

Linear Vs Binary Search

Linear Search

Searches for an element by visiting all the elements sequentially until the element is found.

$\begin{array}{c} 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \\ \boxed{7} \quad \boxed{10} \quad \boxed{2} \quad \boxed{9} \quad \boxed{11} \quad \boxed{21} \quad \boxed{3} \end{array} \Rightarrow \text{can be sorted or unsorted}$

Search '2' \rightarrow Element found WC Complexity: $O(n)$

Binary Search

Searches for an element by breaking the search space into half in a sorted array.

$\begin{array}{c} 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \\ \boxed{8} \quad \boxed{9} \quad \boxed{11} \quad \boxed{18} \quad \boxed{22} \quad \boxed{31} \quad \boxed{88} \end{array}$

$\begin{array}{c} \uparrow \quad \quad \quad \uparrow \quad \quad \quad \uparrow \\ \text{Low} \quad \quad \text{Mid} \quad \quad \text{High} \end{array} \quad \text{WC Complexity } O(\log n)$

Search 18

The search continues towards either side of mid based on whether the element to be searched is lesser or greater than mid.

Linear Search

Binary Search

1. Works on both sorted and unsorted arrays

Works only on sorted arrays

2. Equality operations

inequality operations

3. $O(n)$ WC complexity

$O(\log n)$ WC complexity