

Assignment 6 Written Portion:

- Give an example of two words that would hash to the same value using hashFunction1 but would not using hashFunction2.
 - a. hashFunction1 just adds up the integer value of the word whereas Function2 takes into account the position of the letter within the word. For example, TAB and BAT would hash to the same value with Function1 and two different functions in Function2.
- Why does the above observation make hashFunction2 superior to hashFunction1?
 - a. The goal of the hash function is to create a semi-unique number for whatever is passed to the function. With hashFunction1, you are almost guaranteed to get a collision eventually, whereas with hashFunction, if you have a large enough array, it is unique enough where collision should be less likely, depending on the size of the array.
- When you run your program on the same input file once with hashFunction1 and once with hashFunction2, is it possible for your hashMapSize function to return different values?
 - a. No, hashMapSize should only return the number of elements within the array. This would not change between the two functions.
- When you run your program on the same input file once with hashFunction1 and once with hashFunction2, is it possible for your hashMapTableLoad function to return different values?
 - a. No, the table load is just the size / number of buckets. Capacity is not changed by the functions and as stated above the size value should not change between the two functions.
- When you run your program on the same input file once with hashFunction1 and once with hashFunction2, is it possible for your hashMapEmptyBuckets function to return different values?
 - a. Yes, this could be different, for example, you could take the words tab and bat, which would go into the same bucket in hashFunction1 and into different buckets with hashFunction2. Therefore, the number of empty buckets would be one less with hashFunction2 versus hashFunction1.
- Is there any difference in the number of empty buckets when you change the table size from an even number like 1000 to a prime like 997?
 - a. Yes, because the modulus operator is used, you are less likely to see common similar remainders with a prime number than a non-prime number.