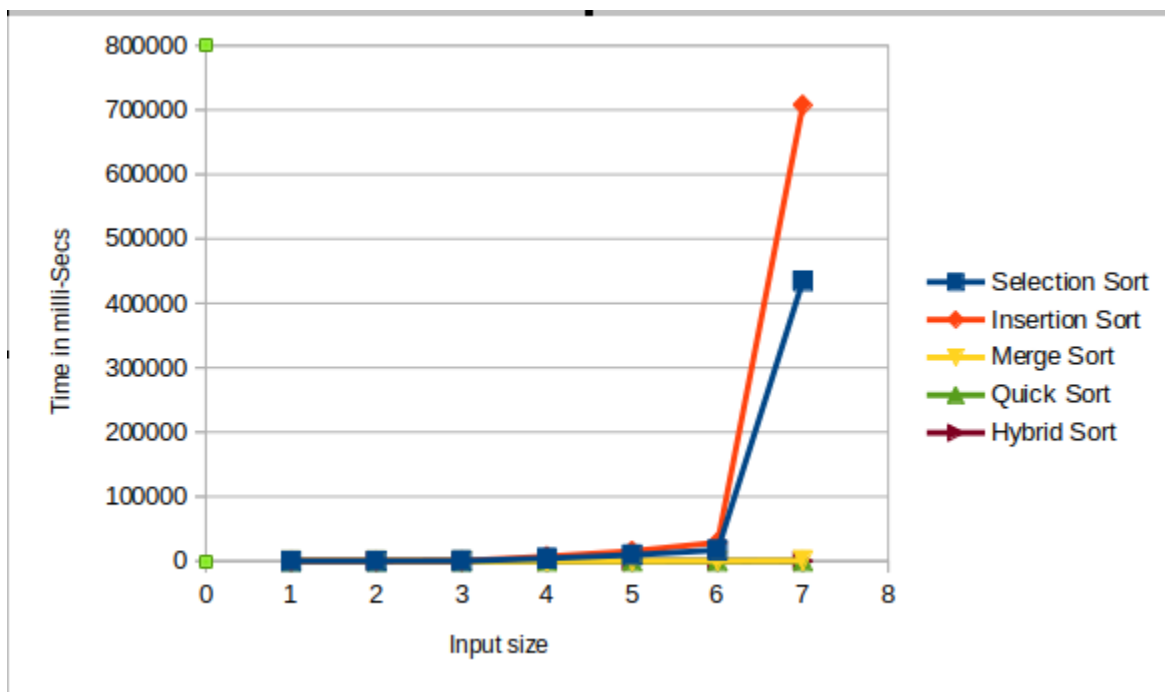


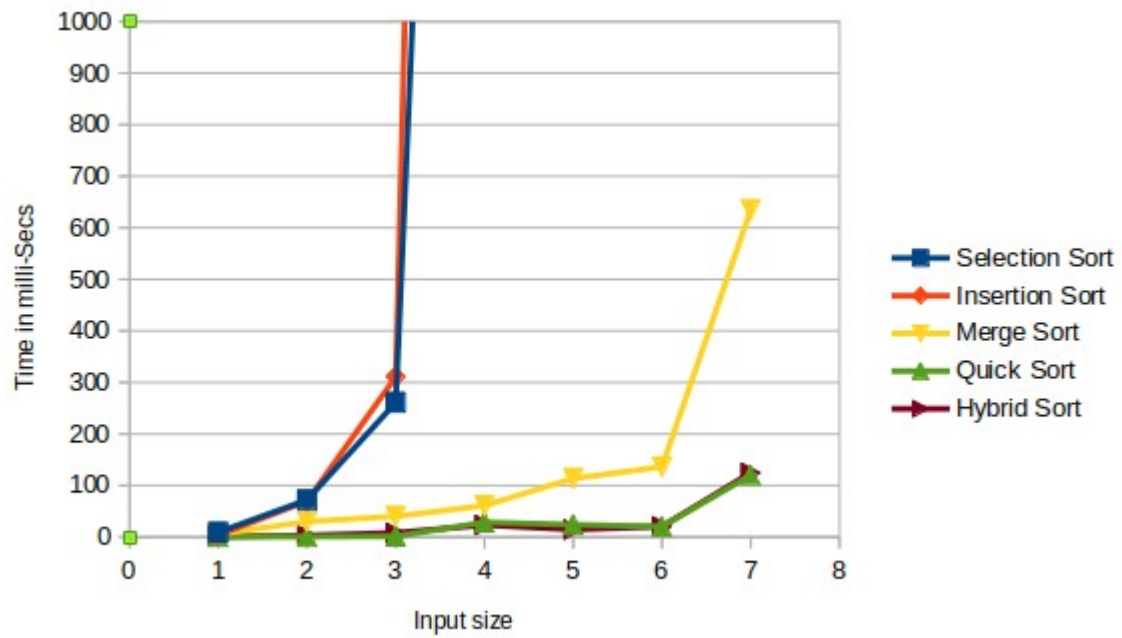
