Tries Revisited: Trie Prefix Auto-Complete

Cpt S 322 Homework Assignment

by Evan Olds

Submission Instructions:

Submit source code (zipped) to Angel BEFORE the due date/time. If the Angel submission is not working, then submit to TA via email BEFORE the due date/time. "Angel wasn't working" is never an excuse.

Optional: Include a readme.txt file in the zip with any relevant information that you want the grader to be aware of.

Assignment Instructions:

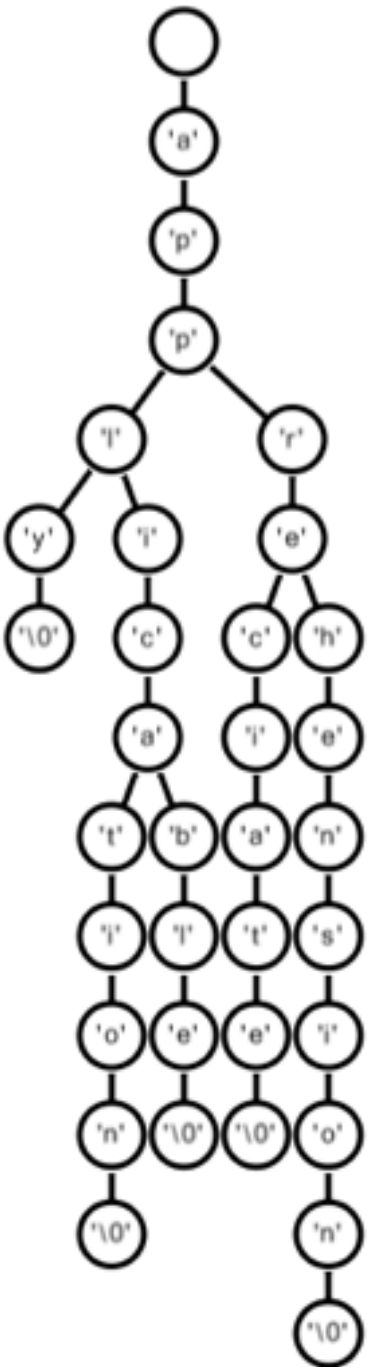
This assignment revisits tries, a Cpt S 223 concept. Build a basic WinForms application that has one text box that allows the user to type in a word. Have a list box below the text box in the interface that lists all words from the supplied dictionary that start with the prefix that the user typed in.

To do this, you will need to build a trie for the array of strings loaded from the dictionary. An "academic word list" text file that was obtained from http://oald8.oxfordlearnersdictionaries.com/academic/ is included in the .zip file for this assignment. If you wish to add more words to this list you may.

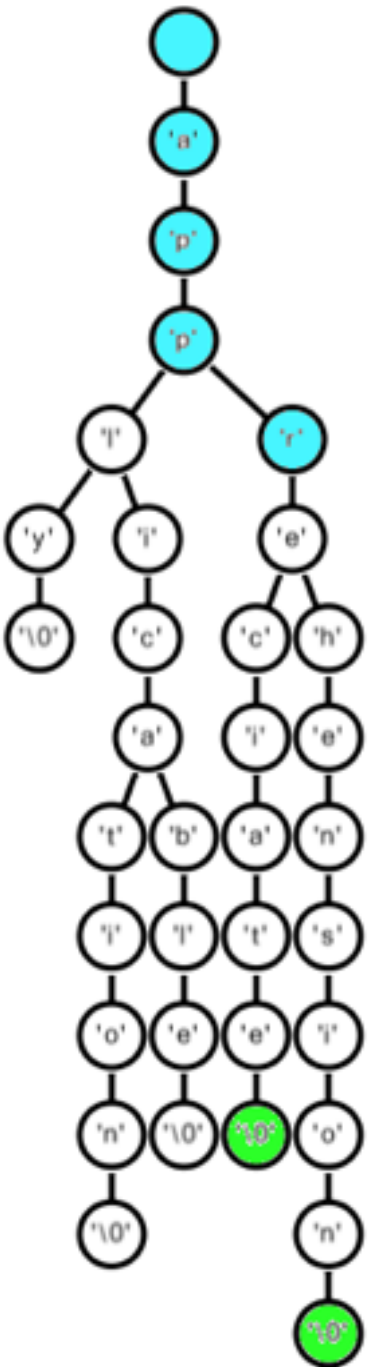
Build the trie initially by adding all words in dictionary. Remember that you'll start back at the root for each new word. If you write an "InsertString" or "AddString" method to add a string to the trie then you can just call that in a loop to add each word to the trie.

After the trie is built, get the prefix string from the user and then display all strings that start with this prefix. Trace down the trie to consume all characters in the prefix. If you can't consume all characters then there are no strings in your dictionary that start with that prefix. Otherwise you'll end at a node that is the parent for all strings that start with this prefix. Enumerate all leaf nodes under this parent to find the strings that start with the prefix. Display each one.

As a simple example, suppose your dictionary has the words: "apply appreciate apprehension application applicable". The trie for these 5 words looks like this:



If the user types in “appr”, then your traversal is represented by the light blue nodes in the image below. The green nodes represent the leaves below that correspond to the ending points of words that start with “appr”. So in this case the output should be “appreciate” and “apprehension”.


'a'
'p'
'p'
'l'
'r'
'y'
'i'
'e'
'\0'
'c'
'c'
'h'
'a'
'i'
'e'
't'
'b'
'a'
'n'
'i'
'l'
't'
's'
'o'
'e'
'e'
'i'
'n'
'\0'
'\0'
'o'
'\0'
'n'
'\0'