### What are data structures?

### Time complexity or Complexity

Big O notation

Linear complexity

### Space Complexity:

### Linear Search:

Linear search is a sequential searching algorithm where we start from one end and check every element of the list until the desired element is found. It is the simplest searching algorithm.

Time complexity: Worse case - O(n), Best case - O(1), Average case - O(n/2)

## Binary Search:

Binary search is the search technique that works efficiently on sorted lists.

Binary search follows the divide and conquer approach in which the list is divided into two halves, and the item is compared with the middle element of the list. If the match is found then, the location of the middle element is returned. Otherwise, we search into either of the halves depending upon the result produced through the match.

Time complexity: Ο(log n).

### Logarithm

### Matrix

### Selection Sort

[Selection sort](https://www.programiz.com/dsa/selection-sort) is a sorting algorithm that selects the smallest element from an unsorted list in each iteration and places that element at the beginning of the unsorted list.

Time complexity: Best - Ο(n2), Worse - Ο(n2), average - Ο(n2).

Space complexity: O(1)

### Bubble sort:

Bubble sort is a sorting algorithm that compares two adjacent elements and swaps them until they are not in the intended order.

Time complexity: Ο(n2)

Space complexity: O(1)

## Insertion sort:

[Insertion sort](https://www.programiz.com/dsa/insertion-sort) is a sorting algorithm that places an unsorted element at its suitable place in each iteration.

Time complexity: Best - Ο(2), Worse - Ο(n2), average - Ο(n2).

Space complexity: O(1)

## stack

A stack is a linear data structure that follows the principle of Last In First Out (LIFO).

You can think of the stack data structure as the pile of plates on top of another.

Applications of Stack Data Structure

1. **To reverse a word** - Put all the letters in a stack and pop them out. Because of the LIFO order of stack, you will get the letters in reverse order.
2. **In browsers** - The back button in a browser saves all the URLs you have visited previously in a stack. Each time you visit a new page, it is added on top of the stack. When you press the back button, the current URL is removed from the stack, and the previous URL is accessed.