

Anthony Iovino  
Assignment 5 Analysis

1.

Jacob Brown was my programming partner. He submitted our source code.

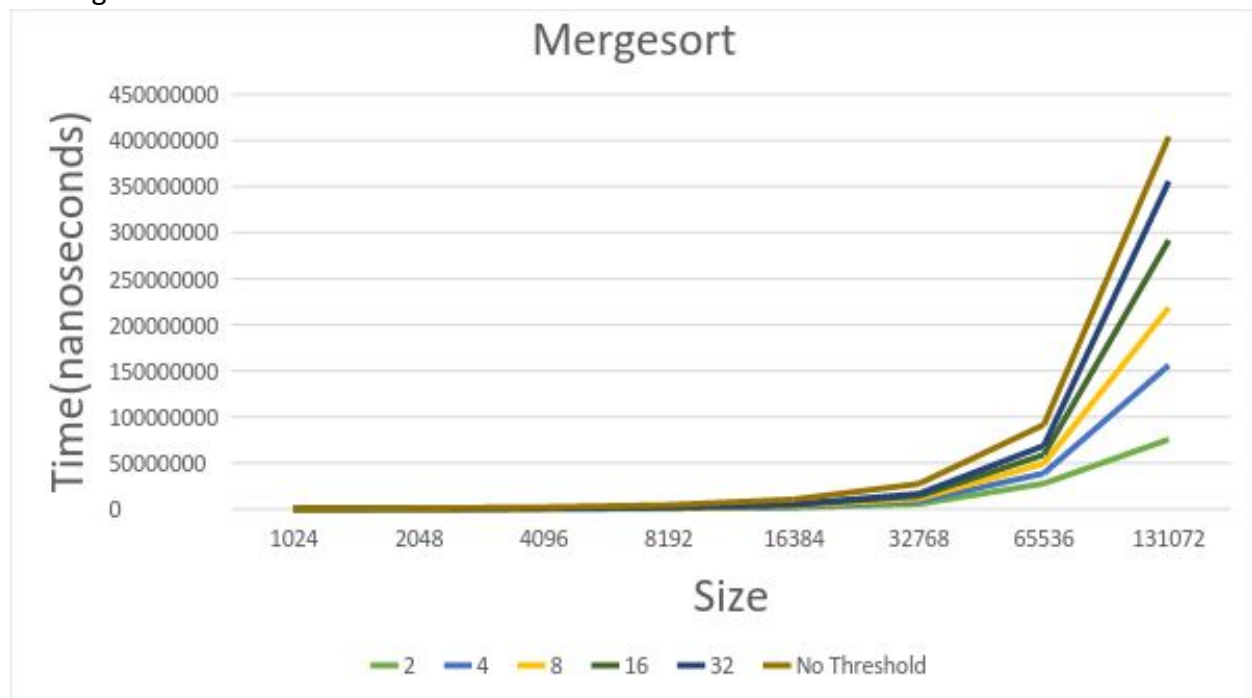
2.

Jake is an extremely dedicated student and a talented programmer. I would really like to work with him again.

