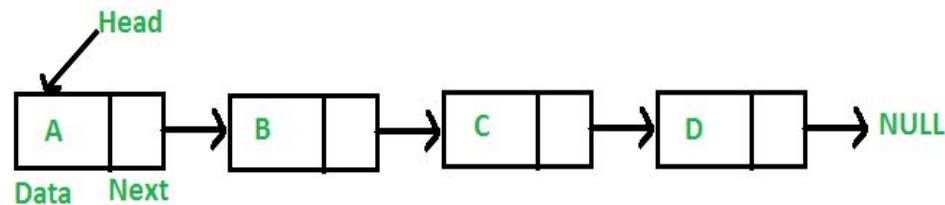


1. LinkedList

A linked list is a linear data structure, in which the elements are not stored at contiguous memory locations. The elements in a linked list are linked using pointers . In simple words, a linked list consists of nodes where each node contains a data field and a reference(link) to the next node in the list.



It takes $O(1)$ time to insert node at head of linked list.

2. Binary search

Search a sorted array by repeatedly dividing the search interval in half. Begin with an interval covering the whole array. If the value of the search key is less than the item in the middle of the interval, narrow the interval to the lower half. Otherwise narrow it to the upper half. Repeatedly check until the value is found or the interval is empty.

The idea of binary search is to use the information that the array is sorted and reduce the time complexity to $O(\log n)$.

3. Searching Element In Array

Input : `arr[] = {4, 6, 1, 5, 8},`

`x = 1`

Output : Found

Searching an element in array will take $O(n)$ time complexity .

4. Selection Sort

The selection sort algorithm sorts an array by repeatedly finding the minimum element (considering ascending order) from unsorted part and putting it at the beginning. The algorithm maintains two subarrays in a given array.

- 1) The subarray which is already sorted.
- 2) Remaining subarray which is unsorted.

In every iteration of selection sort, the minimum element (considering ascending order) from the unsorted subarray is picked and moved to the sorted subarray.

Time Complexity: $O(n^2)$ as there are two nested loops.

5. Tower of Hanoi

The Tower of Hanoi (also called the Tower of Brahma or Lucas' Tower^[1] and sometimes pluralized as Towers) is a [mathematical game](#) or [puzzle](#). It consists of three rods and a number of disks of different sizes, which can slide onto any rod. The puzzle starts with the disks in a neat stack in ascending order of size on one rod, the smallest at the top, thus making a [conical](#) shape.

The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:

1. Only one disk can be moved at a time.
2. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack or on an empty rod.
3. No larger disk may be placed on top of a smaller disk.

With 3 disks, the puzzle can be solved in 7 moves. The minimal number of moves required to solve a Tower of Hanoi puzzle is $2^n - 1$, where n is the number of disks.