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Assignment6:

Down the Rabbit Hole and Through the Looking Glass:

Bloom Filters, Hashing, and the Red Queen's Decrees

WRITEUP

1. What happens when you vary the size of a hash table?

   When I vary the size of hash table, it runs longer than before. It is because with smaller size of hash table, there might be longer linked list (Larger average linked list length).

   With a sufficiently large size, each head will only have one node. Therefore, it is easier to find the word needed, because the first one is exactly is! With a smaller size, or extremely, 1, when looking up for key, it needs run longer to find the key through almost whole linked list if the key is at the end of the linked list.

2. What happens when you vary the Bloom filter size?

   When I use small the bloom filter size, there might be more hash collision, which means more words may have the same bits on the bloom filter. Therefore, it has to be looked up to the hash table with more times to determine whether it is really in the hash table, which caused longer time.

   When I use larger bloom filter size, there will be less hash collision, but it will take larger space to store the value.

3. Do you really need the move to front rule?
   It is not necessary to implement the function. But it may save time or take longer time.
   1. Save time

      In this situation, stdin must be some natural language, or other text which has frequently appearing words. Frequently used words will be put at the front of the list, which means it is easier to find in the next finding. (You don't need to run the whole list if the key is in the end of the linked list)
   2. Waste time (or even longer)

      When stdin is some text with each word only appears once, the node finding need to be put in the front, which will never be searched again. It increases the time to search the next word. Because every time you find a word, you will increase the difficulty to find the next word (probably adding another node before the next word to find).