

# Algorithms — Homework 6

## Balanced Trees

Due: October 20.

- 1) Argue that since sorting  $n$  elements takes  $\Omega(n \log n)$  time in the worst case in the comparison model, any comparison-based algorithm for constructing a binary search tree from an arbitrary list of  $n$  elements takes  $\Omega(n \log n)$  time in the worst case.
- 2) You have given a sorted array  $A$  with  $n$  numbers. Describe a linear time algorithm that builds a balanced BST storing all elements in  $A$ .
- 3) What is the largest possible number of internal nodes in a red-black tree with black-height  $k$ ? What is the smallest possible number?