Practical 5: Advanced Sorting Algorithms

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Short Questions:

1. D
2. B
3. D
4. A
5. A

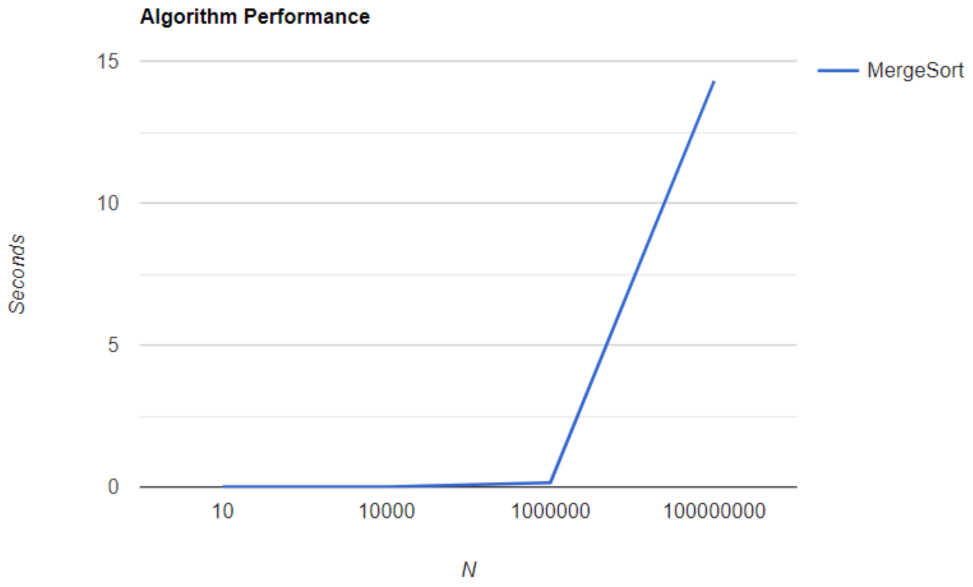
Algorithmic development:

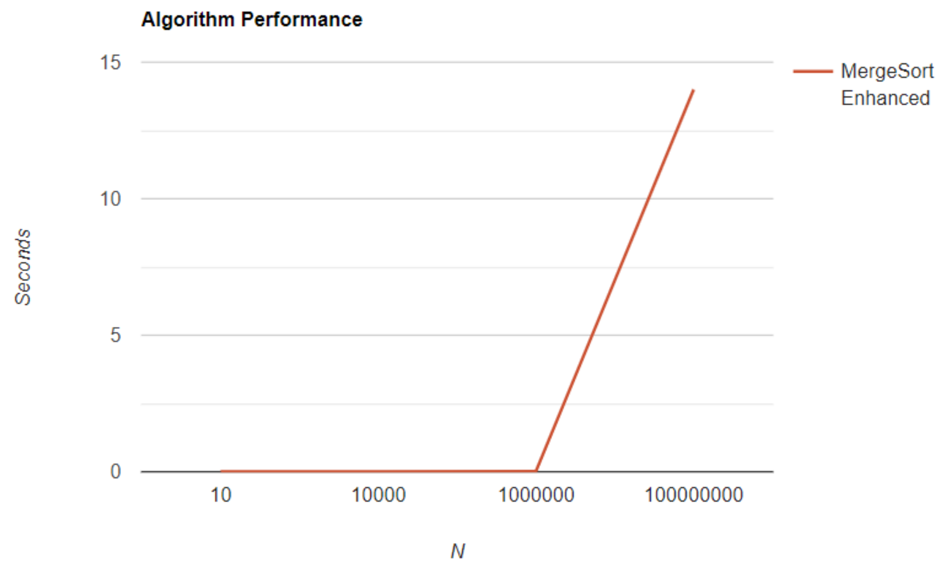
I compared the three Algorithms for the following array sizes and found these results;

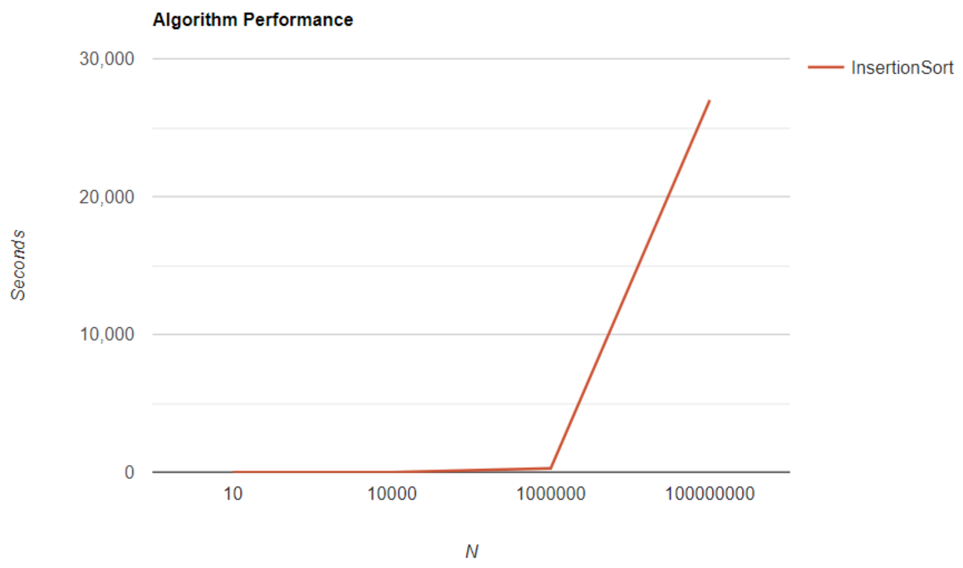
Chart

N	10	10,000	1,000,000	100,000,000
Merge Sort	0	.003	.147	14.279
Merge Sort Enhanced	0	.002	.048	13.995
Insertion sort	0	.033	279.793	>27,000

Graph







As you can see from my findings the Enhanced Merge sort appears to be marginally faster by using insertion sort for smaller cases which helps the performance. The implementation of the functionality to check if the two sub arrays are already sorted also improves the best case to O(n). As you can see Insertion Sort is clearly out performed by the other two Merge Sort methods as it has a time complexity of O(n^2), compared to O(n log n) for the Merge Sort Algorithms (Enhanced merge sort has a marginally better performance due to the implementation of insertion sort for smaller sub arrays and its best case is also better at O(n)).