Final Lab – 22CLC01

75 minutes

You are asked to write a C/C++ functions:

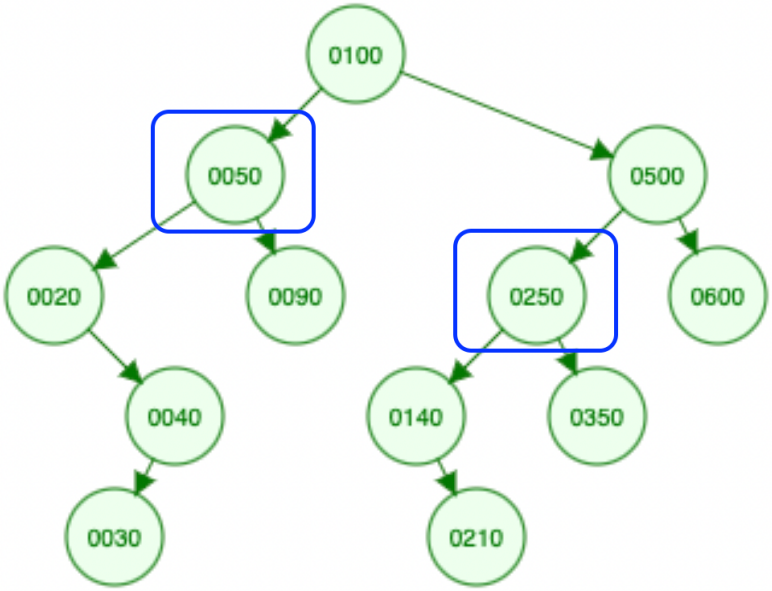
Given the tree structure:

```
struct TreeNode {
  int val;
  TreeNode *left;
  TreeNode *right;
};
```

Problem 1 (3.0p)

Given a binary tree, print all nodes whose left sum is equal to the right sum. Explain your algorithm in comments.
The prototype of the function is as follows: ***void printNodesWithEqualSums(TreeNode* r);***

For example:



Problem 2 (3.0p)

Given a binary tree, write function (and auxiliary functions if needed) to display the keys of all the nodes in the longest path going from the root to a leaf of the tree. If there are many such paths, display any of them.
The prototype of the function is as follows: ***void printLongestPath (TreeNode* r);***

Problem 3 (3.0p)

Given the list of numbers as follow: 76, 93, 40, 47, 10, 55.
You are asked to define structure and functions to put those numbers into a hash table of 7 slots (m = 7), using

- The hash function as follows: h1(k) = k mod m.
- The Collision resolution: Linear probing.

And you also need to write these functions:

- ***bool search(int key, int&val)***: searching a value for a given key.
- ***bool delete(int key)***: deleting a key value pair

Problem 4 (1.0p)

Write the main function to demonstrate all above problems.

Submission:

Root folder named **StudentID**
File name: **StudentID-XX.zip**
Example: 22121234-08.zip