

WIA2005 Algorithm Design & Analysis
Semester 2, 2016/17
Tutorial 9

1. For the set of {1, 4, 5, 10, 16, 17, 21} of keys, draw binary search trees of heights 2, 3, 4, 5, and 6.
2. Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?
3. Give recursive algorithms that perform preorder and postorder tree walks in $O(n)$ time on a tree of n nodes.
4. Suppose that we have numbers between 1 and 1000 in a binary search tree, and we want to search for the number 363. Which of the following sequences could not be the sequence of nodes examined?
 - a. 2, 252, 401, 398, 330, 344, 397, 363.
 - b. 924, 220, 911, 244, 898, 258, 362, 363.
 - c. 925, 202, 911, 240, 912, 245, 363.
 - d. 2, 399, 387, 219, 266, 382, 381, 278, 363.
 - e. 935, 278, 347, 621, 299, 392, 358, 363.
5. Write recursive versions of TREE-MINIMUM and TREE-MAXIMUM.
6. While inserting the elements 71, 65, 84, 69, 67, 83 in an empty binary search tree (BST) in the sequence shown, the element in the lowest level is __.
7. What are the worst-case complexities of insertion and deletion of a key in a binary search tree?