Northern Michigan University (Marquette Co, MI)

CS422-01-25W: Algorithms (Andrew A. Poe) Name: _____
Quiz 5 Friday 21 February 2025 9:00 A.M. EST

Time: 15 minutes

Imagine that we are using the Quick Sort as defined in class to sort an array of ten elements that is already sorted (although we don't know that yet). Suppose that we are very unlucky and each time we request a random pivot, we get the rightmost element in the portion of the array we are sorting; in other words, we draw the element with the largest index in the desired subarray every. single. time.

In this situation, how many comparisons and how many swaps will the Quick Sort make in the course of its run?

The pivot (the last one) will be compared to everything else in the array: 9 comparisons, the pivot is then known to be in the right spot.

We have 9 elements less than the pivot and none greater, so we again choose the largest element as the pivot and now we have 8 comparisons.

And so forth, and so on, down to final comparison between the first and second elements.

A total of 1+2+3+4+5+6+7+8+9 = 45 comparisons.