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Assignment 3

Unit 4: Trees

Submitting: 9/12/16

### Brief Description of Assignment

Implementing trees in C++. Three function implementations were required: insert, delete, and search, all of which took in a root node pointer, and a node pointer or that node pointer's data.

### Brief Description of Logic

The basic logic of traversing through the tree is virtually the same for all three functions. The basic principle is to check the root node, and if that is not where the value you are inserting/deleting/searching, then you recursively traverse the left subtree and the right subtree. Eventually, the calls will make their way back to one of your base cases.

Insert function uses this traversal to find the place the number is supposed to be inserted, making a last function call that finds itself at a child node which does not actually exist yet, and inserting it at that node.

Input: Pointer to a node to insert, pointer to the root (passed by reference)

Output: None; the tree is changed by reference (will have additional node)

The delete function is a little more complicated. When deleting, the same basic principle applies only if the deleted node is a leaf node (no children). However, the cases for one child or two children have to be accounted for. If there is one child, the deleted node becomes that child. If there are two children, the deleted node becomes the left child.

Input: integer value of node to be deleted, pointer to the root (passed by reference)

Output: None; the tree is changed by reference (will be missing the node deleted)

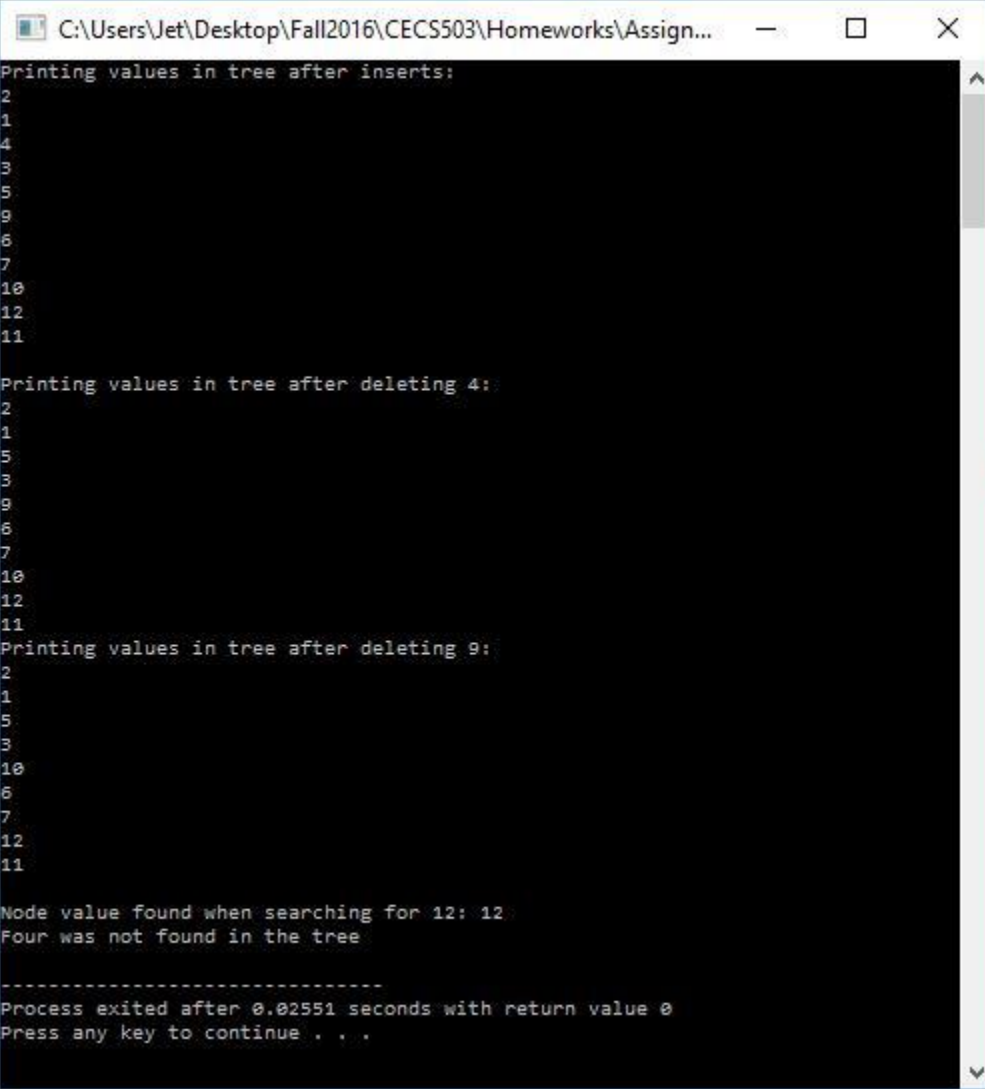
The search function is the one of the most basic implementations of traversal. It looks for the node at the root, then the left subtree, then the right subtree.

Input: integer value of node being searched, pointer to the root

Output: A pointer to the node with the same integer value passed in. It returns a NULL pointer if the value is not found in the tree (I address this case when printing out values in main).

### Snapshot of All Output

I did one snapshot of output for all the questions, separated by newlines for sake of clearer reading.



```
C:\Users\Jet\Desktop\Fall2016\CECS503\Homeworks\Assign...
Printing values in tree after inserts:
2
1
4
3
5
9
6
7
10
12
11

Printing values in tree after deleting 4:
2
1
5
3
9
6
7
10
12
11

Printing values in tree after deleting 9:
2
1
5
3
10
6
7
12
11

Node value found when searching for 12: 12
Four was not found in the tree

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Process exited after 0.02551 seconds with return value 0
Press any key to continue . . .
```