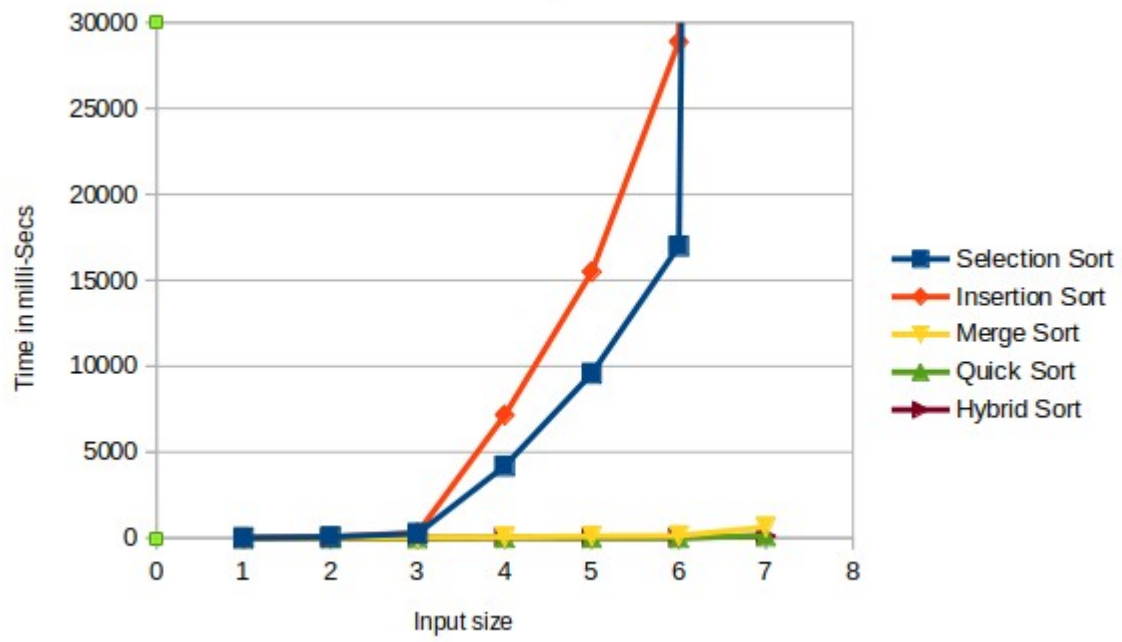
Graph:

