Tutorial 6: CS21003 Algorithms I

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1. Show the result of inserting $2, 1, 4, 5, 9, 3, 6, 7$ into an initially empty AVL tree. In the resulting AVL tree, delete $2, 1, 4, 5, 9, 3, 6, 7$.

2. We say that an array $A[1, \ldots, n]$ is k-sorted if it can be divided into k blocks, each of size n/k, such that the elements in each block are larger than the elements in earlier blocks, and smaller than elements in later blocks. The elements within each block need not be sorted.

   (a) Describe an algorithm that k-sorts an arbitrary array in $O(n \log k)$ time.

   (b) Prove that any comparison-based k-sorting algorithm requires $\Omega(n \log k)$ comparisons in the worst case.