CS260 - Programming Assignment 4- Sorting

The purpose of this assignment is to give you some experience with sorting algorithms and algorithm analysis. Additionally, you'll see how to output data in a format that can be easily imported into excel for analysis, further manipulation, or graph.

Overview

You'll create a program that performs at least three different sorts on datasets of varying size, time each sort, and output the data into a comma-separated-value text file (which can then be easily imported into excel)

Details

You should choose at least three different sorting algorithms. Pseudocode for all can be found online; pick a reliable site and analyze the algorithm so you know how it works.

Each sort should be run on 15 different datasets (5 different sizes, each in 3 different orders).

- Dataset sizes: 100, 1000, 10000, 100000, and 1000000.
- Dataset orders: in order (1-n), reverse order (n-1), and random (with 42 as the seed)

  Note: If a large array is put on the stack you may get a stack overflow So to force the array to be allocated on the heap you can make it static (put the word static before the array declaration).

The run time for each run of each sort should be timed. And only the sort should be timed, not the setup or output. So for each run, you'll need to do the following:

1. create and initialize dataset
2. start timer
3. sort the data
4. stop the timer
5. output the elapsed time of the sort

While the sorted data doesn't need to be output, when testing, when testing you should output it at least once to verify the sort works before moving on to timing it.

When complete, compare your results to the given performance of each sort (Big O notation) to see how they match.

Output

Output should be to a text file with a .csv extension. This will make it easy to import into excel.

You'll have 3 sets of output that look like the example below. All will be in the same file. Each set should be formatted as shown below.:

- Sort Type will be Bubble, Selection, etc..
- Sort Order will be "In Order", "Reverse Order", and "Random"
- time will be the elapsed time of each sort

Sort Type, 100, 1000, 10000, 100000, 1000000
Sort Order, time, time, time, time, time
Sort Order, time, time, time, time, time
Sort Order, time, time, time, time, time

Extra credit will be given if you use excel to produce a nice graph showing the performance of each sort relative to dataset size.

Very Important Stuff

Program should be well written, function properly, and be both easy and efficient to use.

All programs should follow the class's Coding Conventions
Submit the following:

- A zip file containing all your .cpp and .h files and your executable
- The executable as a separate file (so the .exe gets uploaded twice)