ADS HW 4

Problem 4.1

c) Time complexity of merge sort is $O(n\lg n)$ and for insertion sort is $O(n^2)$. This variant of the merge sort algorithm applies insertion sort when it reaches a certain value of k. $n\lg n$ is asymptotically smaller [for basically smaller (larger?)] than n^2. At larger array sizes, merge-sort beats insertion sort because of this. From the running time of the program, and our plots, we can say that the average and worst case scenarios take the least time for $k=20$ and greater time for larger k. Computation time increases for increasing k for average and worst case but actually decreases for best case (as compared to the other cases) as insertion sort has $O(n)$ complexity on best case which is smaller than $O(n^2)$. But generally speaking computation time increases for increasing or larger k. Specifically, for average case, increasing k increases computation time steadily - C