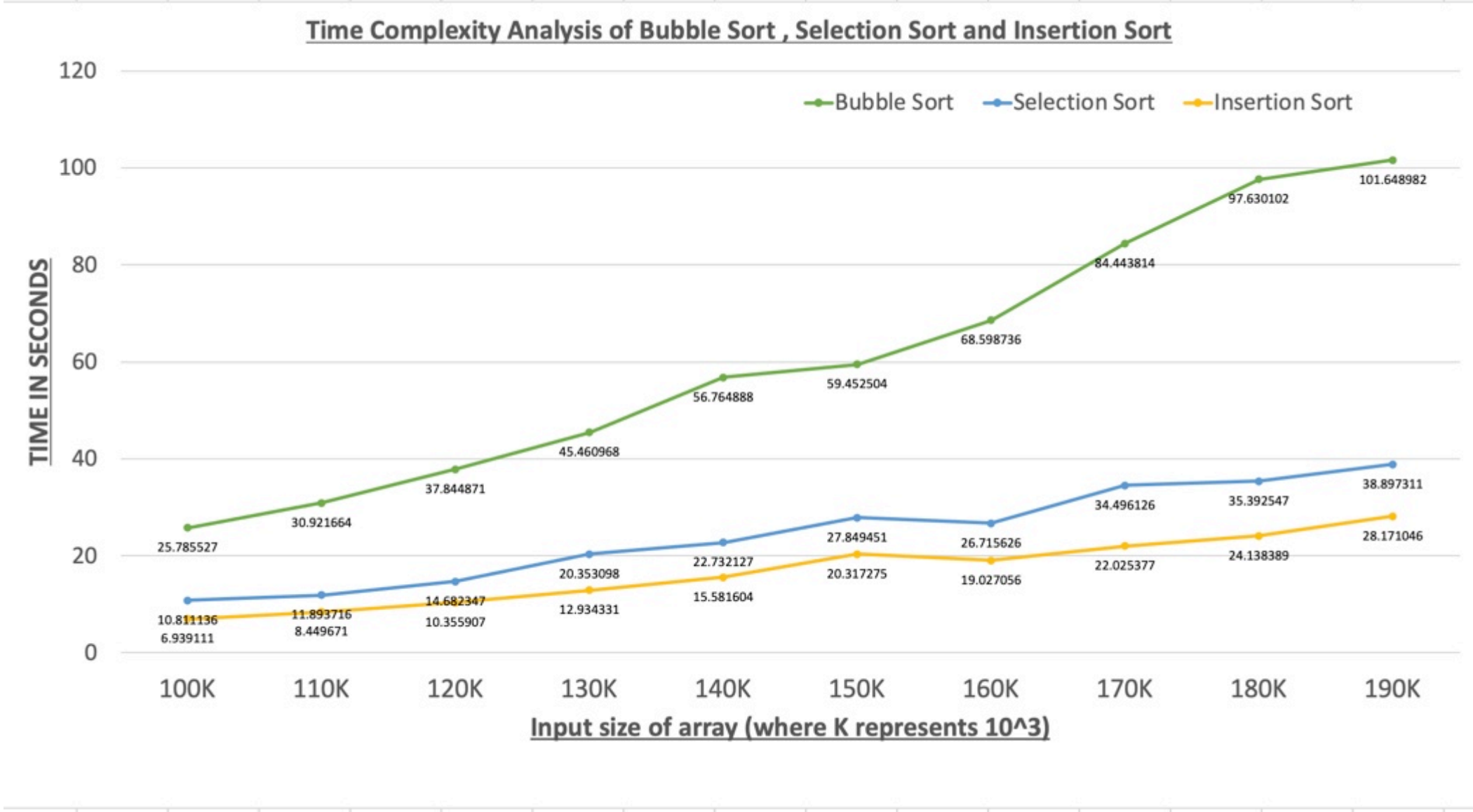
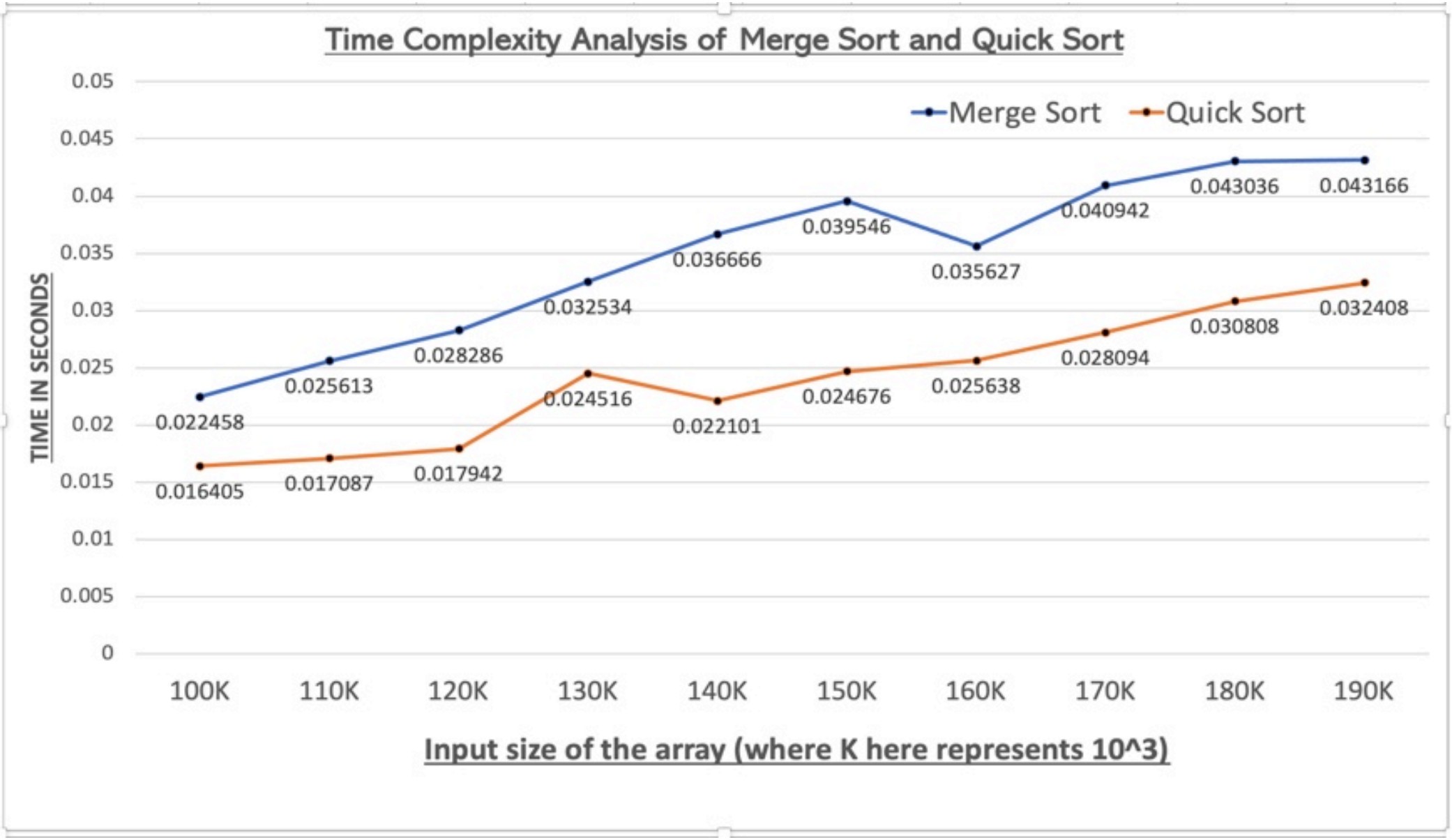
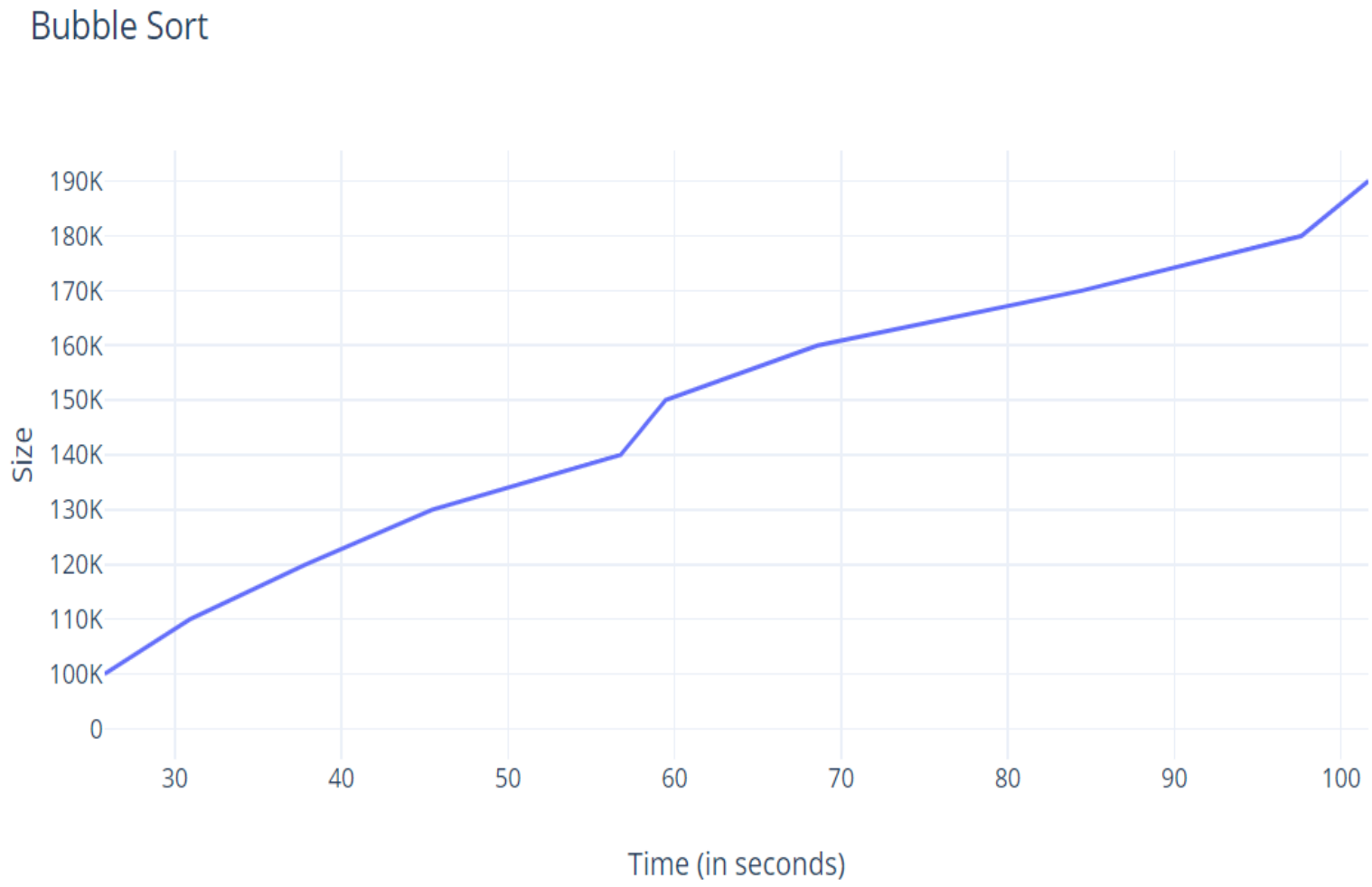
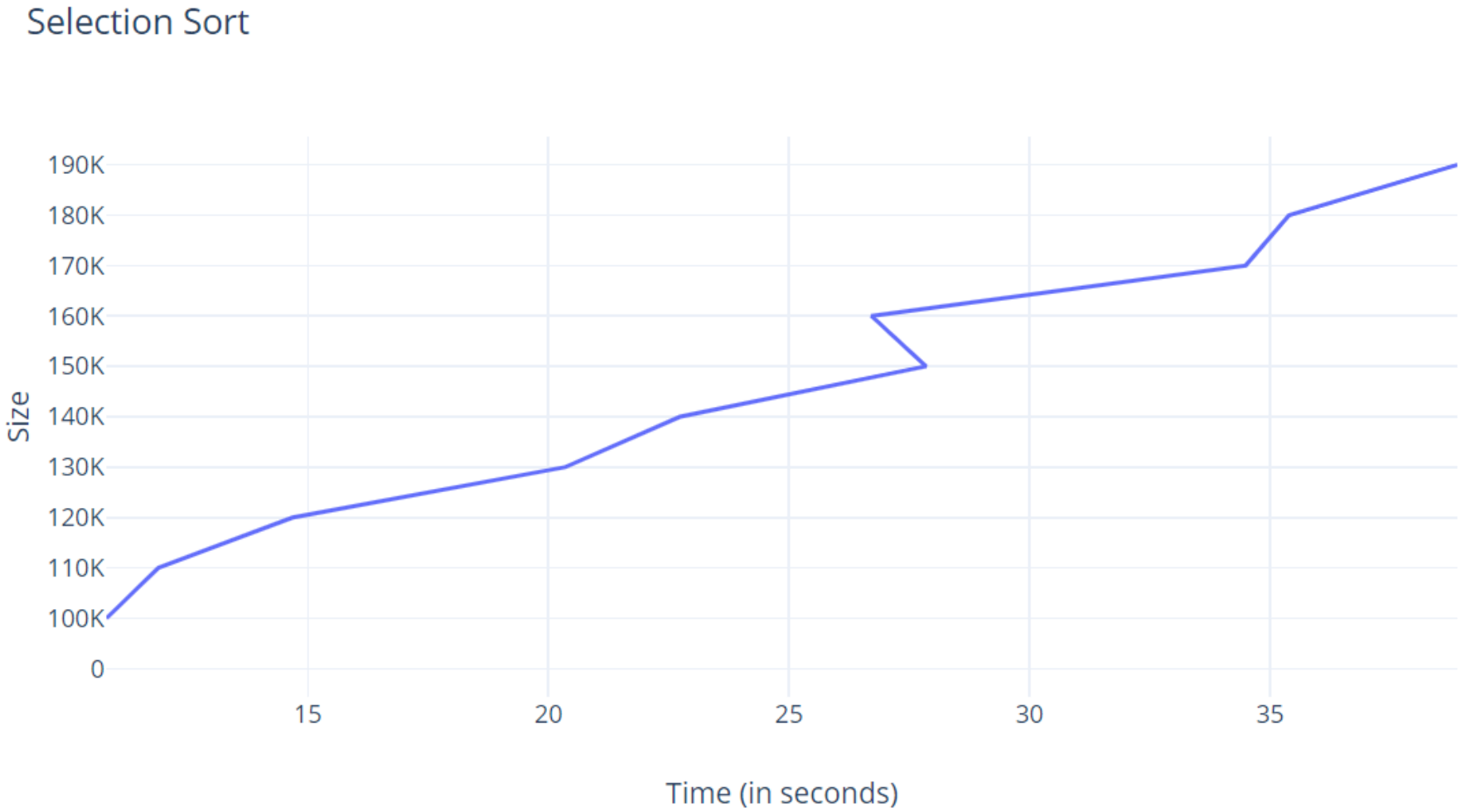
TIME COMPLEXITY ANALYSIS

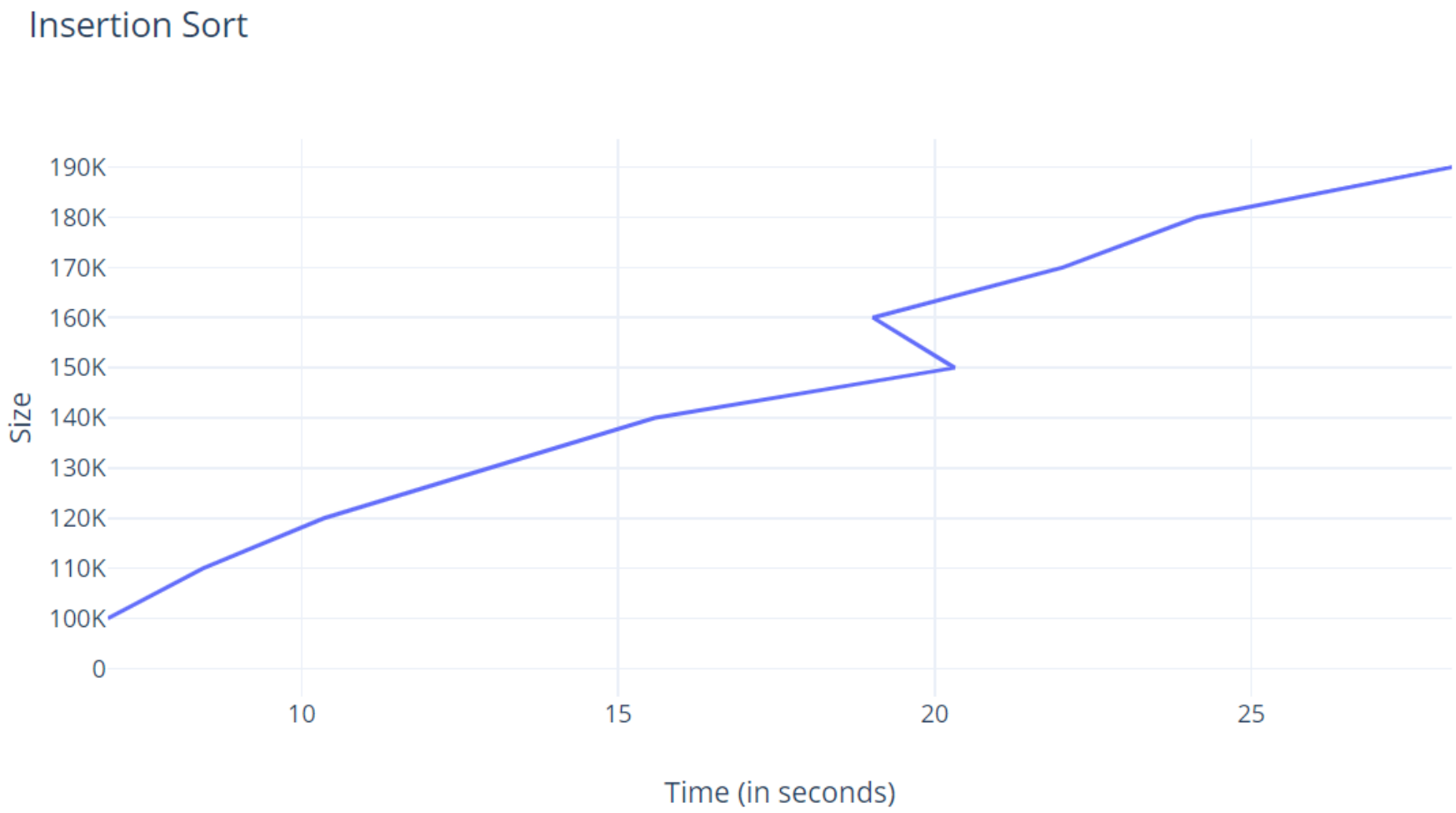
SIZE	Bubble Sort	Selection Sort	Insertion Sort	Merge Sort	Quick Sort
