

1. List the members of your group below. Underline your name.

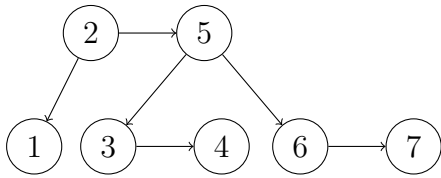
2. A collection of keys belonging to a small finite domain K may be *counting sorted* using a zero-initialized counter C_k for each $k \in K$ and incrementing C_k whenever key k is encountered in a single pass over the collection; finally, C_k instances of k are outputted, processing the counters C_k in order of increasing k .
 - (a) Elaborate the counting sort algorithm by including all implementation details needed by beginning programmer.

- (b) Provide a Java code fragment (or comparably detailed pseudo-code) for counting sort when the input keys are in an array $a[0..N - 1]$.

- (c) Depict the action of your code on the following input array, labeling array states suitably.

3 1 4 1 5 9 2 6 5 3 5 8 9 7 9 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7 9 5 0 2 8 8 4 1 9 7 1 6

3. Depict all the stages in the restructuring of the following AA-tree when the key 1 is removed. It may be convenient to use dashed lines to separate tree levels, as in Andersson's paper.¹



¹Arne Andersson, "Balanced Search Trees Made Simple," in *Proceedings of the Workshop on Algorithms and Data Structures* (Montreal, Canada, 1993).

[additional space for answering the earlier question]