Benjamin Scholar
CSDS 233
4/8/21

HW4 -- Report:

'Entry' class:
The entry class is simply a data class for the hashtable class. It contains the key of type char and the frequency of that key as a long. It also contains a pointer to another entry, which is used for the separate chaining functionality of the Hashtable. In essence it allows for basic linked list functionality. There are no methods within the Entry class (besides toString and a private constructor), only data.

'HashTable' class:
The hashtable class implements the functionality of a hashtable using the separate-chaining method for handling collisions. It holds an array of entries, known as the buckets, the current capacity, current number of items, and the load factor of the table as a float. The class also contains threshold values determining when to rehash the table on insertion or deletion.
Methods:

- **Insert** - Time complexity = O(n) worst, O(1) average - Due to our constraints on load factor, on average, insertion time will be constant, since there should only be 0 or 1 entries in a bucket at a time. A rehash will occur if the load factor increases above the defined threshold (0.75), which will result in a linear runtime.
- **Delete** - Time complexity = O(n) worst, O(1) average - More or less the same as insert. If the load factor drops below a certain threshold the table will be rehashed, resulting in linear time complexity.
- **Search** - Time complexity = O(1) average - Since we never need to rehash and the constraints on load factor, this will always have an average of constant runtime.
- **checkForRehash** - Time complexity = O(n) tight - This method checks if we need to rehash or not, if we do, it will allocate new buckets and insert the elements into the new buckets, which will result in linear runtime.

'Main' class:
Runs the program, calls the 'anagram' method on the first two command line arguments into the program.
Methods:

- anagram - Time complexity = O(n) worst case.
- Main - Time complexity = O(n) worst - this only reads command line arguments and calls anagram.

Benjamin Scholar
CSDS 233
4/8/21

Outputs: