Due at the start of class Wednesday, June 8, 2011.

Consider *Slow*sort:

\[
i \leftarrow 1 \\
\text{while } i < n \text{ do} \\
\quad \text{if } a[i] > a[i+1] \text{ then} \\
\quad \quad a[i] \leftarrow a[i+1] \\
\quad \quad i \leftarrow 1 \\
\quad \text{else} \\
\quad \quad i \leftarrow i+1 \\
\text{end if} \\
\text{end while}
\]

All of the following problems refer to Slowsort. We want to count the number of COMPARISONS. Try to make your analyses as exact as possible. For each problem write out a summation and then solve the summation.

**Problem 1.** Assume you start with a sorted list. Remove the largest element and put it back into a random position (which could be back where it came from so there are \(n\) positions where it could end up).

(a) What is the best case?
(b) What is the worst case?
(c) What is the average case?

**Problem 2.** Assume you start with a sorted list. Pick two distinct elements at random and interchange them.

(a) What is the best case?
(b) What is the worst case?
(c) What is the average case?

**Problem 3.** Assume you start with a random list.

(a) What is the best case?
(b) What is the worst case?
(c) **Challenge problem.** What is the average case?