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September 22, 2016

MP3 Test Log

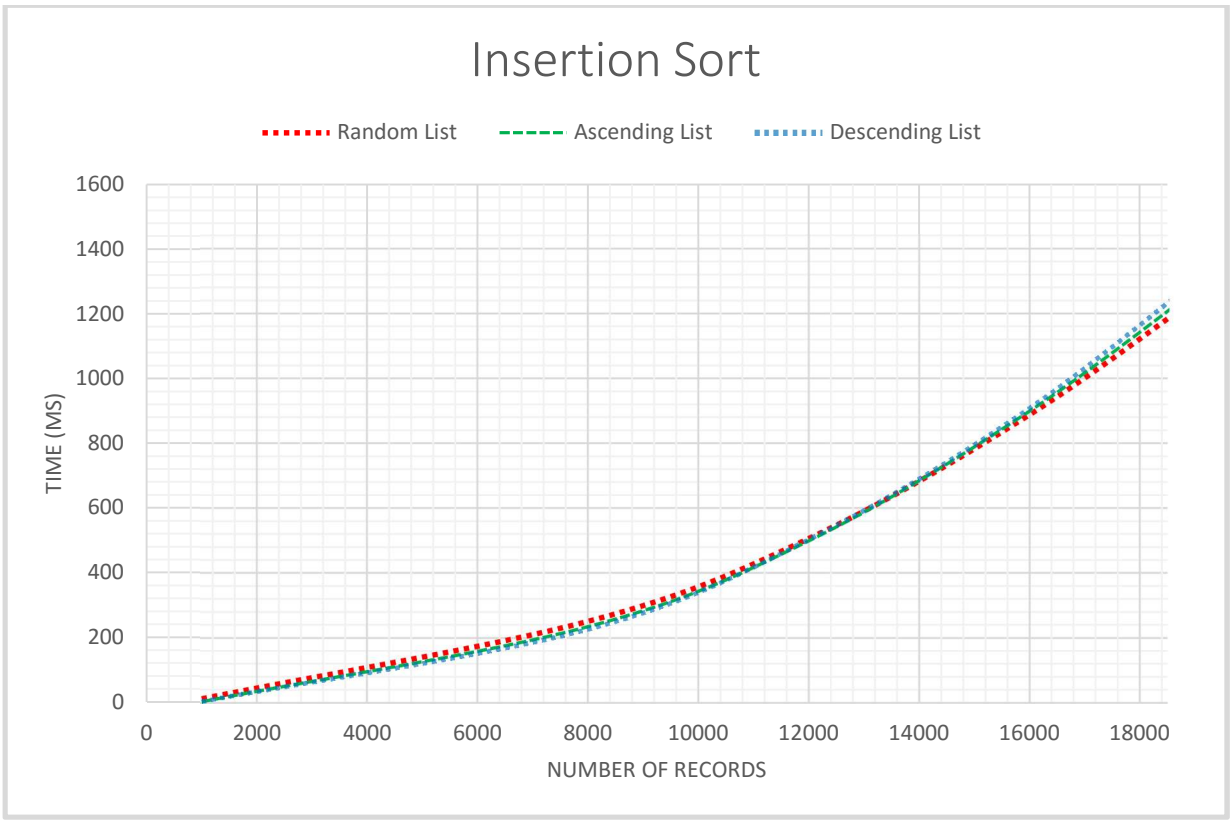
Questions:

