CSC 300: Data Structures  
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Project 3 Sort Report

This report is an analysis of the bubble sort, the base 256 radix sort and the standard template library (STL) sort. The bubble sort was actually optimized so it may run slightly faster than the typical bubble sort. The radix sort took advantage of each byte of a 32-bit integer containing at max 255 and the STL sort was simply called.

As required by the assignment statement, if the bubble sort was taking any longer than 10 seconds, it was immediately terminated. All other sorts were allowed to run to their full length.

As expected, the bubble sort took the longest and didn’t finish for approximately any amount of values greater than one million integers. Attached in the Excel document is a chart and table of each of the sorts. For the values one million to one hundred million, the bubble sort was terminated at roughly ten seconds.

The radix sort was slower than the STL sort for values of ten thousand or less but not significantly. On values above ten thousand, it gets faster and starting around one hundred thousand values appears to be almost twice as fast as the STL sort. It achieved a sort of one hundred million values in almost twenty-four seconds whereas the STL sort took almost forty-two seconds.

As a big O analysis, I divided the time taken by each sort by n^2, n and nlgn respectively. As a result, it appears that the bubble sort is either n^2 or nlgn. However, the nlgn part is probably because it gets terminated after 10 seconds. Radix sort appears to come around nlgn as does the STL sort. None of the sorts appear to be O(n).