

Problem of the Week – 2

Lower bound on almost-sorting

We know that every comparison-based sorting algorithm needs to make $\Omega(n \log n)$ comparisons to sort an n -element list. Some applications are happy to work with partially sorted lists. Call a list *sorted-to-within- k* if every element in the list is within k positions of its position in the sorted list. (Assume that all elements are distinct.)

Give your best lower bound, in terms of n and k , on the number of comparisons needed by an algorithm that takes as input an n -element list and returns a sorted-to-within- k list containing the same elements.