

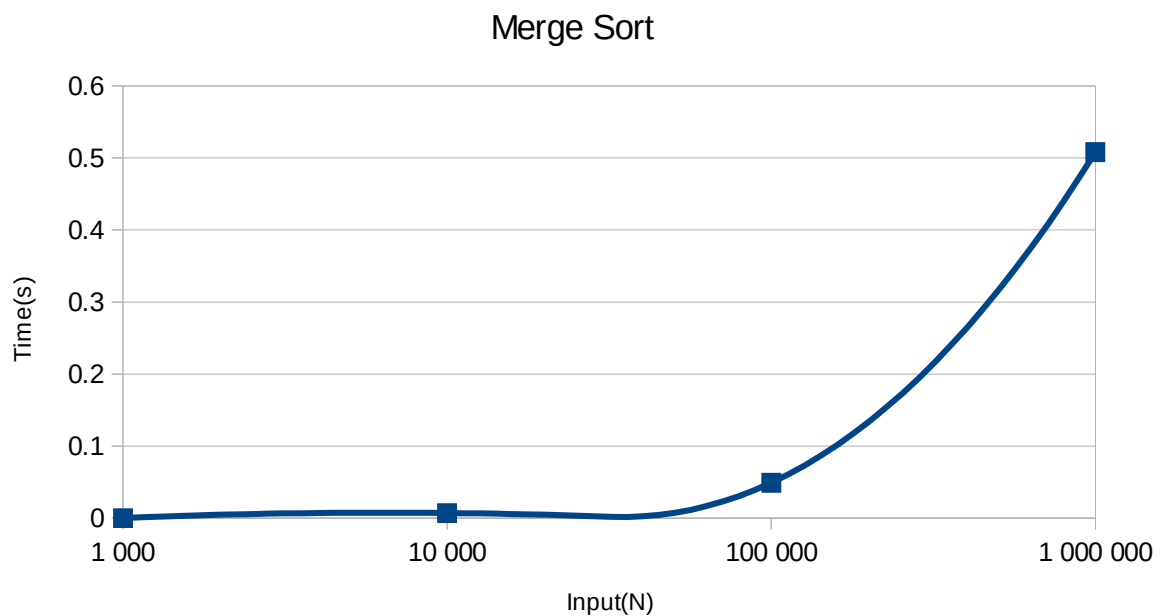
BLG335E, Analysis of Algorithms I, Fall 2015 Project 1 - Report

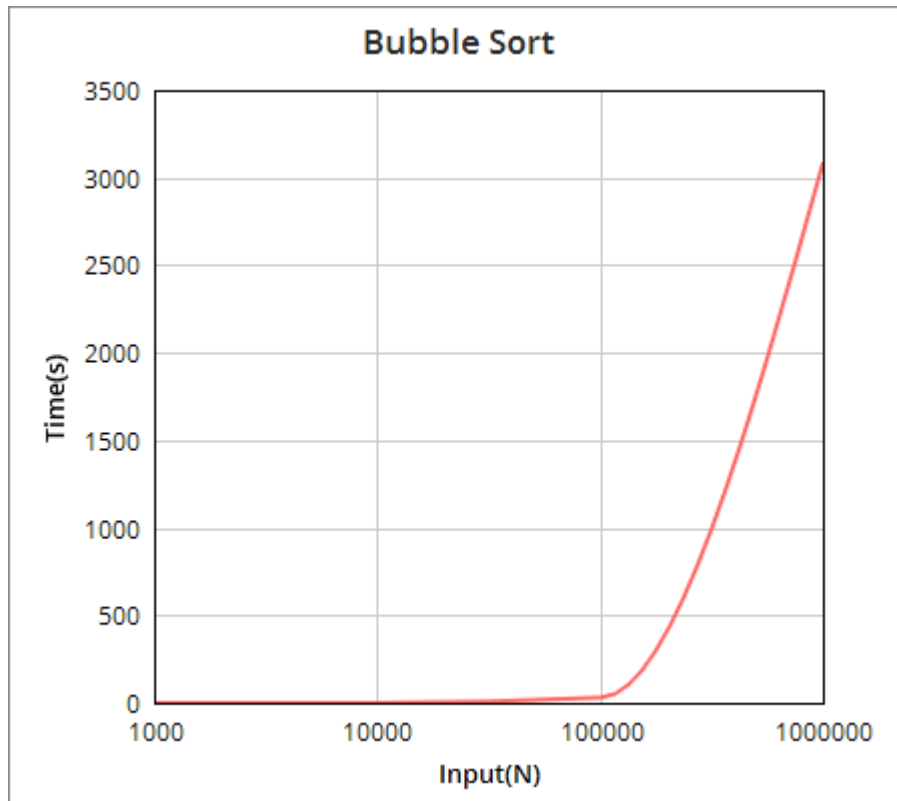
a. Asymptotic upper bound on the running time for Bubble sort is $O(n^2)$ and for Merge sort is $O(n \log n)$. As we can see on b and c parts, results fit with these functions.

b.

N	Bubble Sort	Merge Sort
1 000	0.003 second	0 second
10 000	0.279 second	0.007 second
100 000	30.287 second	0.049 second
1 000 000	3087.25 second	0.508 second

c.





In Bubble sort algorithm, running time increase suddenly after $N=100\,000$. Hence, this algorithm is suitable for only small data sets.

In Merge sort, due to its complexity, time increases very slowly comparing to Bubble sort and even with the small data sets, it is faster or equal to Bubble sort. Though, for small data sets, especially if the set is mostly ordered, Bubble sort might be better since it does not create and delete new arrays. Also, when checking the array for whether it is sorted, Bubble sort would do it faster because it would traverse the whole array once but for any other situations other than these, Merge sort algorithm would be better way to go with.