

## CS302 - Programming Assignment 2

Due: Mon, Oct 9. Must be uploaded to Canvas before the beginning of class.

Please read the sections of the syllabus on programming assignments and honor code before starting this homework. I would also recommend reading the [rubric](#) for programming grading, so that you know how we will be grading this assignment.

1. **[30 points]** Create a Java class called QuickSort. It should enable you to run the algorithm QuickSort three different ways. In the first, you always choose the first element of the array to be the pivot. In the second, you always choose the last element of the array to be the pivot. In the third, you choose the pivot location uniformly at random.

In each case, you should keep track of the total number of comparisons used by your algorithm. To do this, assume that everytime your algorithm calls Partition on a part of an array of size  $m$ , your algorithm does  $m$  comparisons.

Please run your algorithm on the numbers contained in QuickSortNum.txt (see website - it contains the numbers 1 to 10000 with no repeats).

Put a multiline comment at the beginning of your class. It should contain:

- Your name
- "Programming Assignment 2"
- The name of anyone you worked with
- Answer to the following questions:
  - How many comparisons were required to sort QuickSortNum.txt when you always choose the pivot to be the first element?
  - How many comparisons were required to sort QuickSortNum.txt when you always choose the pivot to be the last element?
  - Run your randomized algorithm 100 times on QuickSortNum.txt. What is the average, minimum, maximum, and standard deviation of the number of comparisons needed over those 100 trials?