Complexiplot Report

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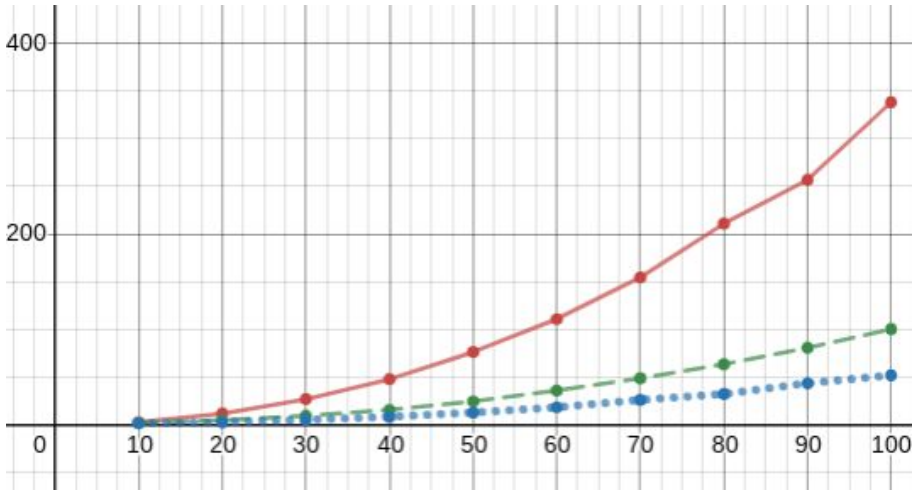
Algorithm Complexity

Algorithm	Best	Worst	Average
Bubble Sort	O(n)	O(n^2)	O(n^2)
Selection Sort	O(n^2)	O(n^2)	O(n^2)
Insertion Sort	O(n)	O(n^2)	O(n^2)

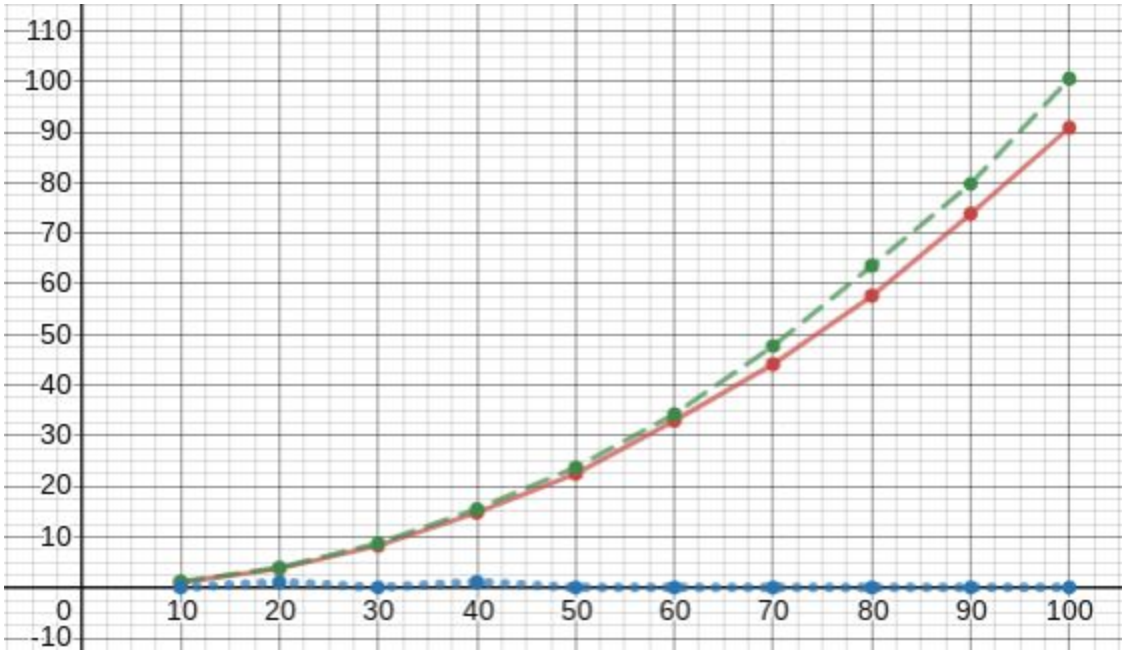
Random Data



Count of Data	Bubble Time (ms)	Selection Time (ms)	Insertion Time (ms)
10000 (10k)	208	121	79
20000 (20k)	112	412	203
30000 (30k)	2631	889	462
40000 (40k)	4726	1509	781
50000 (50k)	7578	2397	1224
60000 (60k)	11046	3542	1770
70000 (70k)	15417	4823	2556
80000 (80k)	21078	6306	3169
90000 (90k)	25686	8023	4306
100000 (100k)	33847	9983	5136

All sorts show roughly similar in speed as the data doesn’t vary wildly in order.

