(c)i. and (c)ii.

Merge Sort

File Ten

It took 0.000163 seconds to input 10 values from file ten.txt
It took 2.7e-05 seconds to sort 10 values using merge sort
It took 0.000256 seconds to output 10 values to file ten.txt
Total time the program took is 0.000626 seconds

The input took ~26.04% of the total running time.
The output took ~40.89% of the total running time.

File Hundred

It took 0.000205 seconds to input 100 values from file hundred.txt
It took 0.000517 seconds to sort 100 values using merge sort
It took 0.000259 seconds to output 100 values to file hundred.txt
Total time the program took is 0.001135 seconds

The input took ~18.06% of the total running time.
The output took ~22.82% of the total running time.

File Thousand

It took 0.000689 seconds to input 1000 values from file thousand.txt
It took 0.005885 seconds to sort 1000 values using merge sort
It took 0.000827 seconds to output 1000 values to file thousand.txt
Total time the program took is 0.007557 seconds

The input took ~9.12% of the total running time.
The output took ~10.94% of the total running time.

File Ten Thousand

It took 0.00476 seconds to input 10000 values from file tenthousand.txt
It took 0.05202 seconds to sort 10000 values using merge sort
It took 0.005734 seconds to output 10000 values to file tenthousand.txt
Total time the program took is 0.062653

The input took ~7.60% of the total running time.
The output took ~9.15% of the total running time.

File Hundred Thousand

It took 0.032643 seconds to input 100000 values from file hundredthousand.txt
It took 0.654187 seconds to sort 100000 values using merge sort
It took 0.048174 seconds to output 100000 values to file hundredthousand.txt
Total time the program took is 0.7352

The input took ~4.44% of the total running time.
The output took ~6.55% of the total running time.

File Million
It took 0.346653 seconds to input 1000000 values from file million.txt
It took 7.246918 seconds to sort 1000000 values using merge sort
It took 0.481947 seconds to output 1000000 values to file million.txt
Total time the program took is 8.076

The input took ~4.29% of the total running time.
The output took ~5.97% of the total running time.

Selection Sort

File Ten
It took 0.000161 seconds to input 10 values from file ten.txt
It took 1.6e-05 seconds to sort 10 values using selection sort
It took 0.000102 seconds to output 10 values to file ten.txt
Total time the program took is 0.00039

The input took ~41.28% of the total running time.
The output took ~26.15% of the total running time.

File Hundred
It took 0.000143 seconds to input 100 values from file hundred.txt
It took 0.000377 seconds to sort 100 values using selection sort
It took 0.000183 seconds to output 100 values to file hundred.txt
Total time the program took is 0.000811

The input took ~17.63% of the total running time.
The output took ~22.56% of the total running time.

File Thousand
It took 0.0007 seconds to input 1000 values from file thousand.txt
It took 0.037485 seconds to sort 1000 values using selection sort
It took 0.000666 seconds to output 1000 values to file thousand.txt
Total time the program took is 0.039003

The input took ~1.79% of the total running time.
The output took ~1.71% of the total running time.

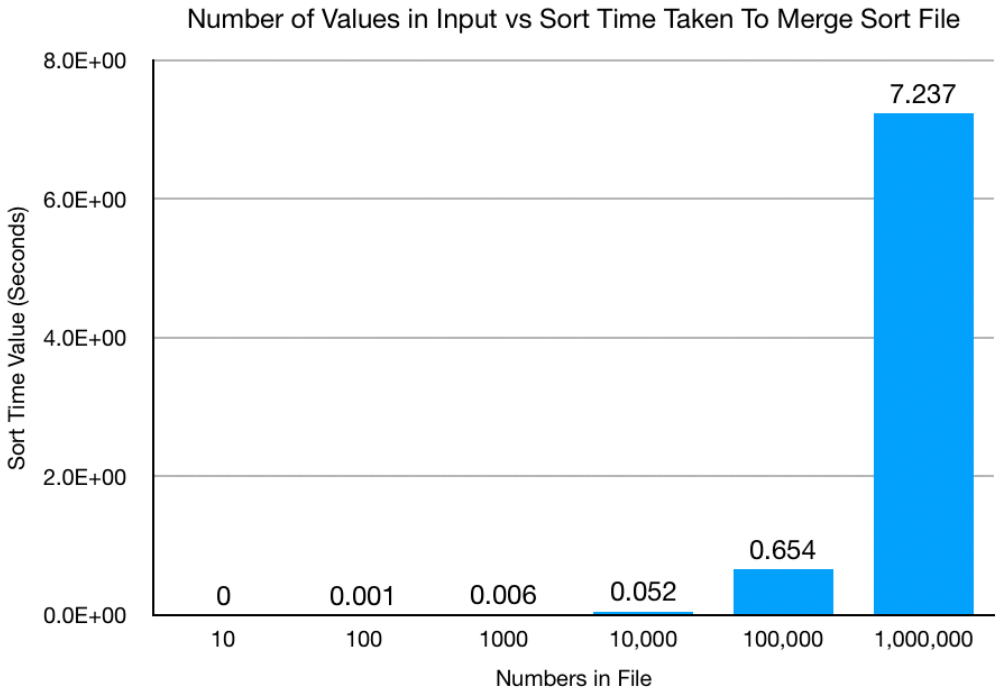
File Ten Thousand
It took 0.004889 seconds to input 10000 values from file tenthousand.txt

