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Project 4
CS 302

1.

Algorithm Name	Complexity
Bubble sort	O(n^2)
Merge sort	O(nlogn)
Radix sort	O(n)

2.

Timings for Sorts in sorted array: (The average of 10 sorts)

Size	Bubble sort	Merge sort	Radix sort
1000	.03 ms	.155 ms	.145 ms
10000	.049 ms	1.155 ms	1.255 ms
100000	.315 ms	14.653 ms	12.551 ms

Comparisons/Swaps in sorted array: (The average of 10 sorts)

Size/Algorithm	Bubble Sort		Merge Sort		Radix Sort	
	Comparisons	Swaps	Comparisons	Swaps	Comparisons	Swaps
1000	999	0	843	0	999	0
10000	9999	0	6819	0	9999	0
100000	99999	0	42999	0	99999	0

2.(cont.)

Timings for Sorts in unsorted array: (The average of 10 sorts)

Size	Bubble sort	Merge sort	Radix sort
1000	170ms	35 ms	10 ms
10000	882 ms	50 ms	20 ms
100000	41s	90 ms	50 ms

Comparisons/Swaps in unsorted array: (The average of 10 sorts)

Size/Algorithm	Bubble Sort		Merge Sort		Radix Sort	
	Comparisons	Swaps	Comparisons	Swaps	Comparisons	Swaps
1000	498372	254743	9965	8451	41320	23921
10000	4997724	24766704	132877	129022	423019	340840
100000	4999889969	24928569695	1660964	144092	4190000	3109210

Bubble Sort, Merge Sort, Radix sort on unsorted data

Legend: ○ Bubble Sort ○ Merge Sort ○ Radix Sort
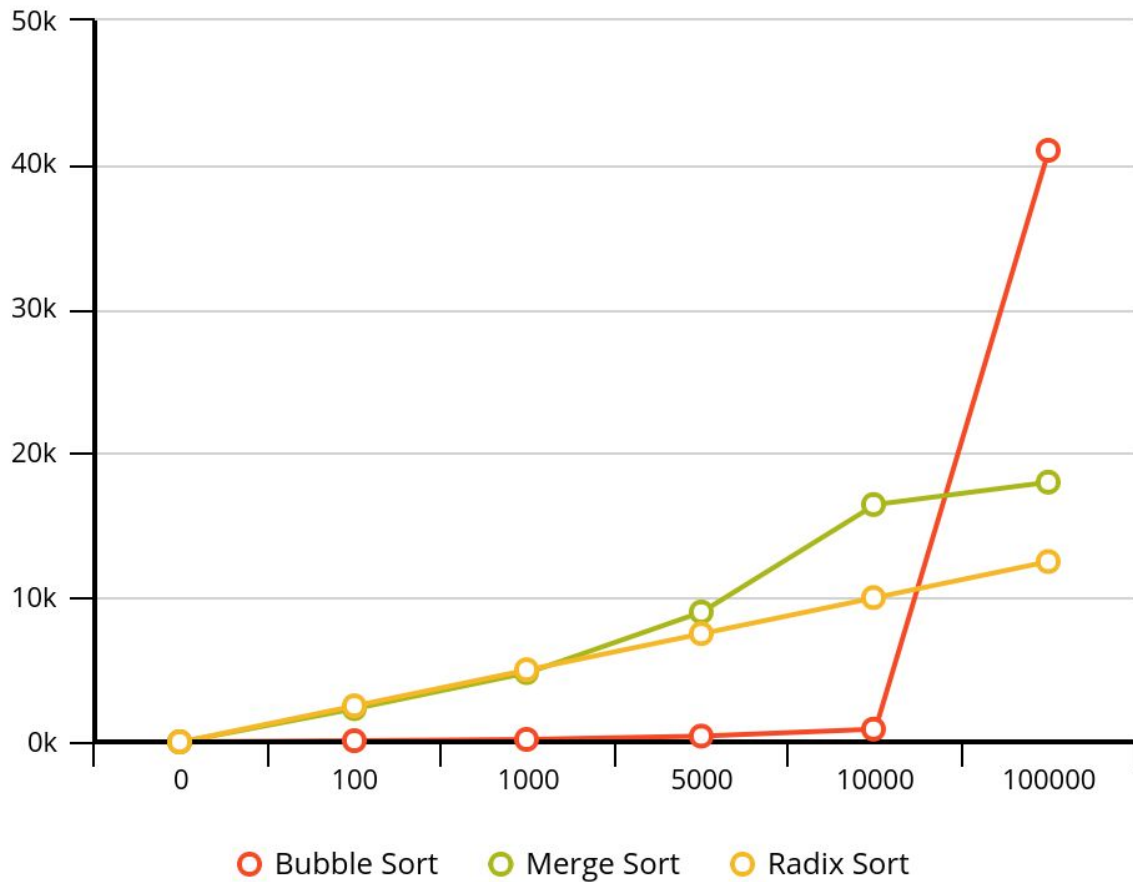
Bubble Sort, Merge Sort, Radix sort on sorted data

