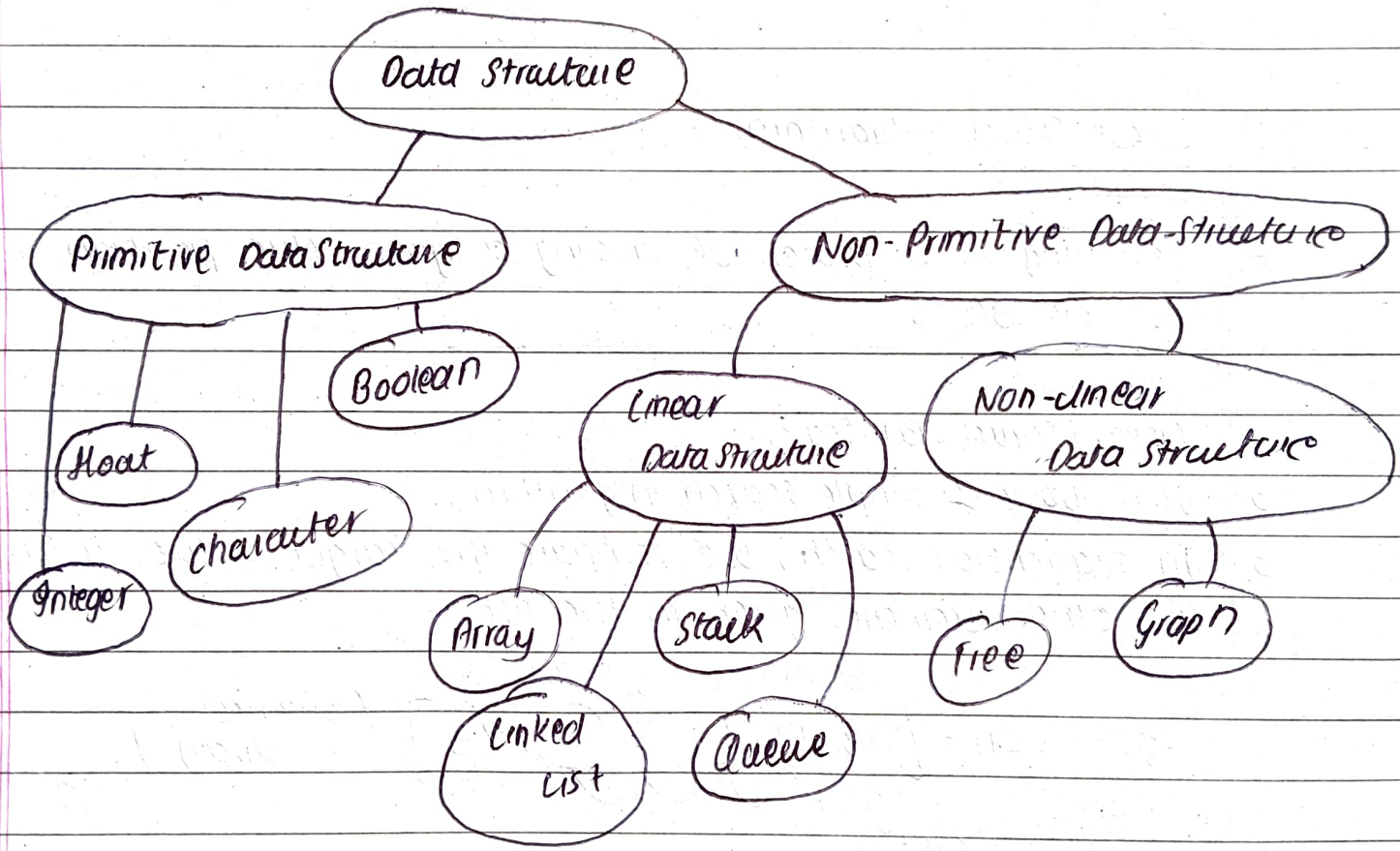
A data structure is a way of organizing, managing and storing data so that it can be used efficiently. It defines how data is arranged in memory, how it can be accessed, and how operations like insertion, deletion, searching, and sorting can be performed on it.

