Algorithms Homework 5*

Divide and conquer

Reading: GT Chapter 5.2

(CLRS 2-4) Let $A[1..n]$ be an array of n distinct numbers. If $i < j$ and $A[i] > A[j]$, then the pair (i, j) is called an inversion of A.

a. List the inversions of the array $< 2, 3, 8, 6, 1 >$.

b. What array with elements from the set $\{1, 2, ..., n\}$ has the most inversions? How many does it have?

c. Give an algorihm that determines the number of inversions in an array in $O(n^2)$ time.

d. Give an algorihm that determines the number of inversions in an array in $O(n \lg n)$ time worst-case (Hint: modify merge sort).

*Collaboration is allowed, even encouraged, provided that the names of the collaborators are listed along with the solutions. Write up the solutions on your own.