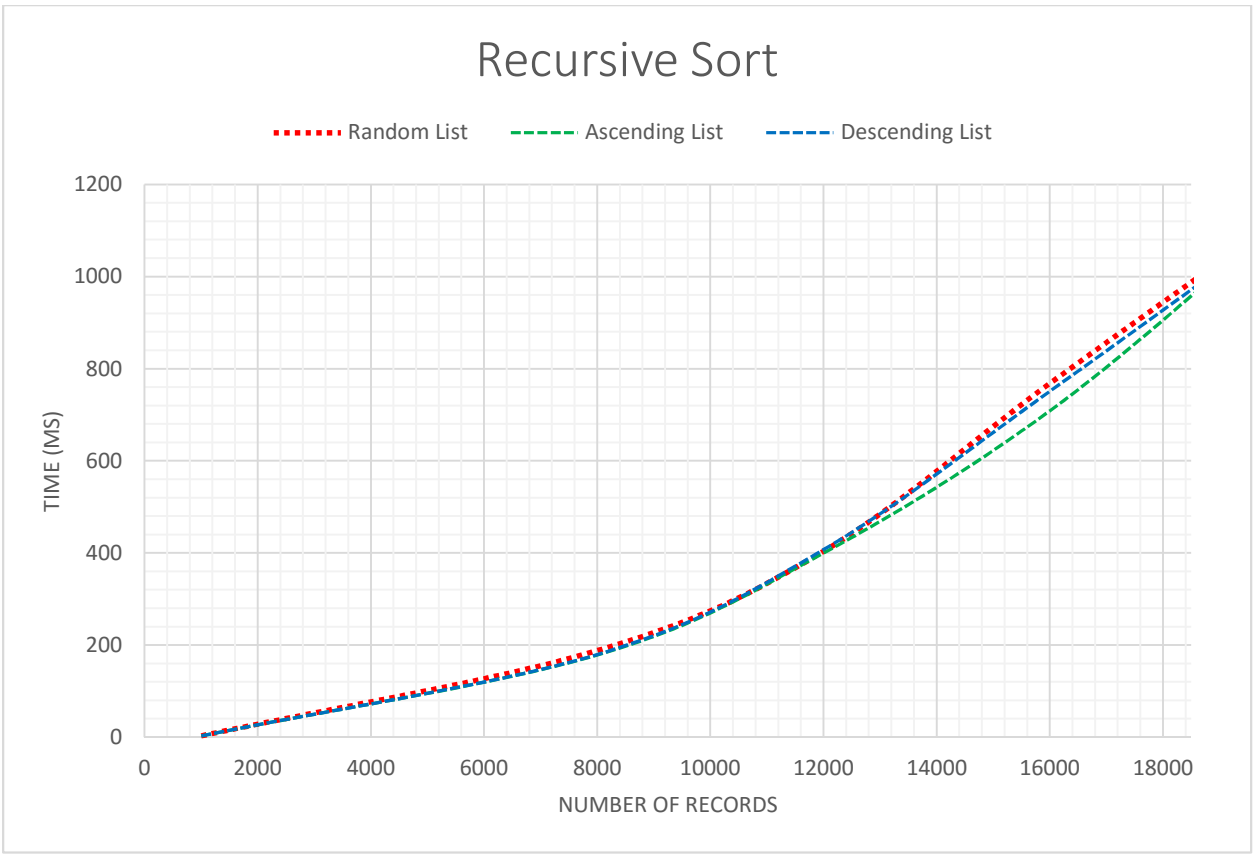
a.)