Types:



IRL examples:

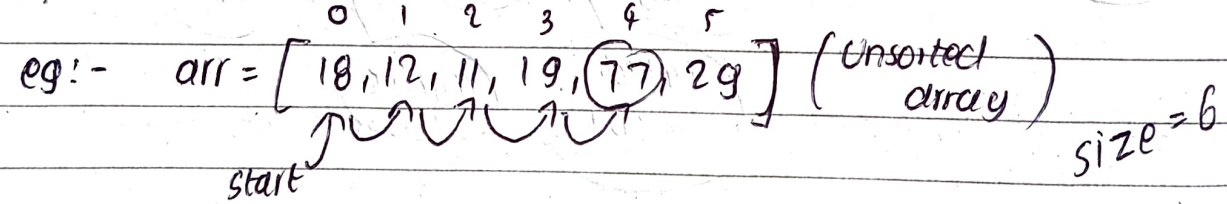
Array : Storing a list of students in school system
Stack : Undo/Redo operations in a text editor
Queue : Printer Queue in an office
Tree : File system hierarchy in a computer
Graph : Google maps for navigation.

Linear Search Algorithm:

- Searching is a process of finding a given value position in a list of values

Linear/Sequential Search

- It is basic & simple search Algorithm
- In sequential search, we compare the target value with all the other elements given in the list



target value = 77

In above example, the target value is compared with all the elements in array in sequential search / linear way.

Time complexity: (Time complexity means how your time will grow as the input size grows)

- Best Case: $O(1)$ → constant

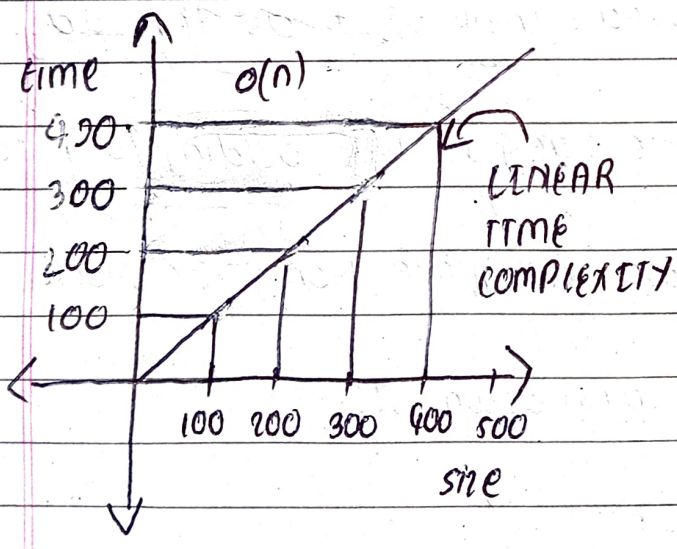
=> How many checks will the loop make in best case i.e the element will be found at the 0^{th} index i.e only one comparision will be made for the best case.

- Worst Case: $O(n)$

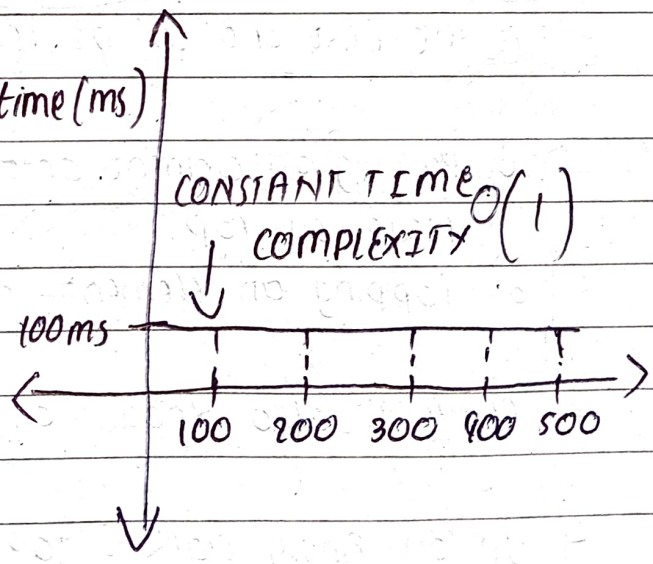
=> Worst Case, here it will go through all the elements and then itill say element not found. here, n is the size of the array.

=>

Size of Array	No of comparisions	time (ms)
100	100	100ms
200	200	200ms
n	n	—



WORST CASE



BEST CASE