

Report

a. For Insertion Sort: upper bound is $\Theta(n^2)$
For Merge Sort: $O(n(\log n))$

b.

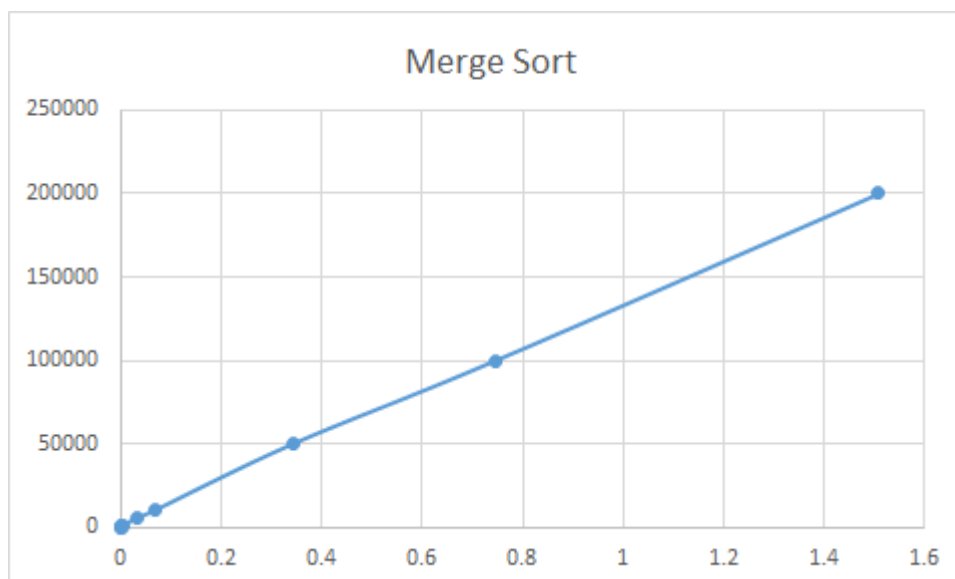
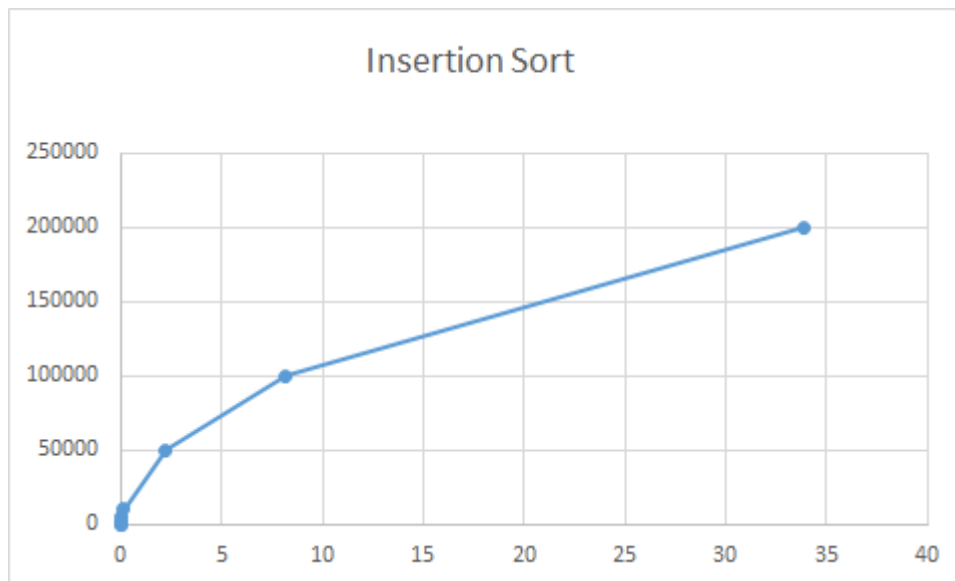
Insertion Sort

Size	Time
5	0.000187
10	0.000199
100	0.000689
500	0.002318
1000	0.005201
5000	0.043509
10000	0.127309
50000	2.24596
100000	8.20293
200000	33.8848

Merge Sort

Size	Time
5	0.000371
10	0.000294
100	0.000689
500	0.002574
1000	0.005465
5000	0.031184
10000	0.06837
50000	0.344462
100000	0.747702
200000	1.50861

c. I preferred to visualize the data in two different graphs, because difference of between two time values is so large to visualize to two table together.



d. According to my observations, when we use the input data with small sizes, Insertion Sort is faster than Merge Sort.

However, if we add more data for the input, Merge Sort will be better choice for larger sizes. As shown in the graph Merge sort has a huge advantage in runtime.

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