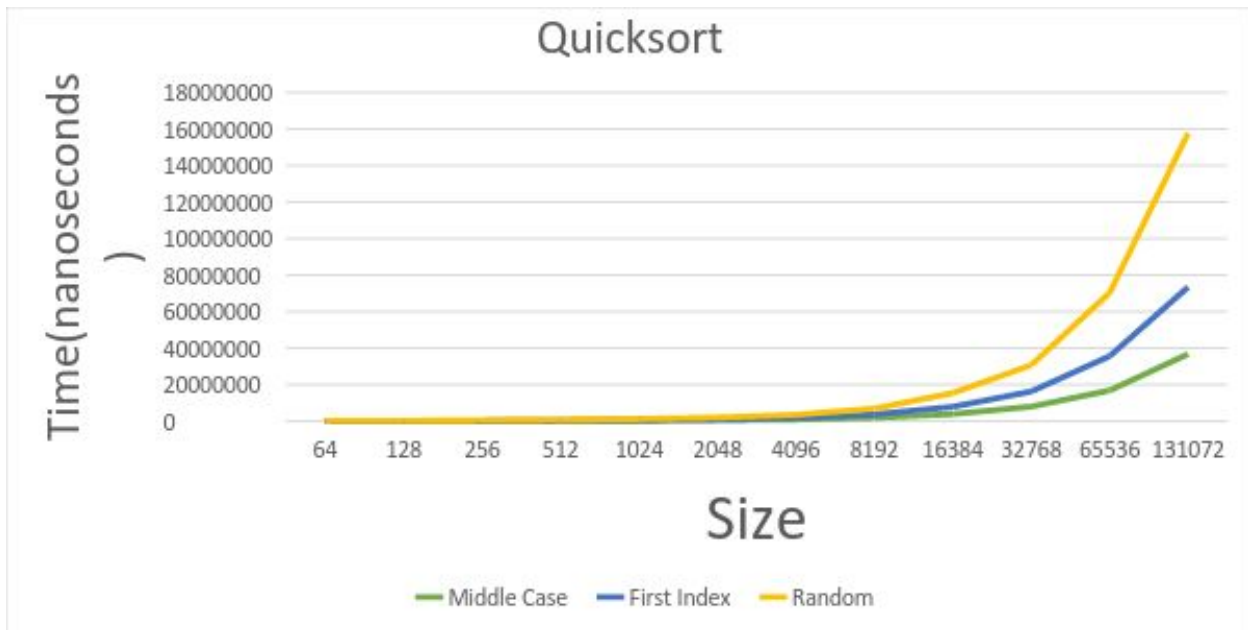
3.

I really liked being able to work with a partner in situations that would have normally stalled me for hours. It's a lot easier to solve coding problems when two people are working to find the solutions. The only caveat I find to this method is that a lot of the learning is actually gained from typing out the code and switching off makes this harder at times. I feel like switching off as much as we do caused me to miss some details of the implementation that I would not have missed if I had been coding the whole time. I think my coding approach is pretty piece by piece based and Jake tends to have a more holistic approach to the assignments. I can be a better partner by improving my overall understanding of the assignment trajectory before we actually start implementing.

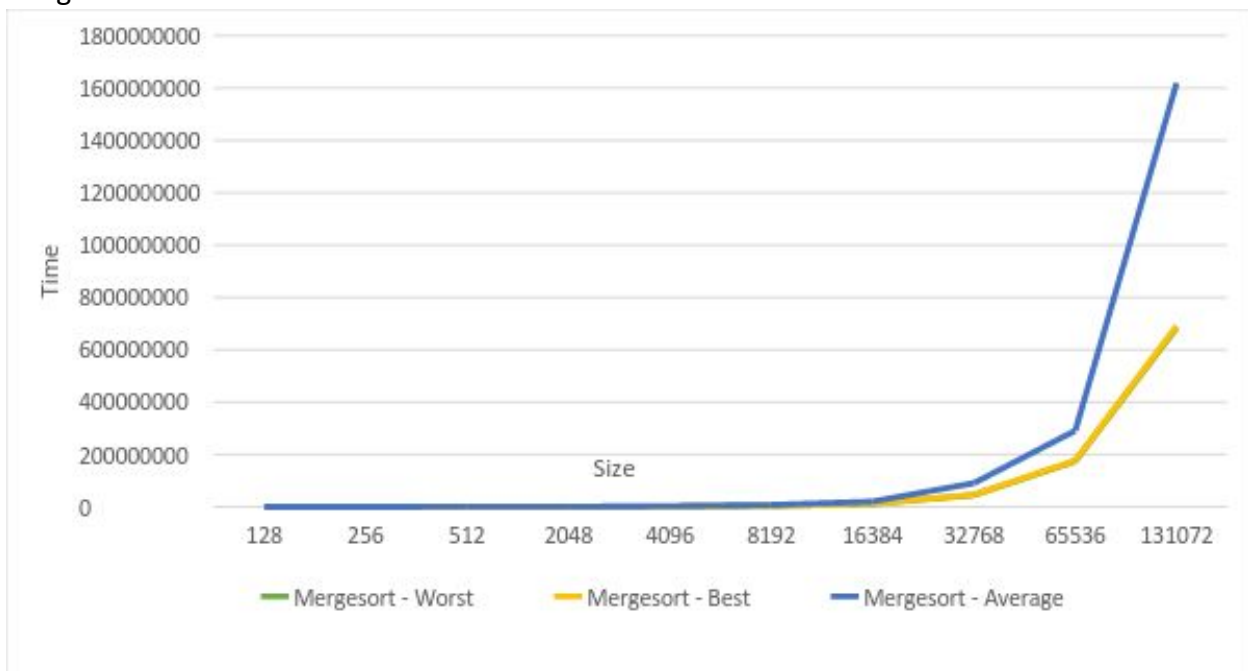
4. Mergesort:



