CS214 – Data Structures

Sorting Algorithm package
Assignment 1 Report

## Supervised by:

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Team Members

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1. Insertion algorithm plot:

Insertion Sort		
Array Size	Time	unit time
200	0	milliseconds
500	0	milliseconds
1000	3	milliseconds
5000	44	milliseconds
10000	93	milliseconds
20000	371	milliseconds
50000	3529	milliseconds
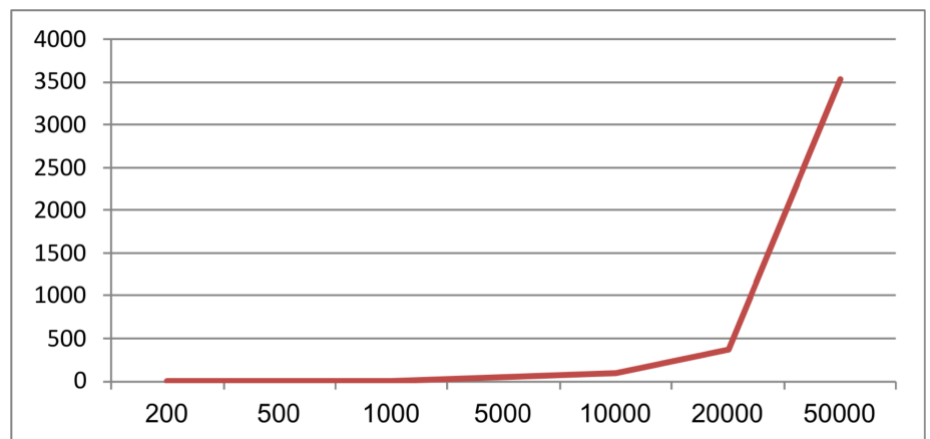
Running time changes according to the randomly generated array's sizes, as it's increasing exponentially by increasing the array sizes.
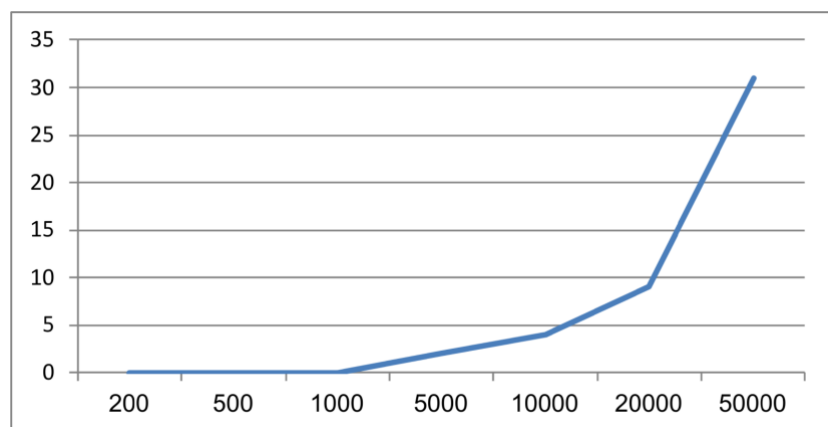
2. count algorithm plot:

Count Sort		
Array Size	Time	unit time
200	1	milliseconds
500	1	milliseconds
1000	1	milliseconds
5000	1	milliseconds
10000	2	milliseconds
20000	2	milliseconds
50000	3	milliseconds
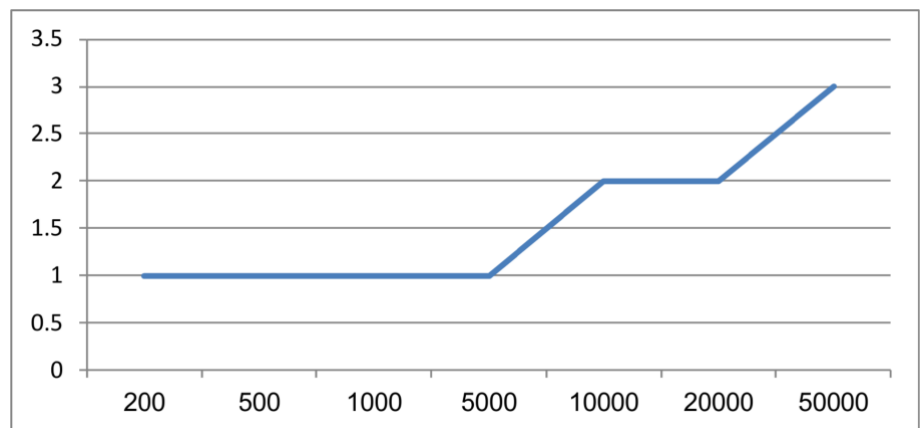
in the count sort graph, the running time increases slightly as the randomly generated array's size increase.
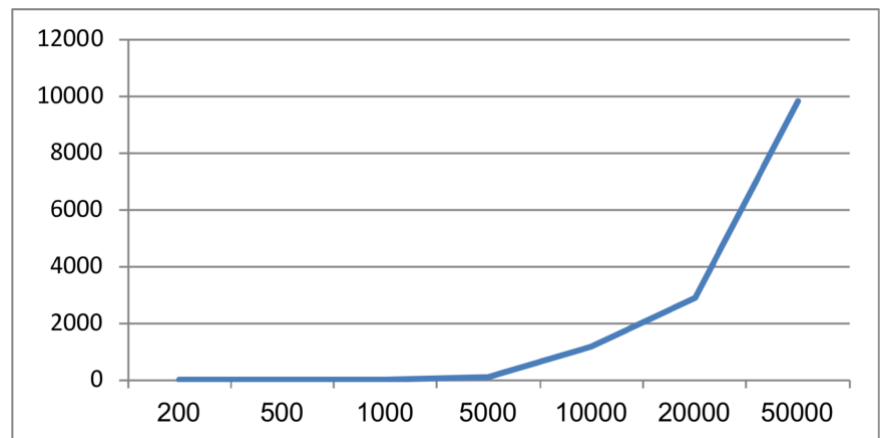
3. merge algorithm plot:

Merge Sort		
Array Size	Time	unit time
200	0	milliseconds
500	0	milliseconds
1000	0	milliseconds
5000	2	milliseconds
10000	4	milliseconds
20000	9	milliseconds
50000	31	milliseconds

As the array size increase and its size is randomly generated, the running time of the merge sort algorithm increases sharply.
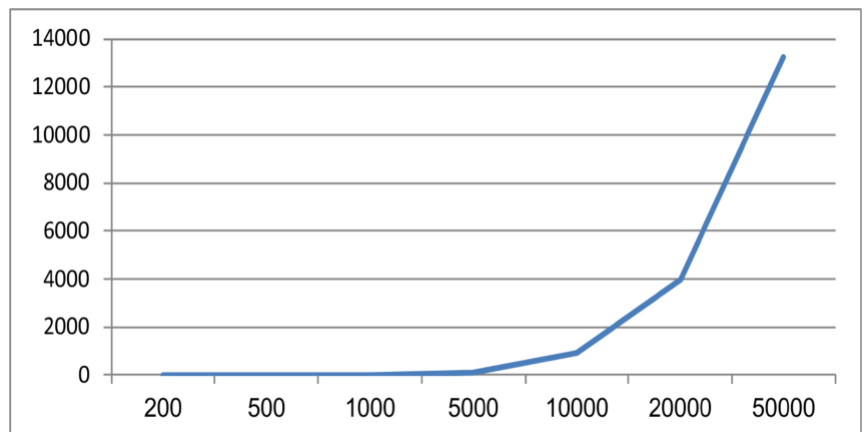
4. shell sort plot:

Shell Sort		
Array Size	Time	unit time
200	0	milliseconds
500	0	milliseconds
1000	4	milliseconds
5000	102	milliseconds
10000	1179	milliseconds
20000	2907	milliseconds
50000	9820	milliseconds

According to the increase in the array size, the shell sort algorithm running time is increasing steadily.
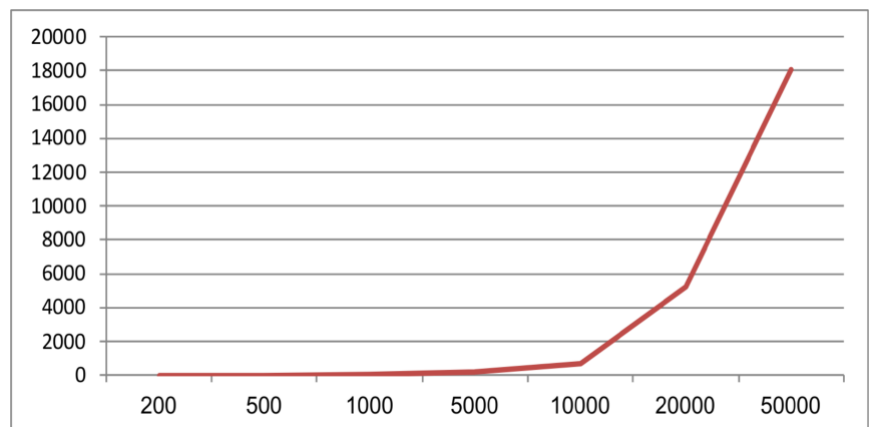
5. bubble sort plot:

Bubble Sort		
Array Size	Time	unit time
200	0	milliseconds
500	1	milliseconds
1000	5	milliseconds
5000	115	milliseconds
10000	895	milliseconds
20000	3964	milliseconds
50000	13239	milliseconds

The randomly generated array size is increasing while the running time of the algorithm is increasing gradually.

6. selection sort plot:

Selection Sort		
Array Size	Time	unit time
200	0	milliseconds
500	2	milliseconds
1000	10	milliseconds
5000	193	milliseconds
10000	665	milliseconds
20000	5214	milliseconds
50000	18098	milliseconds

The running time of the algorithm is suddenly increasing with the increase of the array size as it's randomly generated.

7. quick sort plot:

Quick Sort		
Array Size	Time	unit time
200	0	milliseconds
500	0	milliseconds
1000	0	milliseconds
5000	2	milliseconds
10000	2	milliseconds
20000	6	milliseconds
50000	15	milliseconds
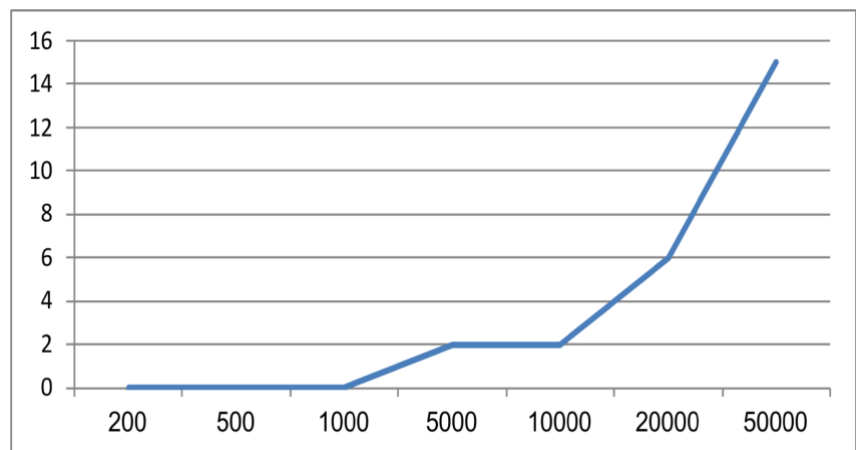
The running time of the quick sort algorithm increases slightly according to the increase in the randomly generated array's size.