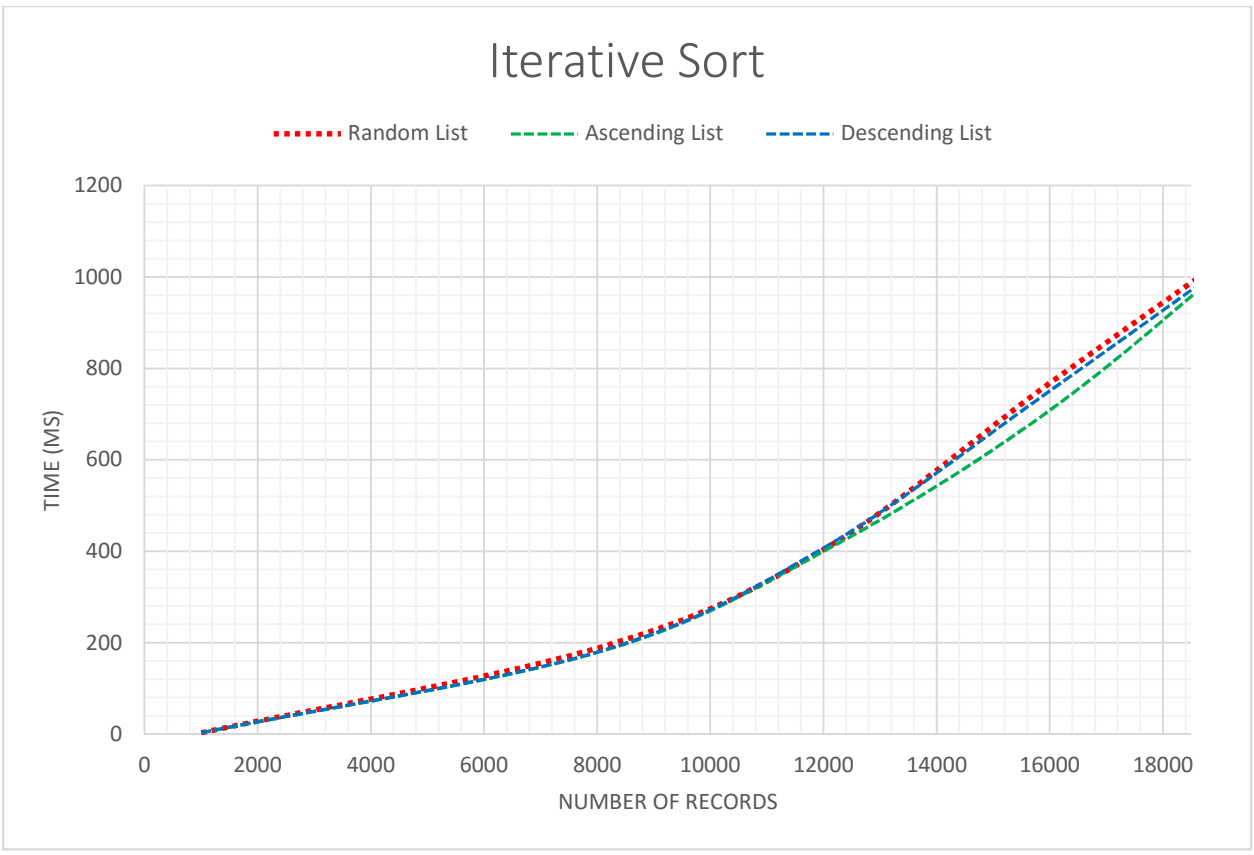
Sort Times of a Random List			
Sort Type	Number of Records	Time (ms)	Number of Items Sorted Per Millisecond
Insertion	20000	1368.983	14.609
Recursive	20000	1119.108	17.871
Iterative	20000	1364.692	14.655
Merge	750000	1178.937	636.166
Quick	6250000	1025.691	6093.453

