CSC 151 Spring 2020
Topic: Trees

April 10, 2020

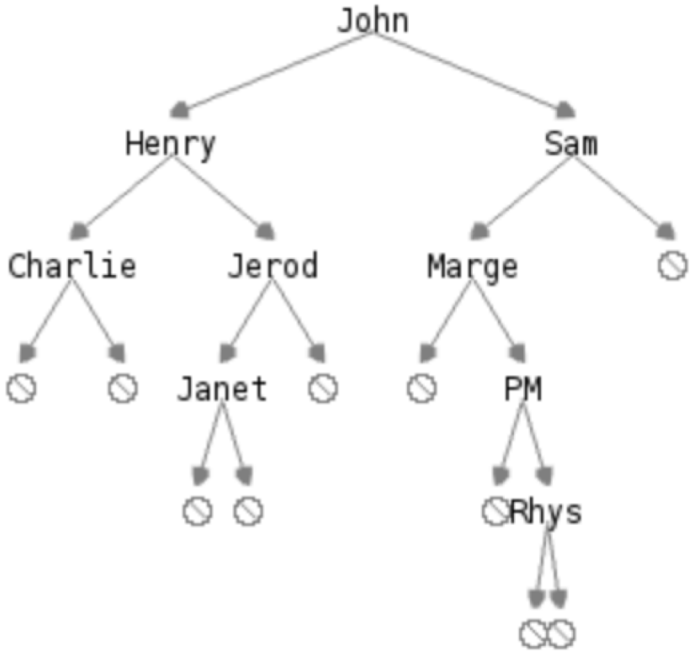
Day 29

Peer Support Opportunities

Are there any online events happening where your classmates could support you? Let me know!

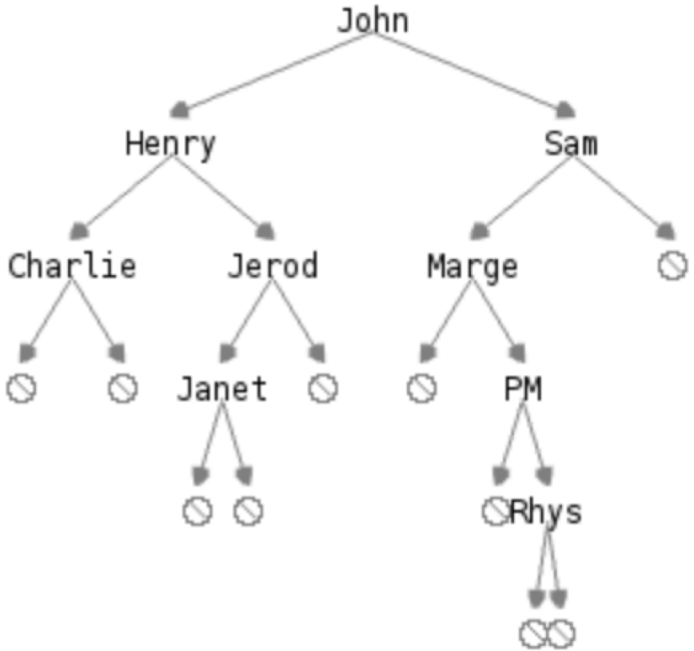
Self-Checks

Describe the series of steps that bst-find would use in searching the tree for the value "janet".



Self-Checks

- Is the tree empty? No.
- Grab the root, which is “John”
- Is Janet = John? No.
- Is Janet < John? Yes, So Recurse on the left subtree
- Is the tree empty? No
- Grab the root, which is “Henry”
- Is Janet = Henry? No.
- Is Janet < Henry? No.
- So Recurse on the right subtree….



Self-Checks

Recall the pattern for Tree-Recursion

What is the base case and combination for tree-size?

How is the base-case related to (or working with) the combination in tree-size?

Self-Checks

Recall the pattern for Tree-Recursion

What is the base case and combination for tree-depth?

How is the base-case related to (or working with) the combination in tree-depth?

Self-Checks

Recall the pattern for Tree-Recursion

How and why do the base-cases and combinations differ between tree-size and tree-depth?

Trees

Think about the following questions.

1. What is a tree?
2. What is a binary search tree?
3. Why are trees and BSTs useful?

Trees

1. **What is a tree?**

Like a list, in that it has hierarchy. Every node in a tree has two children. Each child can be either another node, or empty. Nodes also hold values.

2. What is a binary search tree?

A tree that is ordered. Usually a node's left tree holds only values that are smaller than the node value, and vice versa for the right tree.

3. Why are trees and BSTs useful?

Regular Trees: they can represent relationships between values that are connected through common parents/ancestors. Decision trees are also useful.

BSTs: useful for searching and sorting

Lab Time

Note: There are 9 problems on this lab, which may seem like a lot! However, the majority of the problems are *exploratory* - meaning you will question and learn how the tree structure works.

Only the last two problems are really writing code.

Upcoming Work

Please submit: All problems before the Extras except 2 and 3, by Monday 4/13 at 10:30 pm.
Include 6P's for problems 8 and 9.

To: csc-151-02-grader@grinnell.edu
Subject: CSC 151-02 Lab 4/10

Exam 3 will go out today (Friday).