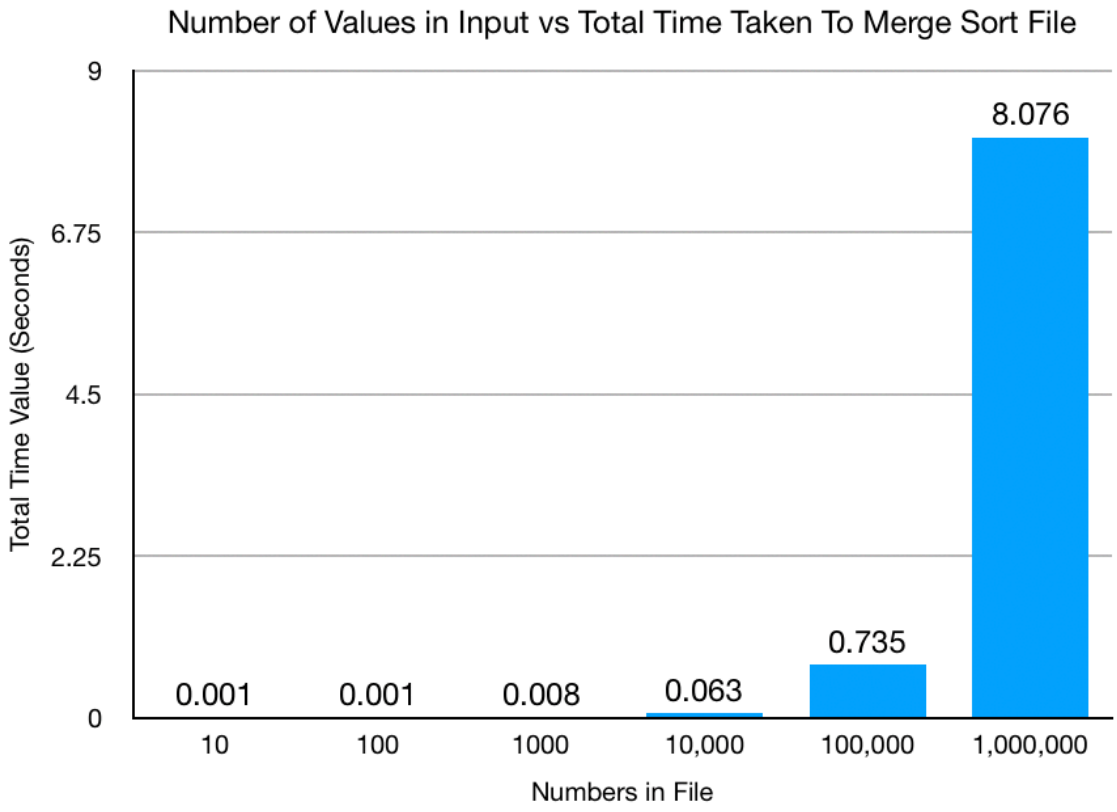
It took 3.490697 seconds to sort 10000 values using selection sort
It took 0.005136 seconds to output 10000 values to file tenthousand.txt
Total time the program took is 3.500858

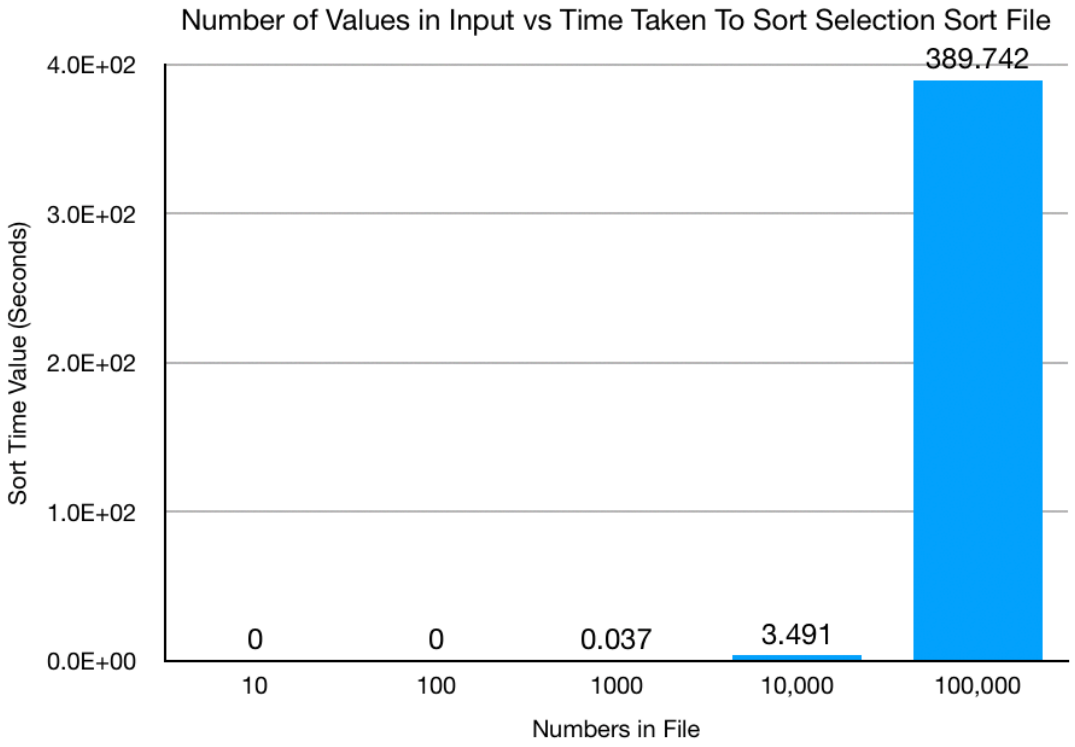
The input took ~0.14% of the total running time.
The output took ~0.15% of the total running time.

