



Sorting – Solution

Author: Dana Lica, “I.L. Caragiale” National College, Ploiești

A first solution is to try all possible values for X and check that the input array will be sorted. So we loop over $1..N-1$. This solution is worth 20 points.

A better solution is based on the fact that a value V that is initially on position P will get to its final destination (position V) if the difference between P and V is K or a divisor of K . For instance value 6, found on position 3 will get to its right place if X is 1 or 3.

This means we can construct an array ct : $ct[j]$ = the number of elements of A that can be moved to their right place if $X=j$. We output the values j for which $ct[j] = N$. This solution should score between 90 and 100 points, depending on the implementation.

This leads us to the best solution. In the ct array we have computed the common divisors for all the differences between the positions of the elements and their respective values. We compute the greatest common divisor of all these differences and output its divisors. The complexity of this algorithm is the complexity of computing GCD for N numbers.