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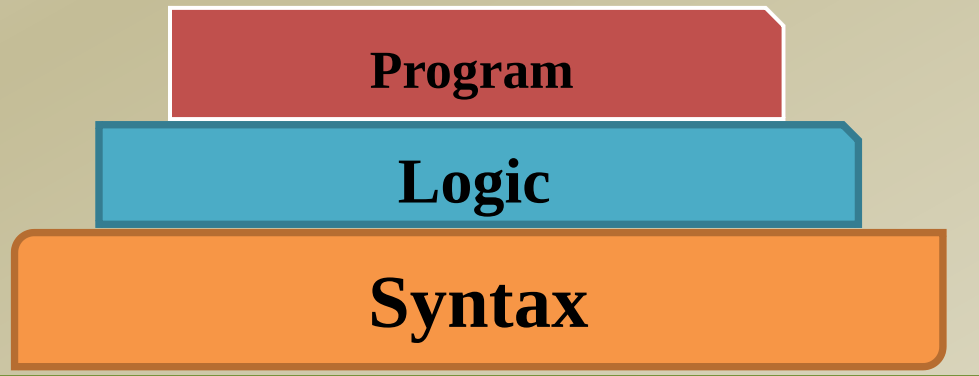
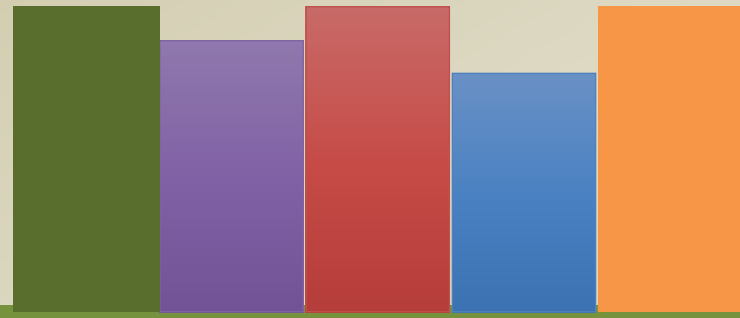
Searching In Arrays





Searching In Arrays

- One of the basic operations to be performed on an array is searching.
- Searching an array means to find a particular element in the array.
- The search operation is used to return the position of the element or check if it exists in the array.
- The objective of searching is to find whether a particular element is present or not, if present then return the index of the particular element, otherwise return NO.
- There are two methods to search in an array:
  - *Linear Search*
  - *Binary Search*

Linear Search

- The simplest search to be done on an array is the linear search.
- This search starts from one end of the array and keeps iterating until the element is found, or there are no more elements left (which means that the element does not exist).
- It can be used reliably in any situation.
- This search is best used when the list of elements is unsorted and the search is to be performed only once.
- It is also preferred for list to be small, as the time taken grows with the size of the data.

Binary Search

- The linear search approach has one disadvantage. Finding elements in a large array will be time consuming. As the array grows, the time will increase linearly. A binary search can be used as a solution to this problem in some cases.
- The principle of binary search is how we find a page in book. We open the book at a random page in the middle and based on that page we narrow our search to the left or right of the book. Indeed, this only is possible if the page numbers are in order.
- Hence, the prerequisite of performing a binary search is that the array must be sorted. That is why this works only in cases where keeping a sorted copy of the array is possible.

Linear Search Vs Binary Search

Linear Search

- In this, search element is compared with each and every element of the array.
- It can work with both sorted and unsorted arrays.
- It is generally used with small-sized arrays.
- It take more number of comparisons.
- It has low performance.

Binary Search

- In this, search element is compared with the middle element of the array.
- It can work only with sorted arrays.
- It is generally used with bigger size arrays.
- It takes less number of comparisons.
- It has high performance.

Happy Learning!!

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