

Hash maps are indexed data structures. A hash map makes use of a hash function to compute an index with a key into an array of buckets or slots. Its value is mapped to the bucket with the corresponding index.

For example, storing user information- consider email as the key, and we can map values corresponding to that user such as the first name, last name etc to a bucket.

Hash function is the core of implementing a hash map. It takes in the key and translates it to the index of a bucket in the bucket list.

Ideal hashing should produce a different index for each key. In Python, dictionaries are examples of hash maps.

Time Complexity:

Memory index access takes constant time and hashing takes constant time. Hence, the search complexity of a hash map is also constant time, that is, $O(1)$.

Advantages of HashMaps

- Fast random memory access through hash functions
- Can use negative and non-integral values to access the values.
- Keys can be stored in sorted order hence can iterate over the maps easily