100K	25.785527	10.811136	6.939111	0.022458	0.016405
110K	30.921664	11.893716	8.449671	0.025613	0.017087
120K	37.844871	14.682347	10.355907	0.028286	0.017942
130K	45.460968	20.353098	12.934331	0.032534	0.024516
140K	56.764888	22.732127	15.581604	0.036666	0.022101
150K	59.452504	27.849451	20.317275	0.039546	0.024676
160K	68.598736	26.715626	19.027056	0.035627	0.025638
170K	84.443814	34.496126	22.025377	0.040942	0.028094
180K	97.630102	35.392547	24.138389	0.043036	0.030808
190K	101.648982	38.897311	28.171046	0.043166	0.032408

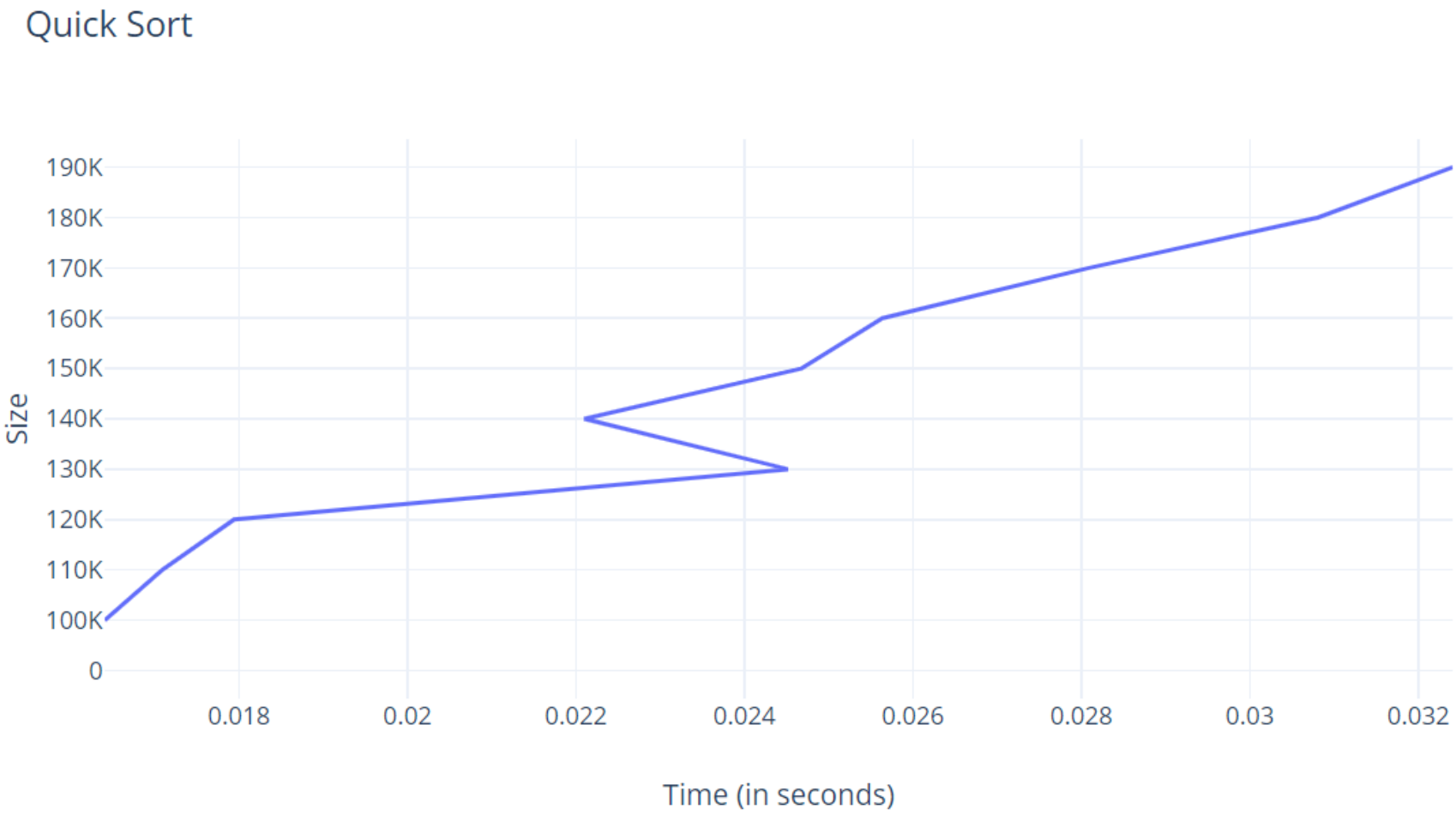

Time Complexity Analysis of Bubble Sort , Selection Sort and Insertion Sort
