Cpt S 450 Homework #2

Please print your name!

1. (easy) Write psuedo-code for partition(A, p, q).

2. (standard) Consider insertsort. Suppose that the input array A has 1% probability to be monotonically decreasing. Show that, in this case, the average-case complexity of insertsort is $\Theta(n^2)$.

3. (not hard) Let iqsort$(A, 1, n)$ be an algorithm that sorts an array A with n integers. It works as follows:

iqsort(A, p, q)\{
if $p \geq q$, return;
r=partition(A, p, q);
//run quick sort on the low part
quicksort$(A, p, r-1)$;
//run insert sort on the high part
insertsort$(A, r+1, q)$;
\}

Compute the best-case, worst-case, and average-case complexities of iqsort.

4. (hard) Let mixsort$(A, 1, n)$ be an algorithm that sorts an array A with n integers. It works as follows:

mixsort(A, p, q)\{
if $p \geq q$, return;
r=partition(A, p, q);
//run mixsort on the low part
mixsort$(A, p, r-1)$;
//run insert sort on the high part
insertsort$(A, r+1, q)$;
\}

Compute the best-case, worst-case, and average-case complexities of mixsort.