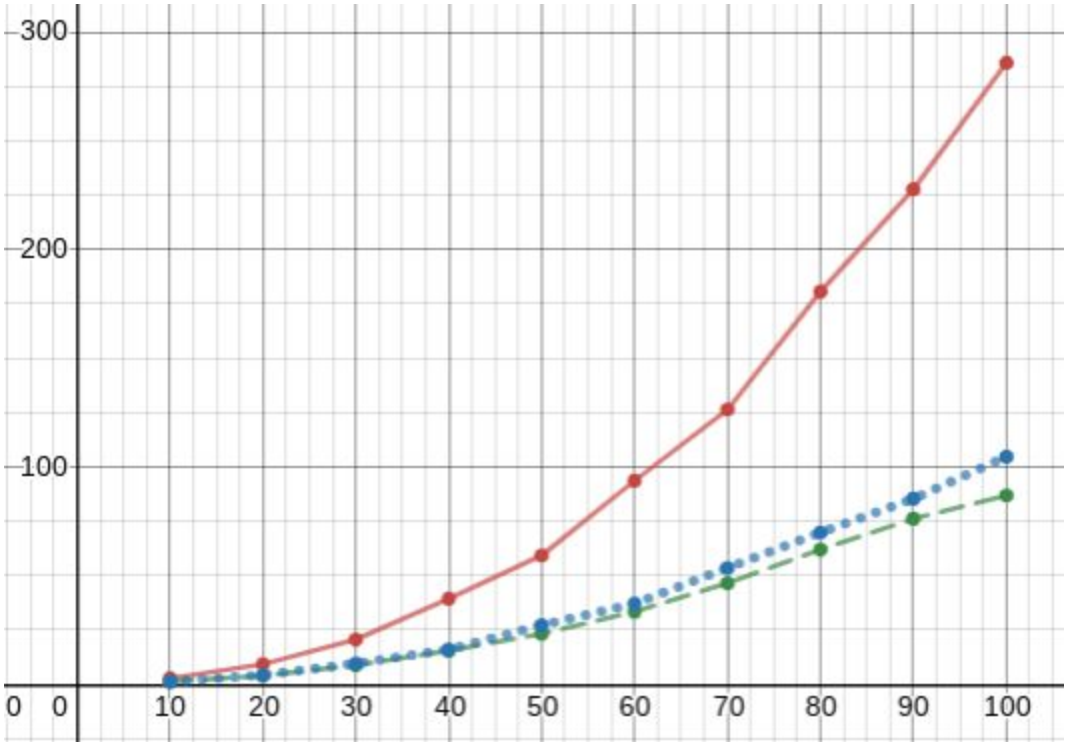
Almost Sorted Data



Count of Data	Bubble Time (ms)	Selection Time (ms)	Insertion Time (ms)
10000 (10k)	99	115	0
20000 (20k)	370	393	1
30000 (30k)	825	875	0
40000 (40k)	1475	1551	1
50000 (50k)	2254	2372	0
60000 (60k)	3297	3425	0
70000 (70k)	4411	4772	0
80000 (80k)	5763	6356	0
90000 (90k)	7384	7975	0
100000 (100k)	9085	10053	0

Insertion sort is extremely competent with partially scrambled arrays.

Backwards Data



Count of Data	Bubble Time (ms)	Selection Time (ms)	Insertion Time (ms)
10000 (10k)	261	115	103
20000 (20k)	914	382	420
30000 (30k)	2049	868	949
40000 (40k)	3930	1539	1589
50000 (50k)	5921	2313	2709
60000 (60k)	9360	3335	3702
70000 (70k)	12639	4646	5346
80000 (80k)	18061	6192	6978
90000 (90k)	22770	7612	8527
100000 (100k)	28592	8680	10465

Bubble sort greatly slowed down as it has a constant increase in complexity whereas insert and selection have variable speed which typically increases as the amount of unsorted numbers shrinks.

Conclusion

Insertion sort on average is faster than all other sorting methods, it falls behind in random data by a small portion but not enough to warrant ignoring its speed in likely situations.