

BST TREES

- 4.4** Show that in a binary tree of N nodes, there are $N + 1$ NULL links representing children.
- 4.5** Show that the maximum number of nodes in a binary tree of height h is $2^{h+1} - 1$. *Hint:* Prove by induction.
- 4.32** Design a recursive linear-time algorithm that tests whether a binary tree satisfies the search tree order property at every node.
- 4.37** Write a function that takes as input a binary search tree, T , and two keys k_1 and k_2 , which are ordered so that $k_1 \leq k_2$, and prints all elements X in the tree such that $k_1 \leq \text{key}(X) \leq k_2$. Do not assume any information about the type of keys except that they can be ordered (consistently). Your program should run in $O(K + \log N)$ average time, where K is the number of keys printed. Bound the running time of your algorithm.