CS 261 Recitation 7: Binary Search Tree

In order to get credit for the recitation, you need to be checked off by the end of recitation. For non-zero recitations, you can earn a maximum of 3 points for recitation work completed outside of recitation time, but you must finish this recitation before the next recitation. For extenuating circumstance, contact your recitation TAs and Instructor.

*Group work,* and *individual work* are highlighted

Recitation 5 Grade Breakdown:
- Part 1: BST Operations 4 pts
- Part 2: Find maximum and minimum depth of a BST 6 pts

**Part 1: BST Operations**
1. Given the following BST, draw the path to find the node with key 60 and 27

![BST Diagram]

2. Draw a BST with the insertions in the following order (assuming the tree is currently empty, i.e., root = NULL):
   2 10 15 18 26 30 48

   ![Insertion Order Diagram]

   18 10 2 15 30 26 48

What difference did you notice?
3. Given the following BST, draw the BST after removing the node with key 29:

![BST after removing node with key 29]

Given the following BST, draw the BST after removing the node with key 65:

![BST after removing node with key 65]

What is the in-order successor of the node with key 65?

4. Given the following binary search tree,

![Binary search tree]

Pre-order traversal:

In-order traversal:

Post-order traversal:

Level-order traversal:
Part 2: Find the Maximum and Minimum Depth of a BST

Download and unzip the start code: (wget command is recommended)
https://classes.engr.oregonstate.edu/eecs/winter2024/cs261-020/recitations/rec7.zip

(6 pts) Problem Statement: Given a binary search tree, find its maximum and minimum depth. (Note: the depth of the root node is 0)

The maximum depth is the number of nodes along the longest path from the root node down to the farthest leaf node.
The minimum depth is the number of nodes along the shortest path from the root node down to the nearest leaf node.

Example 1:

Output: max depth: 2 (3-20-15); min depth: 1(3-9)

Example 2:

Output: max depth: 3 (41-20-29-32); min depth: 2 (41-20-11)

Assuming:

- The depth of the root node is 0
- The depth of an empty tree is -1
- The number of nodes in the tree is in the range \([0, 10^5]\).
- \(-1000 \leq node.val \leq 1000\)

Make sure you get checked off by the TA by showing them the output of your program, your report, and your group work before the end of your recitation section.

For backup purposes, please submit your work for this recitation (including all documents/text files for group work, and programs) to TEACH.