Searching

STUDY NOTES

- Every computer is capable of storing a lot of data which can be retrieved by the user as and when there is a requirement.
- A specific item can be located in a collection of items using searching techniques.
- A searching technique can be used to determine whether an element exist in a collection or not. If the element is existing then its location can be identified.
- There are different types of searching algorithms available and one has to decide which algorithm is most suited for his data.

Linear Search:

- Linear search is the most basic and simplest search method.
- Linear search algorithm compares every element of a given list with the item to be searched.
- Linear search is also known as Sequential or Serial search.
- In a list of n elements, if the key is not present in the list or is placed at the end then the linear search algorithm will have to make n comparisons.

Binary Search:

- Binary search is conducted on a sorted list.
- If the list provided has elements arranged in order, then we can search more efficiently using binary search as compared to Linear search.
- The first comparison of the key is made with the element in the middle of the list.
- Binary search algorithm involves following steps:
  - ❖ It takes a sorted/ordered list.
  - ❖ Midpoint of the list is calculated.
  - ❖ The key is compared to the element in the middle.
  - ❖ If the key matches, the program ends.
  - ❖ If the key does not match then the algorithm checks if the key is greater than the key:
    - ■ If yes, then it continues repeating the search in similar manner in the first half of the list.
    - ■ If no, then it continues repeating the search in similar manner in the second half of the list.

Hashing:

- Hashing is a searching technique which allows you to find if a key exists in a sequence in just one step.
- It makes searching operation efficient.
- It has a hash function that generates index value for each element.
- The hash function works with remainder method to generate a hash value.
- Hash value, h(element) = element%size(hash table).
- Two elements having the same hash value will create a problematic condition called collision.
- Collision is handled by collision resolution.