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 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.\(^1\)

\(\text{Arne Andersson, “Balanced Search Trees Made Simple,” in Proceedings of the Workshop on Algorithms and Data Structures (Montreal, Canada, 1993).}\)