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CS-215-ON

Assignment 5.1

**Github link**: <https://github.com/kladrillono/Assignment5.1_HashMap_KEL.git>

***Part 1***

1. **Explain how a hash function is used.**

A hash function is a technique that configures an index into a table using the search key of an entry. The hash function takes a search key and creates an integer index for an element in the hash table. Then, the search key is mapped to the index.

1. **How might a string hash function be written?**

A common approach for a string hash function is to use a character’s Unicode integer. A better approach is to multiply Unicode values of each character by a factor based on the character’s position and then sum the values.

1. **Explain why we might choose to use a hash function rather than search for a key.**

Hash functions allow for quick access and efficient searching of an element. Since a hash function is used to map a key to a particular index, when a user wants to access a particular element, they are able to do so quickly. If it is a large, unordered data set, this is very useful. With a search key, it is not always guaranteed that the data set is sorted and ordered. If this is the case, looking for an element with a search key would be less efficient than using a hash function.

1. **What hash function does the Java Util HashMap use for hashing string?**

Java uses a function that implements this method on a string:

u0gn-1 + u1gn-2 + … + un-2g + un-1

u represents the Unicode value of a character in the string. g is a constant, 31. n is the length of the string that is used to represent the position of the character within the string. The hash code is calculated by this function of (u) multiplied by the constant (g), which is 31, raised to the power of n minus (the number that corresponds to the position of the character).