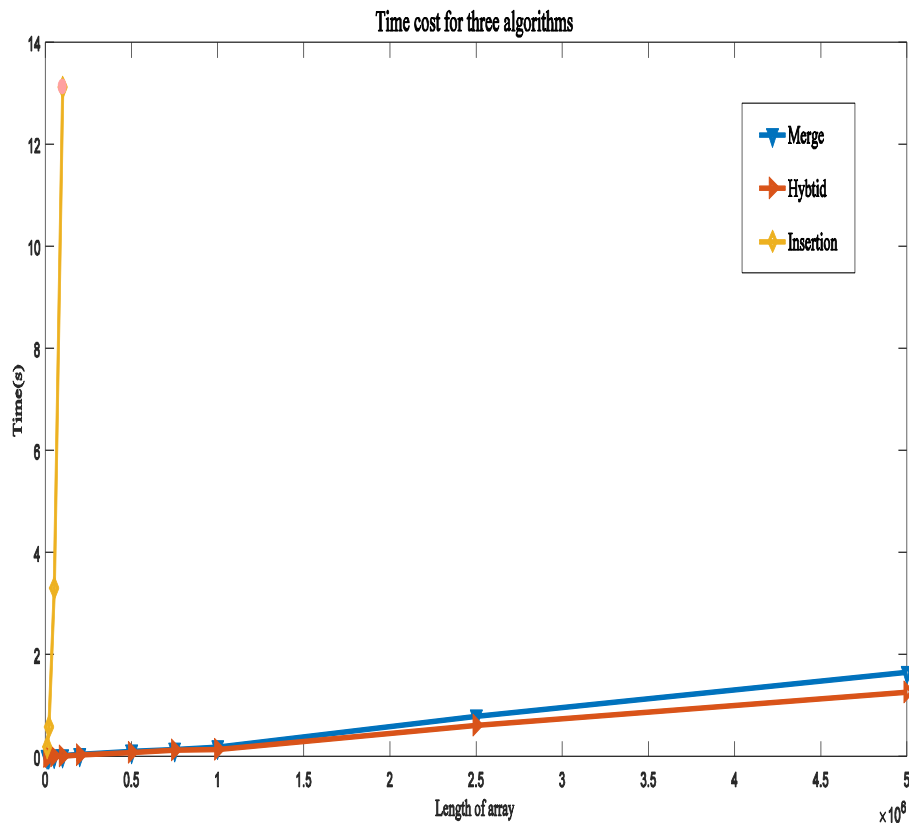EECE 7205

Hw1 q4

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I tested execution time for different array length, and plotted an image.

From the asymptotic costs, the time cost of Merge sort is $O(n^2)$, the merge sort is O(nlogn). And the hybrid algorithm can decrease the time cost in some degree because it uses less stacks when the array length is not long.

From the image, the time of Insertion_sort increased sharply. It could be simulated a quadratic function. As for the other two algorithms, the slope is pretty small. And they could be depicted as nlogn function. We can find

that the Hybrid algorithm has a better performance easier. When the number is larger, this feature can be more obvious.

The raw data is below:

	Insertion(s)	Merge(s)	Hybrid(s)
10000	0.197	0.004	0.004
20000	0.584	0.007	0.005
50000	3.308	0.014	0.012
100000	13.123	0.024	0.021
200000		0.047	0.041
500000		0.11	0.086
750000		0.148	0.132
1000000		0.195	0.143
2500000		0.799	0.62
5000000		1.656	1.269