COL106 Lab Week 6 Questions

Problem 1: Valid BST

Given the root node of a binary tree, output whether it is a binary search tree. Recall that a binary search tree has the following invariants:

- The value of *every* node in a node's left subtree is less than the data value of that node.
- The value of *every* node in a node's right subtree is greater than the data value of that node.

You can submit and check your solution here.

Problem 2: Insertion in AVL Tree

The problem statement is simple: Implement insertion in AVL trees as explained in class. You will need to of course balance the tree post insertion.

You can submit and check your solution here.

Problem 3: Maximum Sum BST in Binary Tree

Given a binary tree, with values for each node, find the subtree which satisfies two properties: it's a BST and the sum of values in the subtree is maximum.

You can submit and check your solution here.

Challenge Problem: Huffman Encoding and Decoding (Optimal BSTs)

Given n keys and their corresponding frequencies $f_1 \ldots f_n$, construct an optimal BST, that is the cost for the BST is minimal.

The cost for the BST is defined as $\sum f_i d_i$ where d_i is the depth of the ith node in the BST.

You can submit and check your solution here.

This is known as the Huffman encoding, to check its application in encoding and decoding the strings, you can solve this problem.