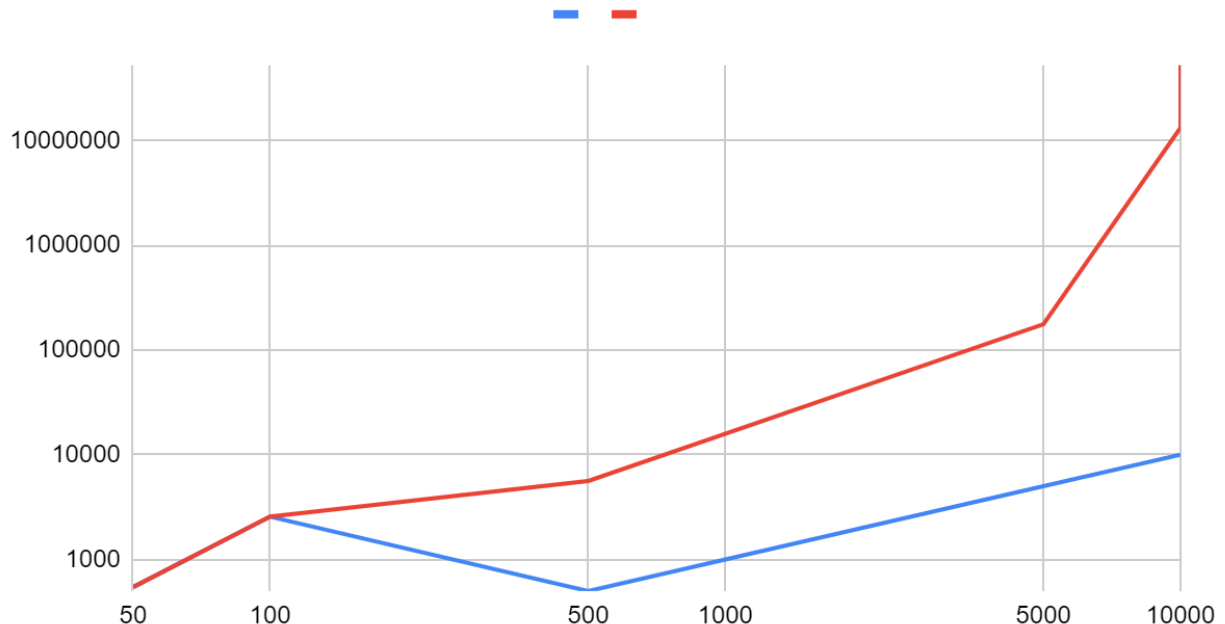


Data Movements and Comparisons



Six Samples were tested, each with different data sizes. The samples for Insertion Sort were of size 50 and 100, while for Heap Sort were 500 and 10000. Finally Tournament Sort was used with data sizes of 5000 and 10000. The graph above shows data movements(blue line), and comparison(orange line).

Insertion Sort operates better at small data sizes. The difference between the data of 50 and 100 is quite big. At 50 elements, both data movements and comparisons are at 544. As soon as the data set doubled, the data movements and comparisons were around 5 times more, indicating that the bigger the data set the more data movements and comparisons have to do.

Heap Sort operates really well with both medium and large data sets. Two data sets of 500 and 10000 were tested. When sorting a data set of 500, heap sort makes lots of comparisons(5619), but at the same time, the data movements were nearly identical to the data set, to be more accurate, 499 movements. With the 10000 data set, the algorithm compared values 176530 times; but again, the data movements were at 9999. This indicates that data movements only happen $N-1$ times, N being the size of the data set.

Tournament Sort operates really well with large data sets. Two data sets of 5000 and 10000 were tested. When sorting a data set of 5000, Tournament sort keeps the data movements similar to that of the Heap sort(with only 5001 movements); however, the comparisons that it does are out of the chart. 13189421 comparisons were done during the sorting. With the 10000 data set, the algorithm compared values 52760414 times, but again, the data movements were close to that of the heap sort, at 10001. This indicates that Tournament Sort is close to Heap Sort when it comes to efficiency.