Christopher Merrill
CS261
3/9/2017

Program 6 Answers

1. Give an example of two words that would hash to the same value using hashFunction1 but would not using hashFunction2:

"dog" and "god" would both hash to the same value using hashFunction1, since hashFunction1 only adds the ASCII values of each letter in a word. Therefore the placement of the letters in a word is irrelevant and any two words that consist of the same letters will hash to the same value. This is not the case for hashFunction2.

2. Why does the above observation make hashFunction2 superior to hashFunction1?

hashFunction2 offsets the ASCII value of each character using the character's position within the word, so it avoids the issue of duplicate results for words that consist of the same letters.

3. 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?

No, the number of links in the hash map should be the same regardless of which hash function is used (assuming the same input file is used).

4. 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?

No, once again the result of the hashMapTableLoad function is determined only by the map size and the map capacity. These values should be the same regardless of which hash function is used.

5. 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?

Yes, the differences between hashFunction1 and hashFunction2 (described in question 1) could allow them to assign the same key/value pair into different buckets. That means the number of empty buckets could differ between the two hash functions.

6. 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 prime number size will reduce the chance of a collision. The table size is used during a modulus calculation to determine a key/value pair's bucket assignment and a prime-valued size wouldn't have any common factors.