# 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.