Nicholas Fasullo : Assignment 2 - First

Data Structures:

For this assignment the data structure I used is known as a Trie. A trie is basically a prefix tree used to help store store and search words for simplier search. The trie consists of nodes called trie nodes, which keep track of the ending of a word and things such the amount of occurences and superwords.

Methods:

makeTrieNode - This method is used to create each trie node. It takes in a letter and then creates memory for the trie node and assigns the all the values for the node and returns it.

readDict- This method takes in the dictionary file and reads it. Here is where the tree is made for the unique words, not excepting any duplicates. The method can be considered the inserted method. The ends of words are marked true in this method.

matchStr - This method is essientally the search method. It reads the data file and then searches throughtout the tree to find matches for the occurences and superwords of the unique words from the dictionary file. The method gets each word in the data file and the goes into the trie and does the matching and updates the numbers.

printResult & printRecur - This method prints out the results of the program run. It prints out all unique words inserted into the trie from the dictionary with the amount of occurences and superwords of each word. The method also uses a helper method to recursively iterate through the trie to get all the info.

freeTree - This is a recusive method to help free up the trie tree after the results have been computed. The method will hit every trie node and free it and then reset the root to null. It is important to free up memory to avoid any problems or overflows, also reseting the tree will make for a quicker search for the next set of files, taking out unnecessary words to make things run quicker.

Challenges:

When thinking of some obsticles I encountered when attempting this assignment, one comes to mind right away. The next before the assignment was due around 11pm I made one major mistake or accident. When compiling my code when I update a header file I complied my code from a .c file to a .out file and it converted all of my code. I lost all of my code and had to restart, remembering everything I had done and then debug any mistakes I may have made again. Other than this huge pain, some other things I had trouble with was just getting started, figuring out how to read everything, as building and searching the trie was not too bad as we pretty much did this assignment last semester for cs112, there were clearly differences, but for the most part I was very comfortable working the trie data structure. Also I spent a lot of time debigging my print method, but finally figured out a small error I made, to go along with other methods.

Big O:

Running Time - O(mk), This means the program reads every single word, m words, of length k in the dict and data files and performs the tasks.

Space Complexity - O(nk), This means the trie stores and creates space for the n unique words in the dict files, all of length k.

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