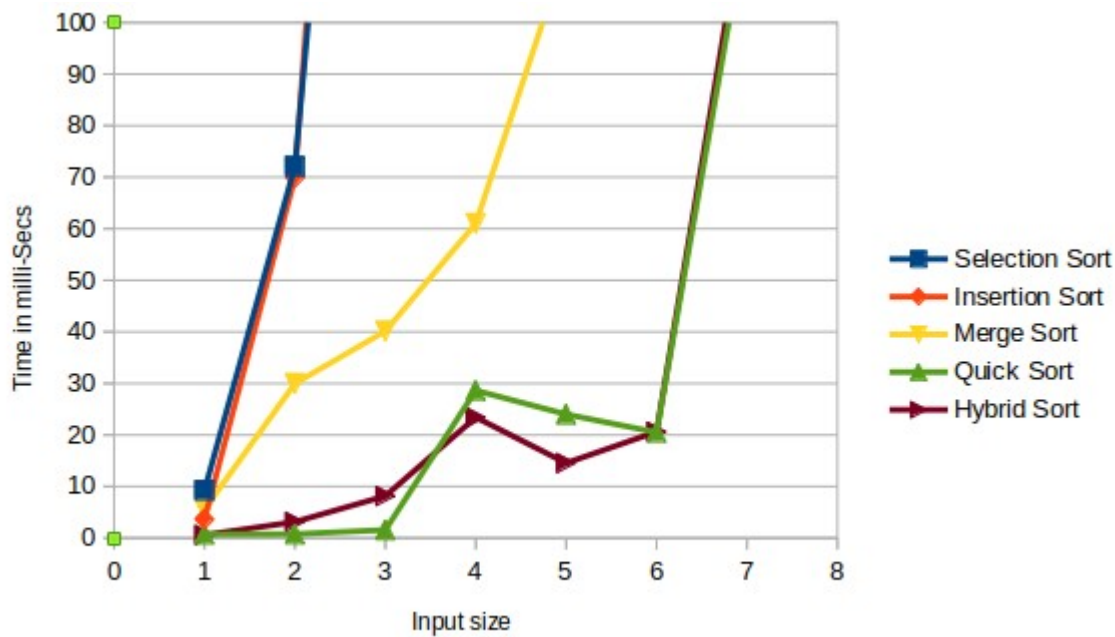
X-Axis

1000_unsorted => 1
5000_unsorted => 2
10000_unsorted => 3
50000_unsorted => 4
75000_unsorted => 5
100000_unsorted => 6
500000_unsorted => 7

The graph is represented with different scale to capture the differences







Hybrid Sort:

I used the quick sort algorithm and insertion sort algorithm

the algorithm starts with the divide and conquer, as the quick sort algorithm showed the best performance to sort the big data.

Then if the size of the list that desired to be sorted reached a certain size the algorithm apply insertion sort, as insertion sort showed the best performance to the smaller size that are nearly sorted.

Running time:

Selection sort

1000_unsorted: 9.27187
1000_sorted: 2.98068
5000_unsorted: 72.1221
5000_sorted: 70.9065
10000_unsorted: 261.247
10000_sorted: 161.332
50000_unsorted: 4193.42
50000_sorted: 4358.61
75000_unsorted: 9577.4
75000_sorted: 9473.16
100000_unsorted: 16989.5
100000_sorted: 16437
500000_unsorted: 434743
500000_sorted: 440403

insertion sort

1000_unsorted: 3.63019
1000_sorted: 0.03151
5000_unsorted: 69.9507
5000_sorted: 0.141752
10000_unsorted: 310.961
10000_sorted: 0.060157
50000_unsorted: 7152.74
50000_sorted: 0.310742
75000_unsorted: 15488.9
75000_sorted: 2.22941
100000_unsorted: 28876.8
100000_sorted: 0.682647
500000_unsorted: 707550
500000_sorted: 3.38228

merge sort

1000_unsorted: 5.58186
1000_sorted: 5.25153
5000_unsorted: 29.9838
5000_sorted: 27.7199
10000_unsorted: 40.1385
10000_sorted: 39.6156
50000_unsorted: 61.0254
50000_sorted: 57.5294
75000_unsorted: 113.721
75000_sorted: 86.8103
100000_unsorted: 136.134
100000_sorted: 126.784
500000_unsorted: 634.796
500000_sorted: 567.749

quick sort

1000_unsorted: 0.738491
1000_sorted: 6.05337
5000_unsorted: 0.776811
5000_sorted: 126.268
10000_unsorted: 1.58303
10000_sorted: 502.471
50000_unsorted: 28.6223
50000_sorted: 12506.2
75000_unsorted: 24.0038
75000_sorted: 27809
100000_unsorted: 20.4988
100000_sorted: 51859.2
500000_unsorted: 120.021
500000_sorted: 567777.749

hybrid sort (quick + insertion)

1000_unsorted: 0.59765

1000_sorted: 29.6708

5000_unsorted: 3.13602

5000_sorted: 124.137

10000_unsorted: 8.15942

10000_sorted: 497.946

50000_unsorted: 23.4183

50000_sorted: 14518.6

75000_unsorted: 14.5375

75000_sorted: 28675.4

100000_unsorted: 20.6139

100000_sorted: 50859.2

500000_unsorted: 124.56

500000_sorted: 547777.749