Solution to Understanding Search Algorithms

1. Explain linear search and binary search algorithms.

Ans.

**Linear Search:** The linear search algorithm is defined as a sequential search algorithm that starts at one end and goes through each element of a list until the desired element is found; otherwise, the search continues till the end of the dataset.

The process of Linear Search is,

* 1. Every element is considered as a potential match for the key and checked for the same.
  2. If any element is found equal to the key, the search is successful and the index of that element is returned.
  3. If no element is found equal to the key, the search yields “No match found”.

**Binary Search:** Binary search is a search algorithm used to find the position of a target value within a sorted array. It works by repeatedly dividing the search interval in half until the target value is found or the interval is empty. The search interval is halved by comparing the target element with the middle value of the search space.

Binary Search Algorithm:

1. Divide the search space into two halves by finding the middle index “mid”.

1. Compare the middle element of the search space with the key.
2. If the key is found at middle element, the process is terminated.
3. If the key is not found at middle element, choose which half will be used as the next search space.
   1. If the key is smaller than the middle element, then the left side is used for next search.
   2. If the key is larger than the middle element, then the right side is used for next search.
4. This process is continued until the key is found or the total search space is exhausted.