

Big O Notation:

Big O Notation can be understood as a mathematical way to quantify and describe the performance of an algorithm. It determines the upper bound of an algorithm's running time for the input of size n meaning predicting the algorithm's worst case scenario performance for the input of size n .

Best, Average and Worst-Case Scenarios for search Operations:

Best Case:

The best-case scenario is the scenario when the target value is found immediately at the starting of the searching algorithm. It determines the minimum time taken by the algorithm for the input of size n .

Linear Search: $O(1)$

Binary Search: $O(1)$

Average Case:

The average-case scenario is the one when the target value can be present anywhere in the search space, therefore the time taken by the algorithm in average case lies between the time taken by it in the best case and worst case.

Linear Search: $O(n)$

Binary Search: $O(\log n)$

Worst Case:

It is considered as the worst scenario when either the target value is not present in the search space or it is found at the very end after searching the whole search space.

Linear Search: $O(n)$

Binary Search: $O(\log n)$