

Homewrok 5 Report

Sort Name	Descending	Ascending	Random
Exchange Sort	29035	10916	19016
Heap Sort	712	616	727
Insertion Sort	10951	34	5776
Merge Sort	386	361	535
Poor Quick Sort	4559	4579	371
Quick Sort	211	215	344
Selection Sort	9017	6150	6465
BST Sort	12323	14086	567
Splay Tree Sort	119	124	516

Table.1 The running time of different sort algorithm in descending input, ascending input and random input.

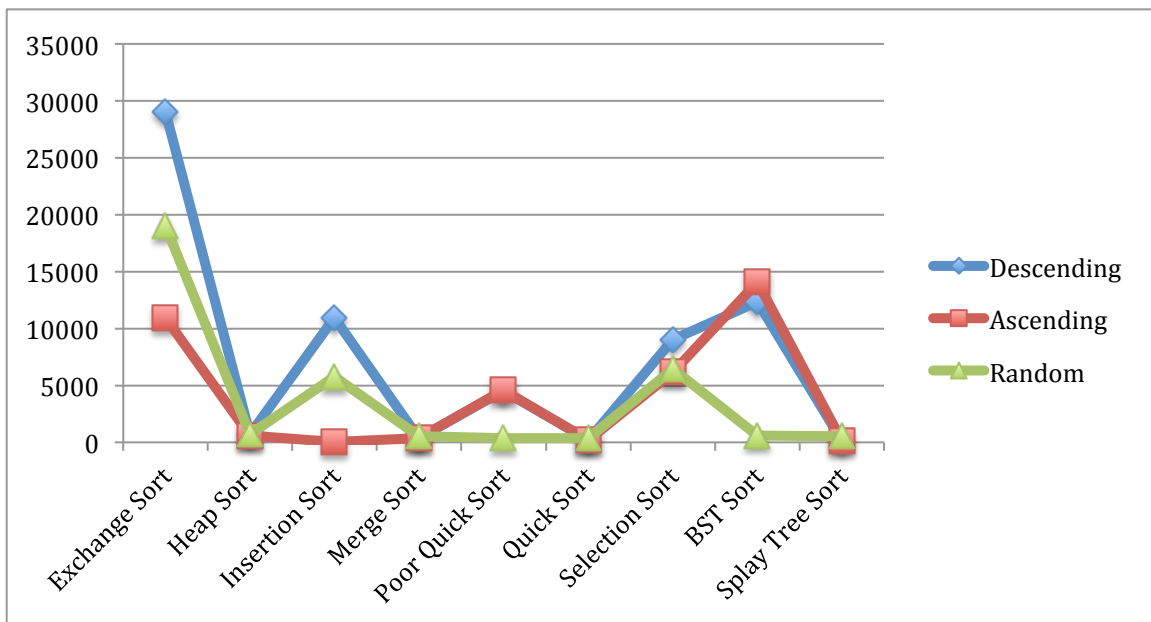


Figure.1 The running time of different sort algorithm in descending input, ascending input and random input.

Code for input:

Ascending: $A[i] = i$;

Descending: $A[i] = 1000 - i$;

Random: `random_shuffle(&A[0], &A[999]);`

Summary:

I choose selection sort, heap sort and quick sort as my three implantations.

Selection sort: in these three sort algorithms, selection sort is the worst one.

Selection sort take $n*n$ time for all cases.

Heap sort: heap sort is a faster sort algorithm compared to selection sort. For all cases, it always takes $n \log n$ time.

Quick sort: quick sort is in the same level as heap sort, it is fast too, while it is a little faster than heap sort. For quick sort, I take 3-median to pick pivot, it is much faster than the poor quick sort, which always take the first element in the array as the pivot. Since the 3-median pivot will avoid the worst case of quick sort.