Legend: ○ Bubble Sort   ○ Merge Sort   ○ Radix Sort
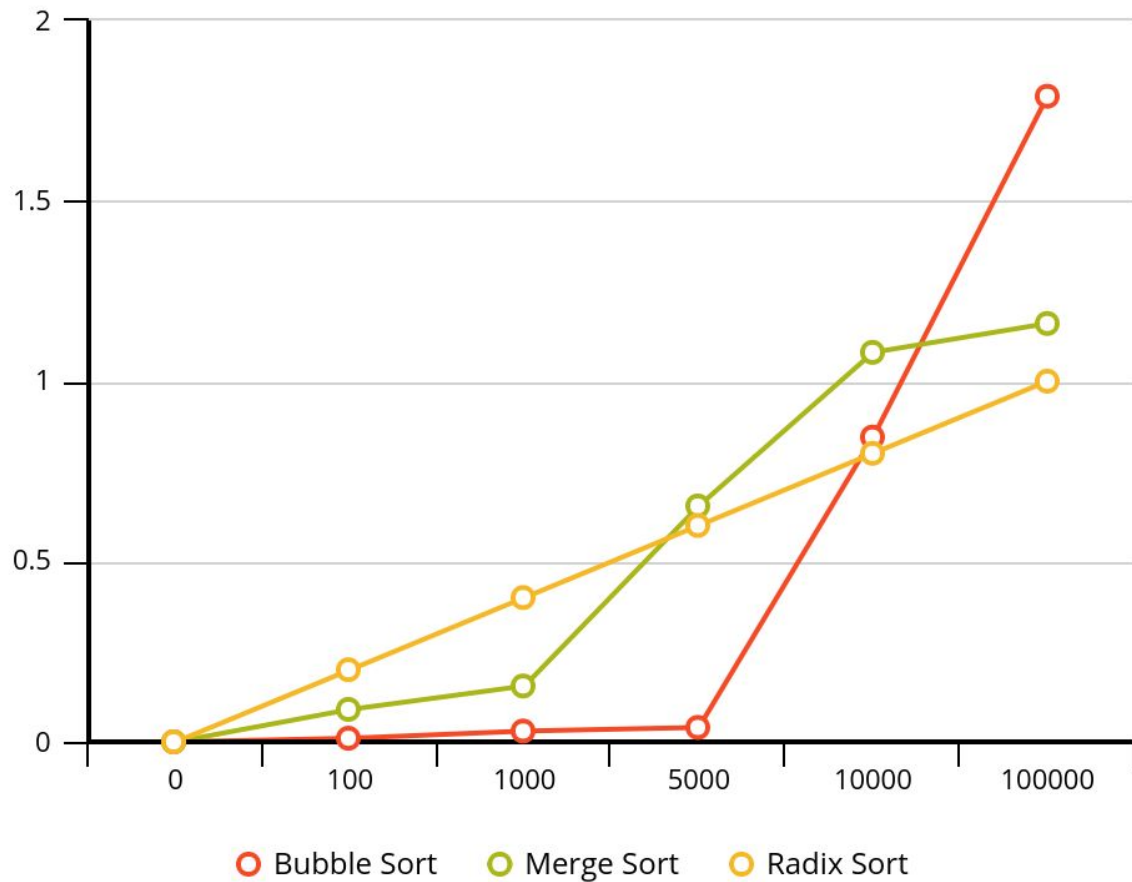
The left side of the graph is the time and the bottom is the input size.