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CS 215 – ON

October 1, 2023

Assignment 5.1

Hash maps

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

First using the search key of the item and it’s converted into an integer index. The index value is used to place the item into the hash table.

b. How might a string hash function be written?

A string hash function may be written using the character’s Unicode integer and a more in-depth approach can be done by multiplying the Unicode value of each character in the string by its position and summing the values.

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

Using a hash function rather than a search key adds a unique component. Search keys can populate multiple values, while using a hash function creates a unique key pointed directly to the item’s value. This creates a faster search process and can be done with an unordered list.

d. What hash function does the Java Util HashMap use for hashing strings?

Java util uses Horner’s method to evaluate hash functions for strings, where it generates a hash code by multiplying the Unicode value of each character by a factor based on the character’s position in the string. The hash code is the sum of the values.

Where a string can have n characters, using ui as the Unicode value for the ith character starting with 0 for the first char and g is a positive constant of 31. The book displays the formula to look like, u0gn−1+u1gn−2+…+un−2g+un−1.