

Algorithms: Assignment 3

Due date: September 11 (Wednesday)

Problem 1 (5 points)

Write an algorithm that combines INSERTION-SORT and MERGE-SORT. It should use INSERTION-SORT for small segments of the array, and recursively merge sorted segments. A segment $A[p..r]$ is “small” if its length is no larger than some fixed value k , that is, $r - p < k$.

Problem 2 (5 points)

Argue that the following algorithm correctly sorts the array $A[p..r]$:

STOOGESORT(A, p, r)

if $A[p] > A[r]$

then exchange $A[p] \leftrightarrow A[r]$

if $p + 1 \geq r$

then return

$q \leftarrow \lfloor (r - p + 1)/3 \rfloor$

STOOGESORT($A, p, r - q$) ▷ first two-thirds

STOOGESORT($A, p + q, r$) ▷ last two-thirds

STOOGESORT($A, p, r - q$) ▷ first two-thirds again