Ben Albright

Assignment 5.1

a. Hash functions takes a search key and produces the integer index of an element in the hash table. The array element is where one would either store or look for the value associated with the search key. It converts the search key into an integer called the hash code. It also compresses the hash code into a range of indices for the hash table.

b. An approach to generating a hash code for a string involves multiplying the Unicode value of each character by a factor based on the character’s position in a string. The hash code is the sum of those products. The polynomial can be evaluated using Horner’s method.

For String s and int constant g. The Java String class uses g = 31.

int hash = 0;

int n = s.length();

for (int i = 0; i < n; i++)

hash = g \* hash + s.charAt(i);

c. Sequentially searching for an index is O(n) because you may have to go through the whole array before finding what you’re looking for. Hashing determines the index using the entry’s search key without searching. This operation is O(1) because the hash function takes the search key and produces the index of the element in the hash table, instead of searching through the array until the index is found or you reach the end of the array. This can be done independently of the size of the array.

d. Java Util HashMap uses hashCode() to hash strings. It converts them using Horner’s method to produce the hashcode integer.