Week: 08 Date: 10/21/2021

15-110 Recitation Week 8

Reminders

- HW4 due Monday 10/25 @ Noon EDT
- Reminder to fill out mid-semester surveys for HW4

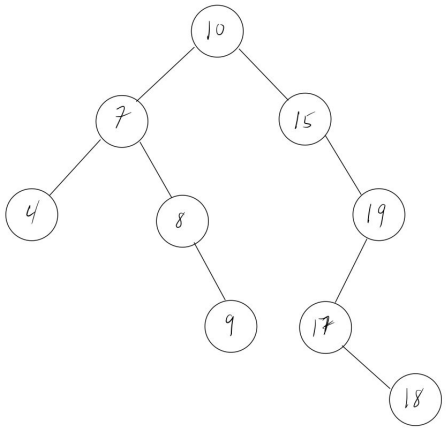
Overview

- BST Practice + Code Writing
- Big-O Exercise
- Graphs, BFS, and DFS Review

Problems

BINARY SEARCH TREES

What is the ordering invariant for a binary search tree (BST)?



What elements would you look through to find the value of 17?

What elements would you look through to find the value of 9?

Write the function addEvenLeaves(t) that takes in a dictionary representation of a tree and returns a sum of **only** the even values held by leaves.

BIG-O EXERCISE

Calculate the Big-O for the following examples:

Returning the last character in a string	

`def powersOfTwo(n):`
`    m = 1`
`    while m <= n:`
`        print(m)`
`        m *= 2`	

`def foo(L):`
`    if L == []:`
`        return 0`
`    else:`
`        L.append(L[0])`
`        n = L.index(10)`
`        L.pop(len(L)-1)`
`        return n`
`# .index(), .pop() are O(n) worst case!`	

```
def tripleLoop(L):
    for i in range(20):
        for row in L:
            for elem in row:
                print(elem)
#You are guaranteed L is a nxn 2D
list
```

GRAPHS PRACTICE

Draw the graph corresponding to the following dictionary:

```
graph =
{
      "A": ["B", "C", "E", "G"],
      "B": ["A", "D", "E"],
      "C": ["A", "G", "H"],
      "D": ["B", "F"],
      "E": ["A", "B", "F"],
      "F": ["D", "E"],
      "G": ["A", "C"],
      "H": ["C"]
 }
```

Given the above graph, use both BFS and DFS to find the element I starting at node A. List out all the values you would visit, and visit nodes in alphabetical order.

BFS: DFS:

P vs. NP

	Solve	**Verify**
P	polynomial	polynomial
NP	either	polynomial
Neither	non-polynomial	non-polynomial