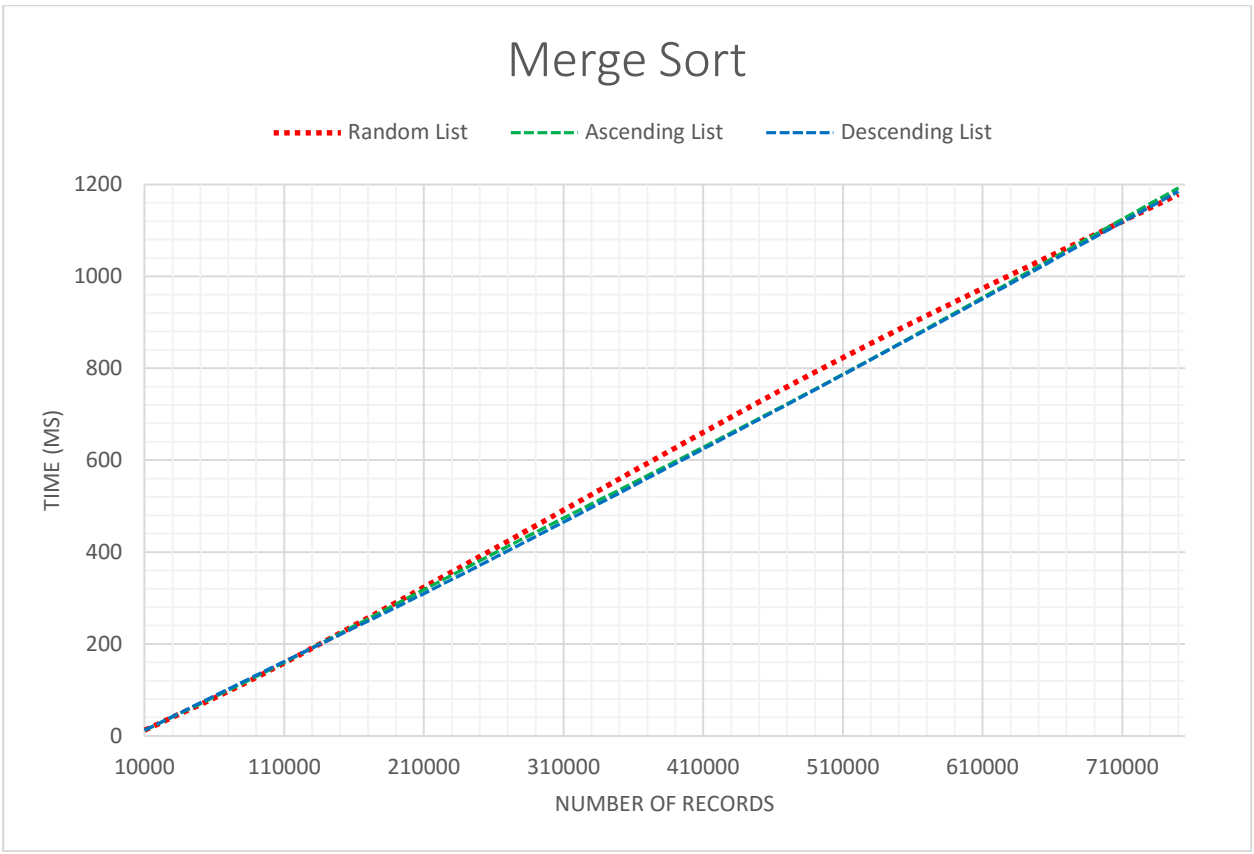
Looking at the chart above, it is obvious that qsort is the clear winner in sorting a random list. It had a ton of items compared to the other sort types and still beat them in sorting the list. The recursive sort type was slower in sorting the list than insertion with the same number of items. Why 3ms slower is not dramatic it is something to note. Merge sort was definitely a dramatic improvement compared to insertion sort, recursive sort and iterative sort. The reason merge sort and quick sort are much faster at sorting lists is because they take time O(N log(N)) whereas insertion, recursive, and iterative sort take $O(N^2)$. N^2 grows much faster than N log(N).