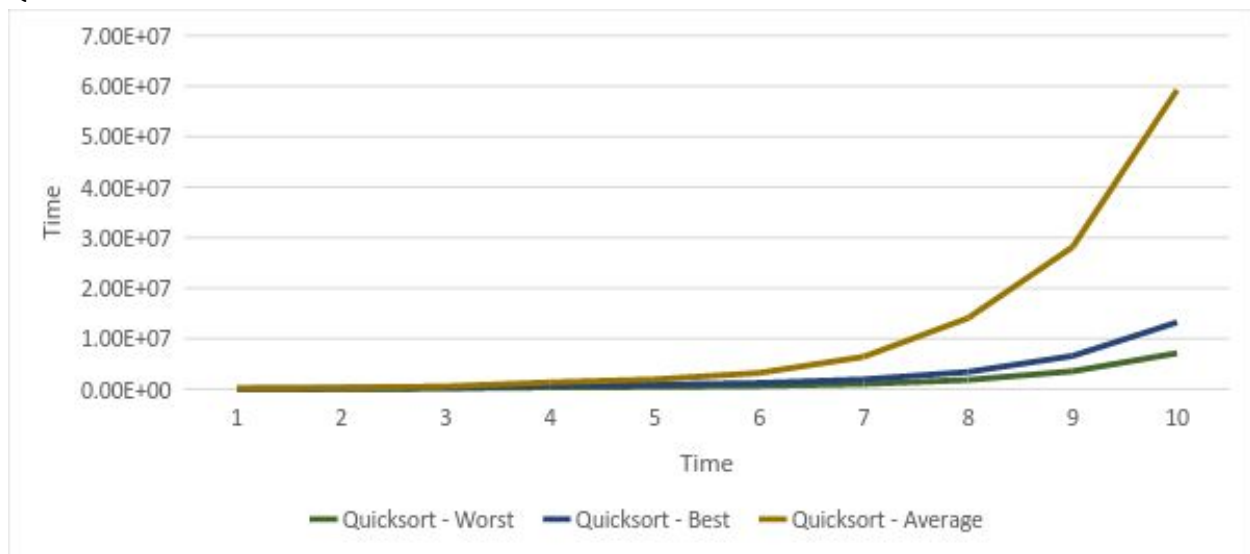
## 5. QuickSort



## 6. MergeSort



## Quicksort:



7.

The plotted running times of our mergesort algorithm exhibits the expected big O complexity of  $N \log N$ . The  $N$  arises from the inherent insertion sort that results after the subarrays have been created. The  $\log N$  component arises from the repeat splitting of the subarrays into increasingly smaller units. Quicksort also demonstrated  $N \log N$  complexity which was expected. Again the  $\log N$  arises from a repeated halving principle because the entire array is traversed and every element is compared. Unexpectedly our average case for the quicksort and mergesort algorithms showed worse performance than our worst case. I am unsure as to why this is.

8.

15 hours.