Advanced Topics in Data Structures

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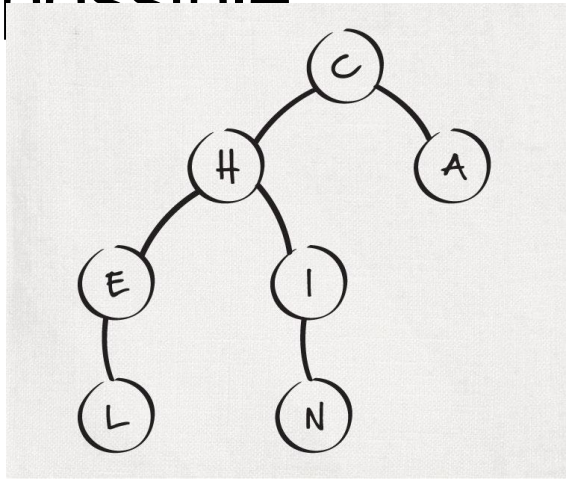
Recap

In part one I looked at running time analysis. The question I was trying to answer was, how efficiently can we access our data.

Now I will turn to the far harder question of, how do we efficiently store our data.

Enter the Trie

A trie is nothing more than a purposely unbalanced tree. The goal of a trie is to conserve as much memory as possible



Most common use:

auto-complete of words

DAWG: Directed Acyclic Word Graph

A directed acyclic word graph is a special case of a directed acyclic graph (for words).

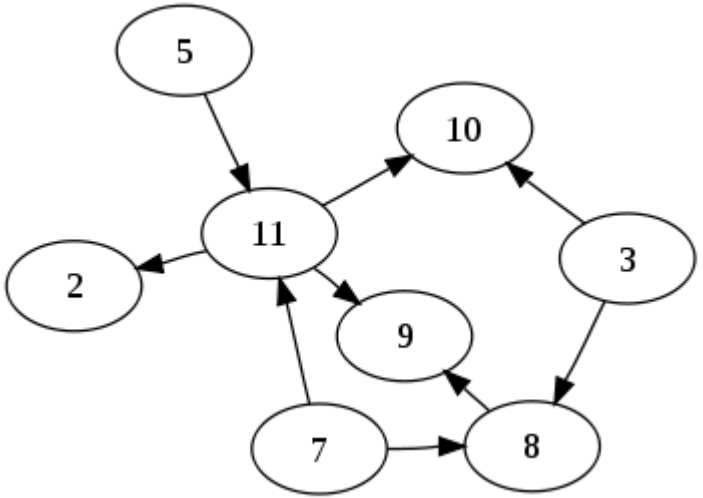
Example DAG:

Rules:

1) No Cycles

2) Each node points at,

at most one other node



Comparing Tries and DAWGs

Tries:

-only one path to a given node

-easy to code

DAWGs:

-multiple paths to a node -> more space efficient than Tries

-harder to code

Demo

Installation:

sudo pip install DAWG

sudo pip install biopython

Demo continued!

[demo]

Reference

http://kmike.ru/python-data-structures/

--a litany of advanced data structures in python

http://www.toptal.com/java/the-trie-a-neglected-data-structure

--why tries are awesome

http://en.wikipedia.org/wiki/Deterministic_acyclic_finite_state_automaton

--in depth discussion of the difference between DAWGs and Tries