Marie Elizabeth Kelling

Chapter 5 – Hashed Data Structures Assignment

A **Hash Table** is a data structure that can be thought of as an array. Its number one advantage over other, alternative data structures is that it allows for both very fast Insertion and Searching operations. Key values are assigned to the elements stored in a Hash Table using a Hash Function. **Hash Functions** calculate the best index that a value should be stored in. Because these data structures are based off of arrays, they are limited in size, and therefore the index calculated by the Hash Function must be small enough to fit inside of the array/structure size. Also, it cannot overwrite values already in the structure. Hash functions store values in the structure in a way that the array does not need to be searched in order to find the correct index. Instead, values can be entered in any order, and then can be found by using a calculation. This is what makes Hashed Data structures so fast, and the reason for that is because memory accesses are slow, whereas calculations are very fast.

For example:

Say you have a piece of information stored in a Hash Table that is identified with a unique, nonduplicate ID value. This ID is calculated in the Hash Function, and the result of this calculation provides the exact index for the information with said ID. It then goes directly to that index in the array / Hash Table, and then returns this information to the user.