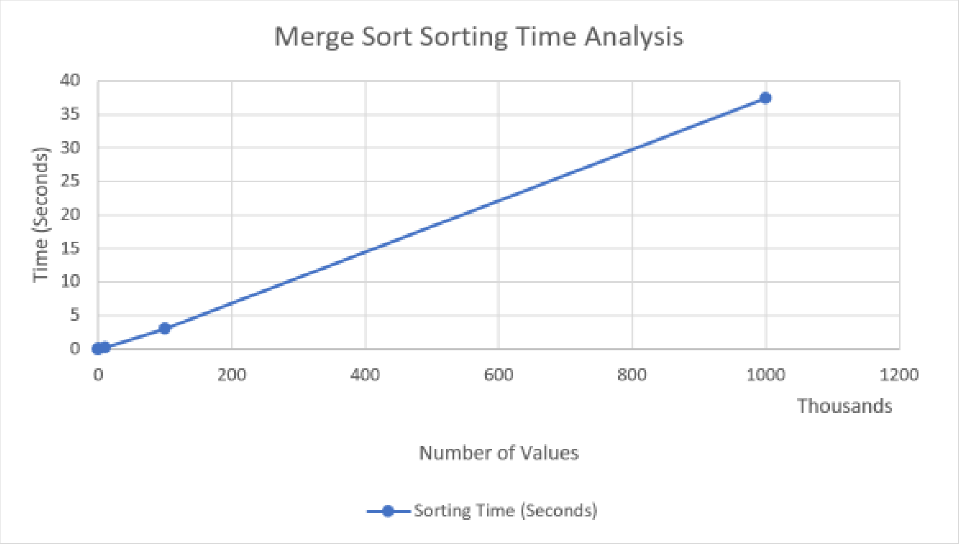
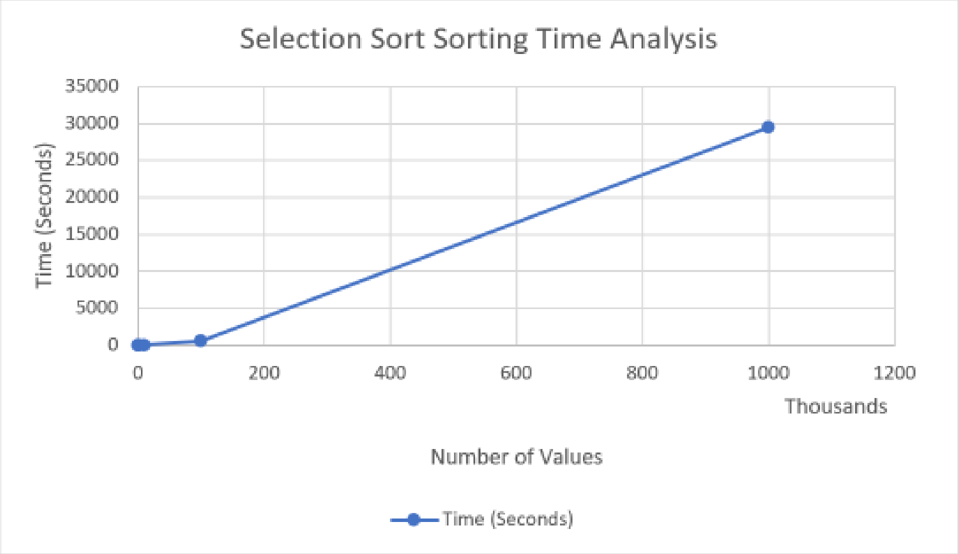
i. Garrett Gilliom and Matt Ryan

