Wednesday, November 1, 2017

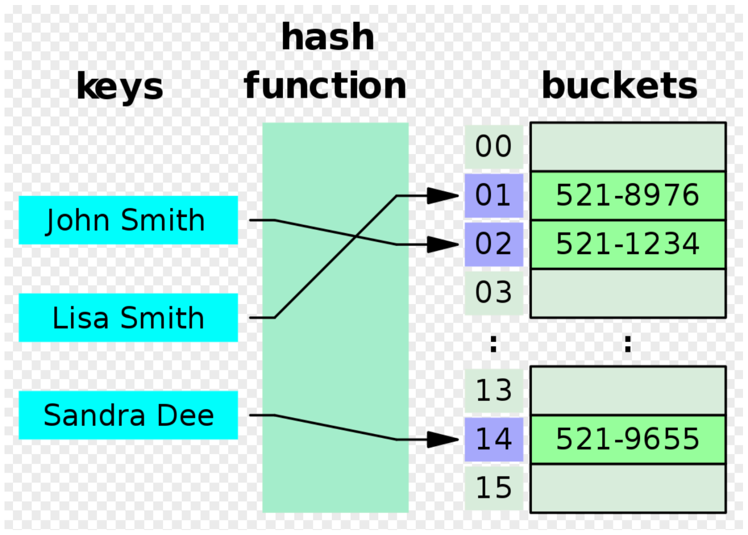
1) Arrays and Strings

Hash Tables

- Stores pairs of (key, value) in a way that is very efficient to lookup for the value using the key.

  Below there is an implementation example using and array of linked lists:

- A hash function receives the key and compute an integer. (Simple example could be return the length)
- When stores a pair (k,v), compute the hash of the key, go to that index in the array and add the pair (k,v) to the linked list.
- To lookup with the key, compute the hash, get the linked list and search.
- Worst case O(n), best case O(1), depends on the design of the hash function.



Array List

- An array list (or resizable array) is an array that augment their size every time that the user try to append an element and the array is full.
- Still provides O(1) access but every time it gets full it cost O(n) the next insertion. In the end the insertion cost is O(1) because the cost of increasing the array is amortized.
- Simple implementation for the auto augment is create a new array of double the size and put every thing in this new one.

String Builder

- Concatenation of 2 strings is in general expensive. Think of two string one of size n and the other of size m. Then to concatenate them you usually create a new string and put both there character by character O(n+m)
- String Builder data structure use a resizable array instead. Then to concatenate 2 string append each string in the string builder. So the array will be doubling their size but we know that is still O(1) each insertion.