Analysis of Algorithms: Assignment 1

Due date: January 13 (Thursday)

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*. For example, the array $\langle 2, 3, 8, 6, 1 \rangle$ contains five inversions.

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

Problem 2 (4 points)
Give an algorithm that inputs an array and outputs the number of inversions in the array. You may assume that all elements of the array are distinct.

Problem 3 (4 points)
Estimate the worst-case running time of your algorithm.