Warren Scipio Lab7

1: **Ascending**

selection sort: the growth rate was quadratic as should it always be. Selections worst best and average case are all the same.
Insertion sort: the growth rate was linear. The numbers I used were smaller than suggested but still showed linear in the graph of insertion sort.
Merge sort: the growth rate was N*log(N) for merge as it always is, merge's best case and worse case are the same making it reliable if anything else.
Bubble sort: the growth of bubble sort was very linear. It proved its complexity's function is O(N).
Quick sort: the growth was linear as it should have been. The complexity was O(N) for this case which was quick sort's best case.

Descending

selection sort: the growth rate was quadratic as should it always be. Selections worst best and average case are all the same. It was bad.
Insertion sort: the growth rate was quadratic. It took a very long time...
Merge sort: the growth rate was still N*log(N) which wasn't too long. This is because as I said before merge's best and worst case are the same.
Bubble sort: the growth rate of bubble turned from best to worse quite literally, this is its worse case so it was quadratic
Quick sort: the growth of quick sort was

Random

*Selection sort:*the growth rate was quadratic same as always still bad.
Insertion sort: the growth rate of insertion was quadratic with a random list.
Merge sort: the growth rate will always be N*log(N) so thats what it is this time.
*Bubble sort:*the growth rate of bubble was
Quick sort: the growth of quick sort was

2. **Random**

Insertion: 3.43 *10^10 microseconds
Selection: 8.57 * 10^11 microseconds
Merge: 4.69 *10^8 microseconds
Bubble: 3.41*10^12 microseconds
Quick:

Ascending

Insertion: 1.56 *10^4 microseconds
Selection: 5.22 *10^10 microseconds
Merge: 2.5 *10^5 microseconds
Bubble: 9.45*10^4 microseconds
Quick:

Descending

Insertion: 1.32 *10^10 microseconds
Selection: 9.12 * 10^10 microseconds
Merge: 1.10 *10^6 microseconds
Bubble: 8.95 *10^11 microseconds

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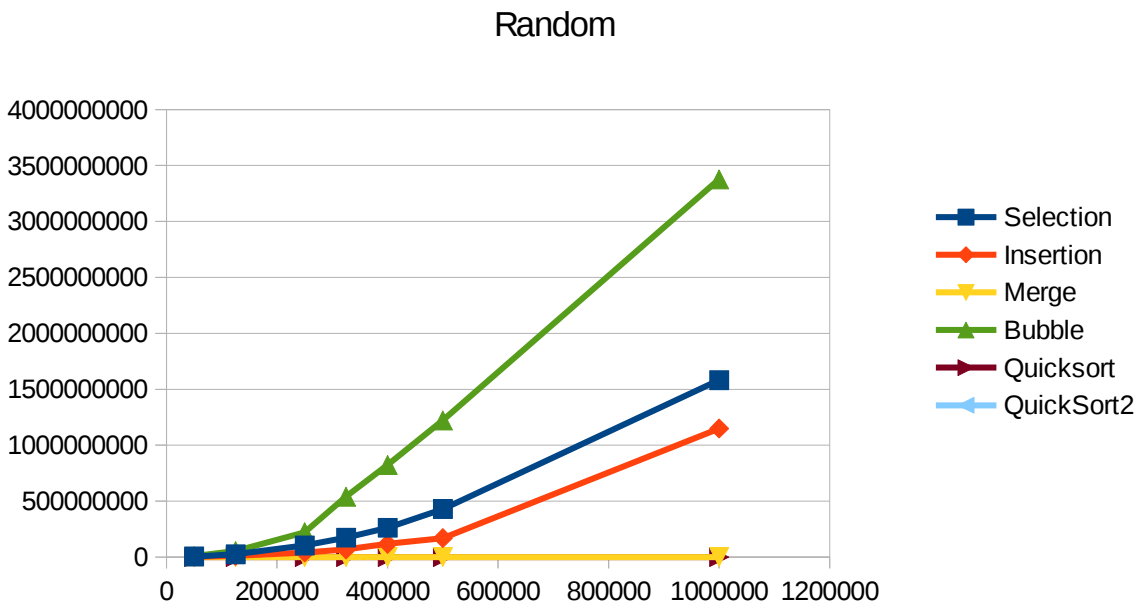
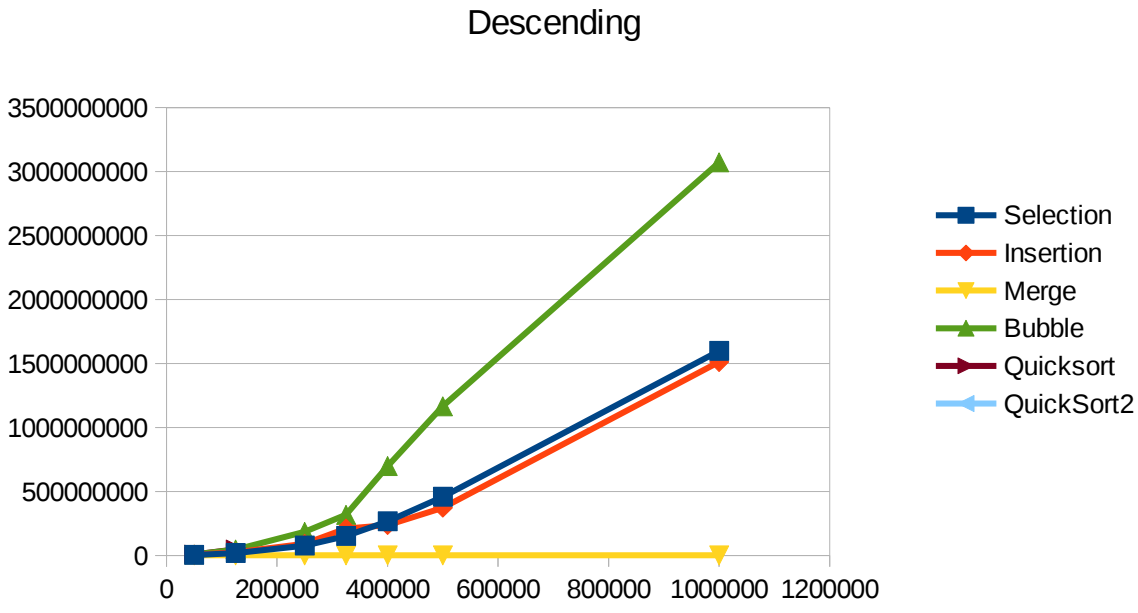
Quick:





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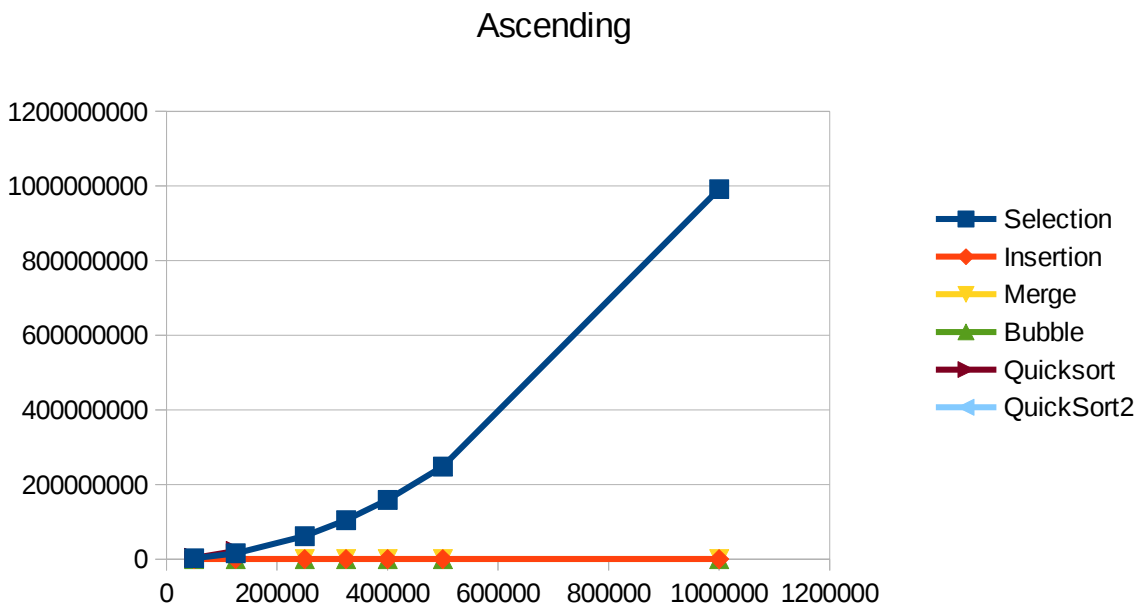

*side notes something is clearly wrong with my quick sort...