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Assignment 2 readme

The data structure used for this project is a Trie and is essentially a tree with a child for each letter in the alphabet (at least in this case). The node struct consisted of a single character, three integers, and an array of 26 nodes pointers which are the children of the current node. One for the occurrences, one for super words, and the last one is to check whether the the node is the end of a word.

The trie allows for high efficiency. Whenever a word has to be placed or searched for in the trie it runs at $O(k)$ time (where k is the length of the longest word). This is because both of the functions will have to iterate through the word character by character to get to the location of where the word should placed or found. The code will have to do this for all file pairs m in the map file so the total runtime efficiency is $O(mk)$.

Now for the space complexity. There has to be nodes allocated for each letter of each word. So k nodes need to be allocated for the longest word making the efficiency $O(k)$. The code will then have to do this for each unique word n in the dictionary provided so the space efficiency is $O(nk)$.

The challenges faced with writing the code were relatively minimal. When creating the various functions that are utilized in the code, pencil and paper was used. Each function was then traced to see if it logically made sense and slight adjustments were made when needed. The hardest function to write was `printResult`. I was expecting it to use inorder traversal to print out the words from the trie like you would do with a binary tree. However, preorder traversal was required instead. `printResult` also required a for to control the recursive calls. It difficulty in making the function came from how unintuitive the process was in the beginning. On the lighter side, there were only a few compiler errors to fix when the functions were moved to a computer. The first test of the code ran flawlessly, and further testing and grading ran in the same manner. not a

single segmentation fault was experienced so Santosh can eat it.
He can take his segfaults and leave, I couldn't care less for
them.