Hash Table

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Hash Table is one of the most important data structures that uses a special function known as a hash function that maps a given value with a key to access the elements faster.

A Hash table is a data structure that stores some information, and the information has basically two main components, i.e., key and value. The hash table can be implemented with the help of an associative array. The efficiency of mapping depends upon the efficiency of the hash function used for mapping.

For example, suppose the key value is John and the value is the phone number, so when we pass the key value in the hash function shown as below:

Hash(key)= index;

Drawback of Hash function

A Hash function assigns each value with a unique key. Sometimes hash table uses an imperfect hash function that causes a collision because the hash function generates the same key of two different values.

Hashing

Hashing is one of the searching techniques that uses a constant time. The time complexity in hashing is O(1). The worst time complexity in linear search is O(n), and O(logn) in binary search. In both the searching techniques, the searching depends upon the number of elements but we want the technique that takes a constant time. So, hashing technique came that provides a constant time.

There are three ways of calculating the hash function:

- **Division method**
- **Folding method**
- **Mid square method**

Collision

When the two different values have the same value, then the problem occurs between the two values, known as a collision.

The following are the collision techniques:

- Open Hashing: It is also known as closed addressing.
- Closed Hashing: It is also known as open addressing.