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 $A[p..r]$:

STOOGE-SORT(A, p, r)
if $A[p] > A[r]$
    then exchange $A[p] \leftrightarrow A[r]$
if $p + 1 \geq r$
    then return
$q \leftarrow \lfloor (r - p + 1)/3 \rfloor$
STOOGE-SORT$(A, p, r - q)$ $\triangleright$ first two-thirds
STOOGE-SORT$(A, p + q, r)$ $\triangleright$ last two-thirds
STOOGE-SORT$(A, p, r - q)$ $\triangleright$ first two-thirds again