File Hundred Thousand
It took 0.038264 seconds to input 100000 values from file hundredthousand.txt
It took 389.742299 seconds to sort 100000 values using selection sort
It took 0.052236 seconds to output 100000 values to file hundredthousand.txt
Total time the program took is 389.832975

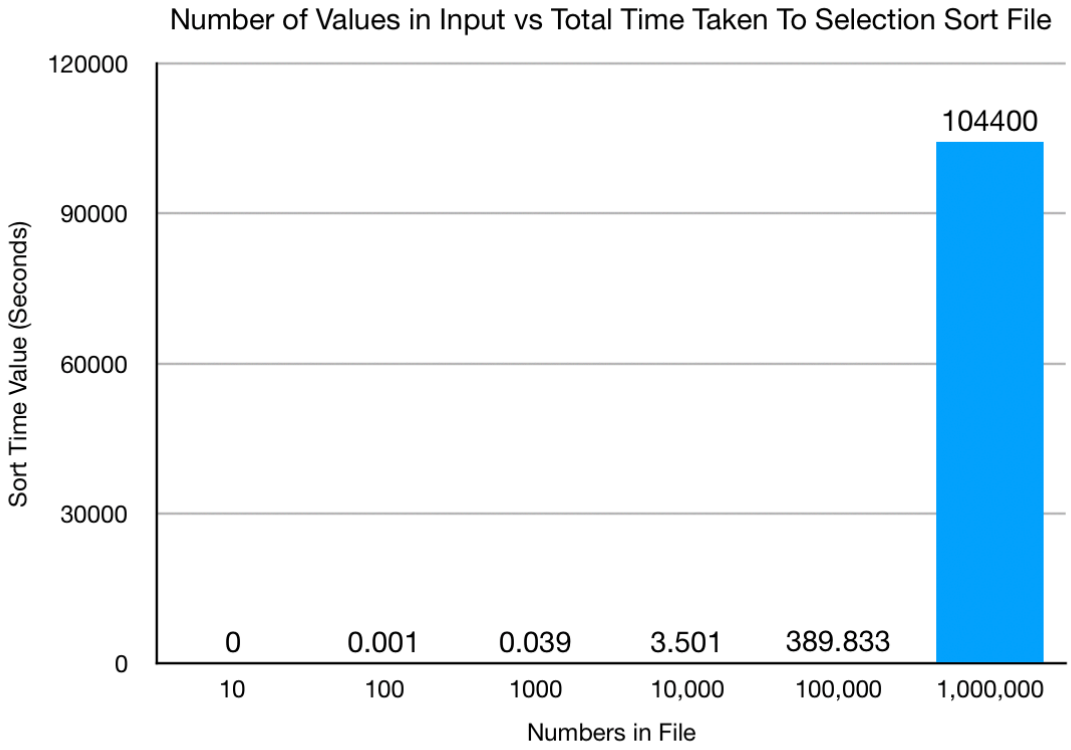
The input took ~0.0098% of the total running time.
The output took ~0.0134% of the total running time.




Number of Values in Input vs Total Time Taken To Merge Sort File
Total Time Value (Seconds)
9
6.75
4.5
2.25
0
0.001
0.001
0.008
0.063
0.735
8.076
10
100
1000
10,000
100,000
1,000,000
Numbers in File



Sort time for selection sort is unknown, but it can be assumed that it is close to the approximate total runtime for the program.



Percentages tell us that vast majority of program runtime is taken up by the sort algorithm. Runtime of inputting and outputting is negligible.

The graphs tell us that sort time increases exponentially as number of items to be sorted increases. It also shows that merge sort is significantly faster than selection sort.