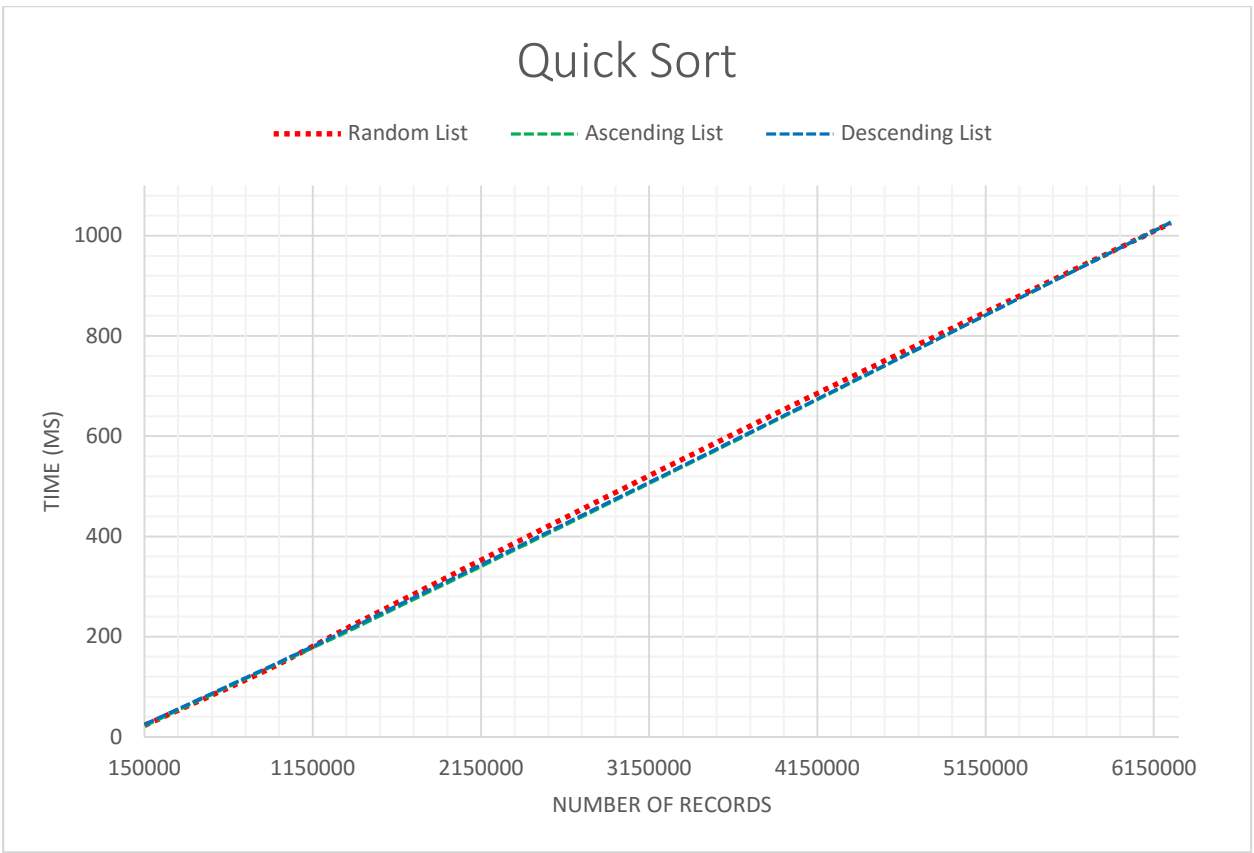
b.) Insertion sort is a good candidate if a list is already in ascending order. This is because the inner loop in the insertion code never executes, making the time O(N). However if the list is descending, the inner loop executes the maximum possible number of times making the time $O(N^2)$.


Insertion Sort
Random List
Ascending List
Descending List
TIME (MS)
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
NUMBER OF RECORDS


Recursive Sort
Random List
Ascending List
Descending List
1200
1000
800
600
400
200
0
TIME (MS)
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
NUMBER OF RECORDS


Iterative Sort
Random List
Ascending List
Descending List
1200
1000
800
600
400
200
0
TIME (MS)
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
NUMBER OF RECORDS


Merge Sort
Random List
Ascending List
Descending List
1200
1000
800
600
400
200
0
TIME (MS)
10000
110000
210000
310000
410000
510000
610000
710000
NUMBER OF RECORDS


Quick Sort
Random List
Ascending List
Descending List
1000
800
600
400
200
0
TIME (MS)
150000
1150000
2150000
3150000
4150000
5150000
6150000
NUMBER OF RECORDS