We can express insertion sort as a recursive procedure as follows. In order to sort $A[1..n]$, we recursively sort $A[1..n-1]$ and then insert $A[n]$ into the sorted array $A[1..n-1]$. Write a recurrence for the running time of this recursive version of insertion sort.

Solution.

$$T(n) = \begin{cases} 0 & \text{if } n = 1 \\ T(n-1) + c_1 n + c_2 & \text{if } n \geq 2 \end{cases}$$