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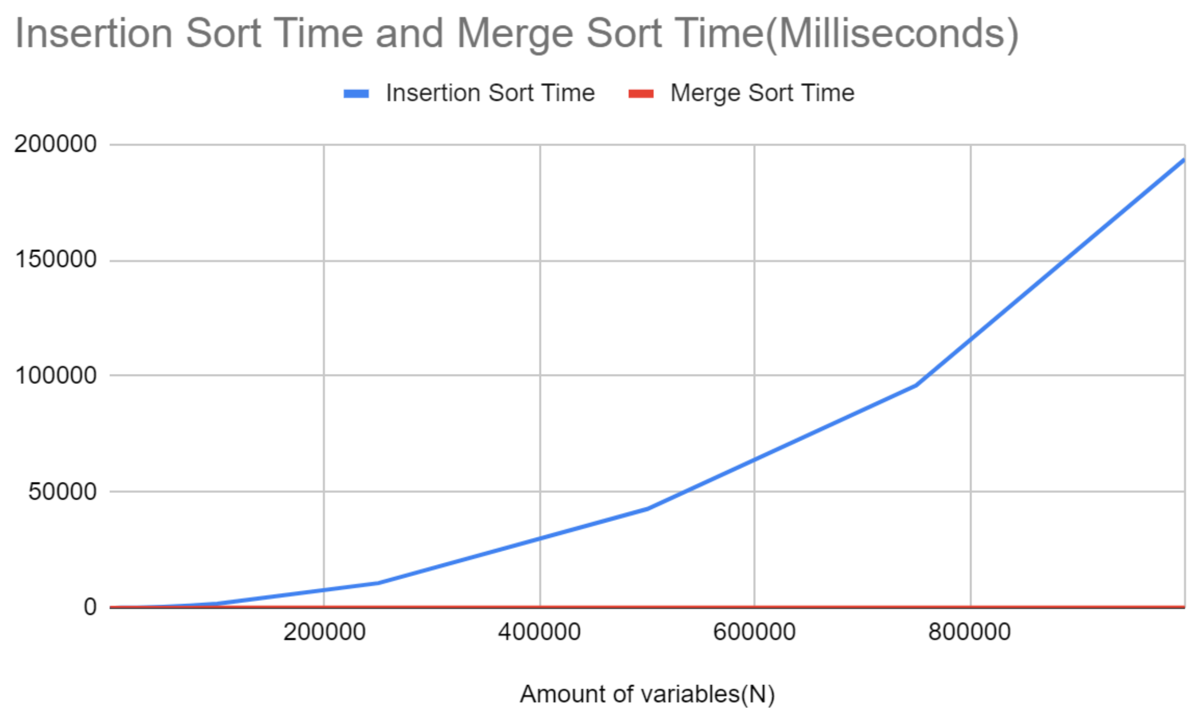
PROJECT 1 ANALYSIS

CSC310

15 FEBRUARY, 2024

Amount of variables (n)	Insertion Sort Time (in milliseconds)	Merge Sort Time (in milliseconds)
10	0.0	0.0
100	0.0	0.0
1000	2.0	0.0
5000	8.0	1.0
10000	23.0	2.0
25000	117.0	4.0
50000	454.0	7.0
75000	988.0	9.0
100000	1762.0	12.0
250000	10656.0	26.0
500000	42618.0	49.0
750000	95976.0	76.0
1000000	193593.0	102.0
10000000	~21680530.0 (estimated on regression, not on the graph)	1081.0 (also not on the graph)



ANALYSIS:

This data is not very surprising, but it still tells us a lot about algorithms and other related computer things. The first and most present thing to note is that this chart and graph reinforce the running time idea, that elementary sort is O(N^2) and merge sort is O(N*log(N)), numerically and graphically. With the extra point that I did not include(for 10 million numbers), I plotted the point, and the graph was completely reinforced, almost unidentifiable, with the blue line(elementary sort) going almost straight up.

In a large dataset (as above), the lines are exacerbated compared to a smaller dataset, and the linearithmic graph is visually horizontal compared to the quadratic. It shows that a little bit of extra lines of code and some better math, can really speed up processes, and make them more efficient. It also shows that it is important to be wise with how you program, as many small choices may really pile up and cause inefficiencies or actual problems.