Running time analysis

$t(n)$ is the running time for recursive BubbleSort on inputs of size n.

1. If $n = 1$, the running time is C_1 for some constant C_1.
2. The "preprocessing" takes place in Step 0 (checking to see if $n = 1$) and Step 1 (the left-to-right scan, swapping adjacent elements that are out of order), and uses no more than $C_2 n$ operations.
3. There is only one subproblem and it has $n - 1$ elements; hence the recursion takes $t(n - 1)$ operations.
4. There is no postprocessing stage for this algorithm.

Hence

- $t(1) = C_1$
- for $n > 1$, then $t(n) \leq C_2 n + t(n - 1)$