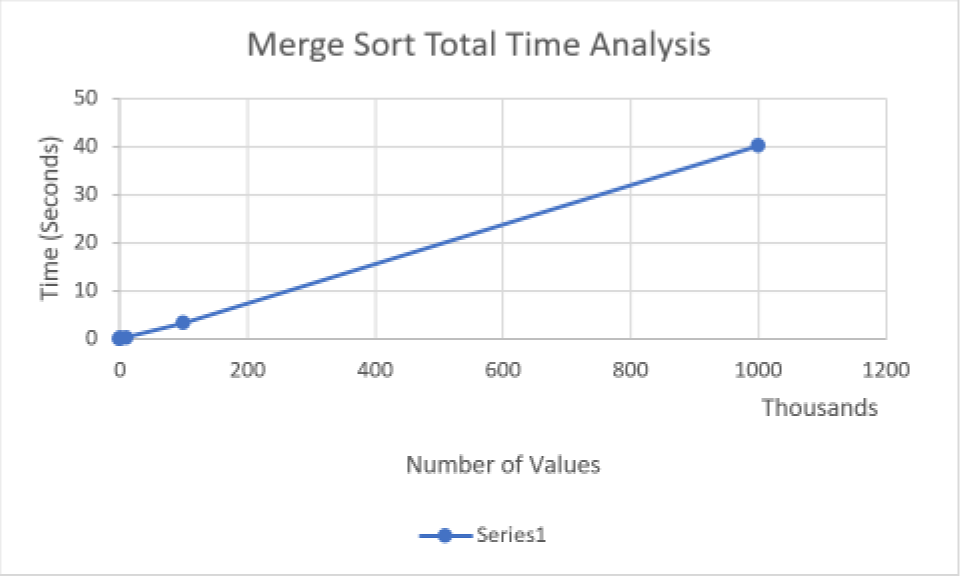
Number of Items	Selection Sort	Merge Sort
10	Total: 0.000520 seconds Input: 0.000241 seconds Output: 0.000231 seconds Sort: 0.000048 seconds % Input: 46.3% % Output: 44.4% % Not on Sorting: 92.7%	Total: 0.001162 seconds Input: 0.000354 seconds Output: 0.000727 seconds Sort: 0.000081 seconds % Input: 30.5% % Output: 62.6% % Not on Sorting: 93.1%
100	Total: 0.001603 Input: 0.000236 Output: 0.000306 Sort: 0.001061 % Input: 14.7% % Output: 19.1% % Not on Sorting: 33.8%	Total: 0.001212 Input: 0.000183 Output: 0.000262 Sort: 0.000767 % Input: 15.1% % Output: 21.6% % Not on Sorting: 36.7%
1,000	Total: 0.207973 Input: 0.002139 Output: 0.00108 Sort: 0.204754 % Input: 1% % Output: .05% % Not on Sorting: 1.05%	Total: 0.059411 Input: 0.001344 Output: 0.001216 Sort: 0.056851 % Input: 2.3% % Output: 2.05% % Not on Sorting:4.35%
10,000	Total: 18.566693 Input: 0.005334 Output: 0.059151 Sort: 18.502208 % Input: % Output: % Not on Sorting: <1%	Total: 0.231348 Input: 0.005358 Output: 0.006607 Sort: 0.219383 % Input: 2.3% % Output: 2.86% % Not on Sorting: 5.16%
100,000	Total: 570.6 Input: .106432 Output: 0.150678 Sort: 570.34 % Input: % Output: % Not on Sorting: <1%	Total: 3.309544 Input: 0.110545 Output: 0.185676 Sort: 3.013323 % Input: 3.3% % Output: 5.6% % Not on Sorting: 8.9%
1,000,000	Total: 29514.830333 Input: *Used given number* Output: *Used given number* Sort: 29514.830333 % Input: *Used given number* % Output: *Used given number* % Not on Sorting: *Used given number*	Total: 40.134241 Input: 0.994661 Output: 1.726154 Sort: 37.413426 % Input: 2.5% % Output: 4.3% % Not on Sorting: 6.7%

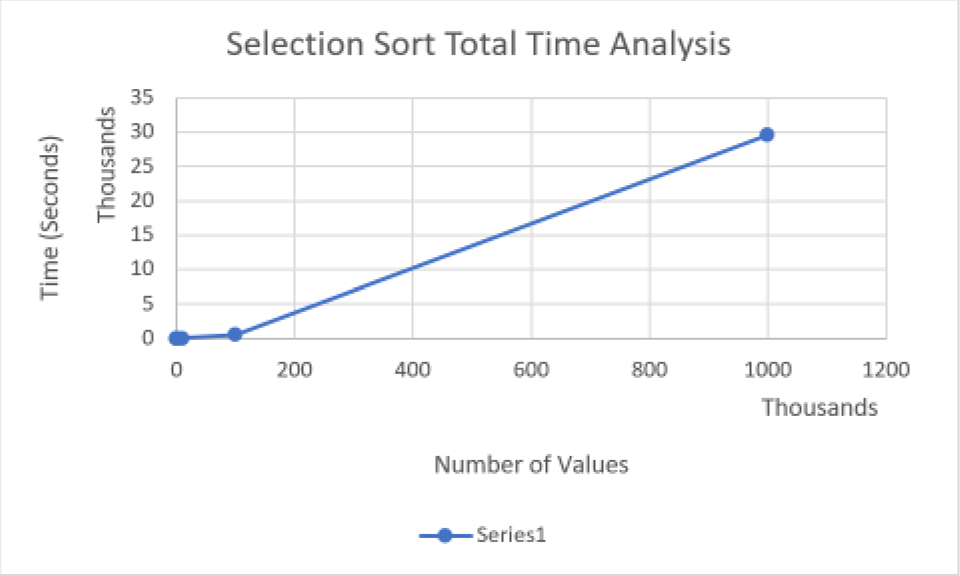
ii. For smaller amounts of data, input and output account for most of the time, but as the amount of numbers gets larger, the overall time is much more dependent on how long the sorting takes.

iii. Excel Graphs









iv. Conclusions from Graph

Selection Sort sorting time appears to have a quadratic relationship between number of values and time which makes sense since it has a 0(n^2) relationship. As the number of values passes 100,000, selection sort takes a very long time.

Merge Sort has a lower power quadratic but is not linear as it has a distinct curve up as the numbers grow larger. However, the time is much more reasonable even at 1,000,000 values. This makes sense as merge sort has a O(n * logn) relationship.

Overall, time essentially becomes running time, which makes since, in both tables, time spent for input and output became less than 10% at 1,000 values.