

In general, a recurrence of the form $T(n) = T(n-1) + f(n)$ with a constant value for a small input value of T will have the solution $T(n) = \sum_{i=1}^n f(i) + c$, for some constant c . (This can be shown by iterating down to a base case.)

Alternatively, one can note that if we "unroll" the recursion, the code effectively runs a nested set of loops where the first loop runs n times, the second loop runs $n-1$ times, etc., last loop runs once. From that observation, we obtain the same summation as the one shown above.

Grading: 2 pts for recognizing that the initial recursive call does $O(n)$ work.

2 pts for recognizing that the effective input size to the recursive call is $n-1$, if the input size of the previous input was n .

2 pts for either setting up the recurrence relation or summation

4 pts for solving the recurrence relation or summation

If an answer of $O(n^2)$ is given without any justification, award 1 pt as stated.)