CSCI 2170 Spring 2006
Review for test 4 (Thursday, April 20th, 2006)

General Tree: root, parent node, child node, ancestor, descendant, sub-tree, sibling, leaf

Binary tree

- Definition
- level of a node
- degree of a node
- height of a tree
- full binary tree
- complete binary tree
- number of nodes=2^H-1, height = ceiling($\log_2$N)
- balanced binary tree
- In-order, pre-order, post-order traversal
- Binary tree operations(i.e., build a new binary tree)

Binary search tree

- Definition
- Insertion
- Deletion
- saving BST to file and restore BST from file
    - restore to the original tree
    - restore to the minimum height tree
- binary search tree operations (insert, delete, pre-order / in-order / post-order traversal, copy tree, destroy tree, …), understand the code

AVL tree

- definition
- build/maintain AVL tree using rotation (single rotation and double rotations)

QuickSort

- time complexity
- trace the execution of the sorting algorithm

Function parameter: define functionType, pass function to function as parameter

Sample Test questions:

1. draw a complete binary tree with 15 nodes
2. what is an AVL tree?
3. why is it better to store large collection of records in a tree structure rather than a linked list?
4. what type of binary tree structure makes record insertion, deletion and retrieval most efficient?
5. understand the code that can be used to save a binary search tree and restore the tree, or rebuild the tree with minimum height.
6. Show how to build a binary search tree with records that have keys listed below: 40, 25, 8, 60, 48, 90, 31, 5, 17, 16, 29, 45, 46
7. what is the height of this tree?
8. Is this a balanced binary tree?
9. what is the level of the node with key 5?
10. Show the order of the nodes being visited (list the key values of the nodes visited) if pre-order traversal, in-order traversal, or post-order traversal method is used.

11. show the tree after the record with key 31 is deleted
12. show the tree after the record with key 40 is deleted
13. Show how to build and maintain an AVL tree that have key values listed below: 22, 15, 8, 25, 27, 17, 20, 16, 18