**The Principle of Hash Table**

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As we mentioned in the introduction,  Hash Table is a data structure which organizes data using hash functions in order to support quick insertion and search. In this article, we will take a look at the principle of the hash table.

*The Principle of Hash Table*

The key idea of Hash Table is to use a hash function to map keys to buckets. To be more specific,

1. When we insert a new key, the hash function will decide which bucket the key should be assigned and the key will be stored in the corresponding bucket;
2. When we want to search for a key, the hash table will use the same hash function to find the corresponding bucket and search only in the specific bucket.

*An Example*

A diagram of a diagram

AI-generated content may be incorrect.

In the example, we use y = x % 5 as our hash function. Let's go through the insertion and search strategies using this example:

1. Insertion: we parse the keys through the hash function to map them into the corresponding bucket.
   * e.g. 1987 is assigned to bucket 2 while 24 is assigned to bucket 4.
2. Search: we parse the keys through the same hash function and search only in the specific bucket.
   * e.g. if we search for 1987, we will use the same hash function to map 1987 to 2. So we search in bucket 2 and we successfully find out 1987 in that bucket.
   * e.g. if we search for 23, will map 23 to 3 and search in bucket 3. And We find out that 23 is not in bucket 3 which means 23 is not in the hash table.