Bubble Sort
Selection Sort
Insertion Sort
TIME IN SECONDS
120
100
80
60
40
20
0
25.785527
30.921664
37.844871
45.460968
56.764888
59.452504
68.598736
84.443814
97.630102
101.648982
10.811136
11.893716
14.682347
20.353098
22.732127
27.849451
26.715626
34.496126
35.392547
38.897311
6.939111
8.449671
10.355907
12.934331
15.581604
20.317275
19.027056
22.025377
24.138389
28.171046
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input size of array (where K represents 10^3)

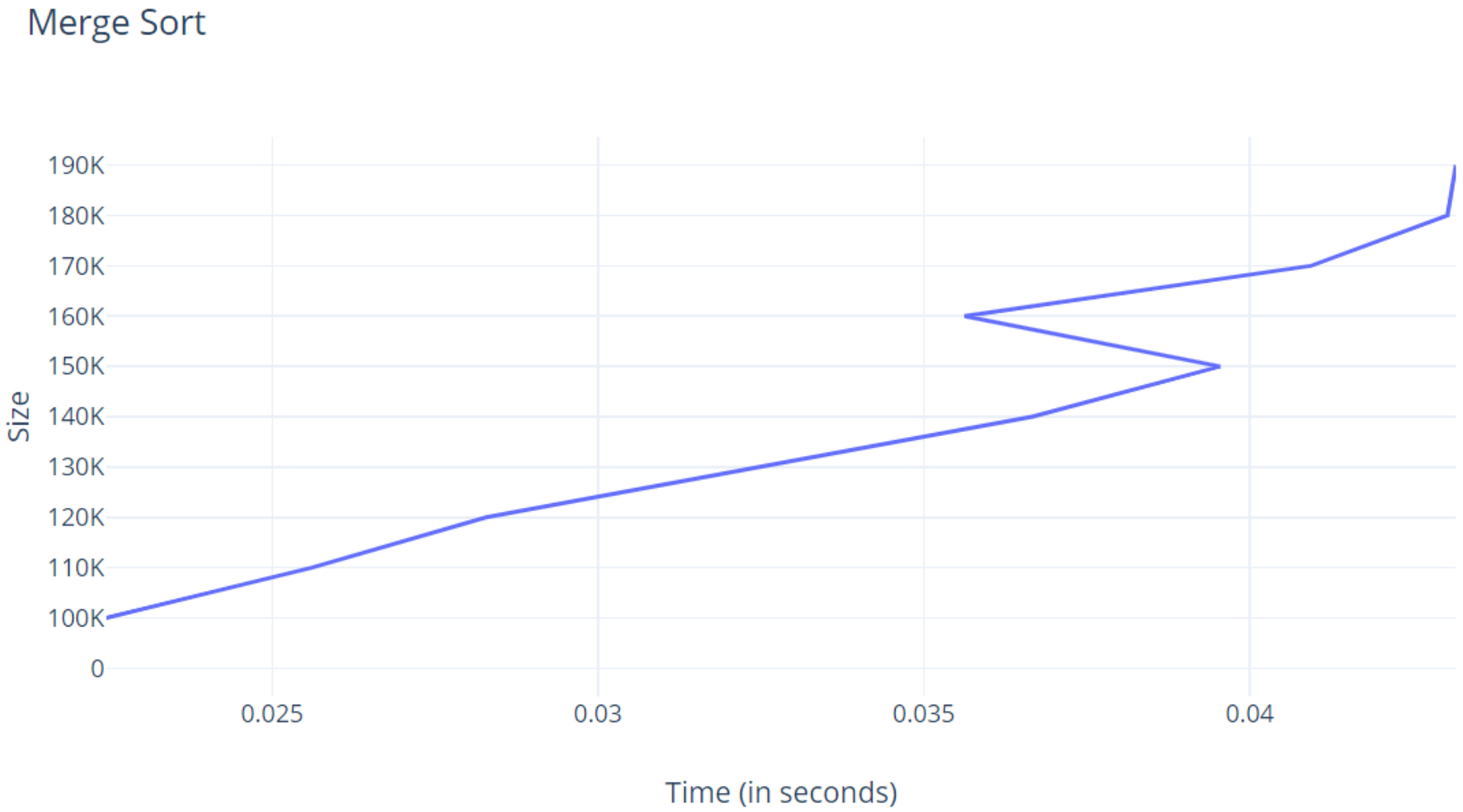

Time Complexity Analysis of Merge Sort and Quick Sort
Merge Sort
Quick Sort
TIME IN SECONDS
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0.022458
0.025613
0.028286
0.032534
0.036666
0.039546
0.035627
0.040942
0.043036
0.043166
0.016405
0.017087
0.017942
0.024516
0.022101
0.024676
0.025638
0.028094
0.030808
0.032408
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input size of the array (where K here represents 10^3)


Bubble Sort
190K
180K
170K
160K
150K
140K
130K
120K
110K
100K
0
Size
30
40
50
60
70
80
90
100
Time (in seconds)


Selection Sort
190K
180K
170K
160K
150K
140K
130K
120K
110K
100K
0
Size
15
20
25
30
35
Time (in seconds)

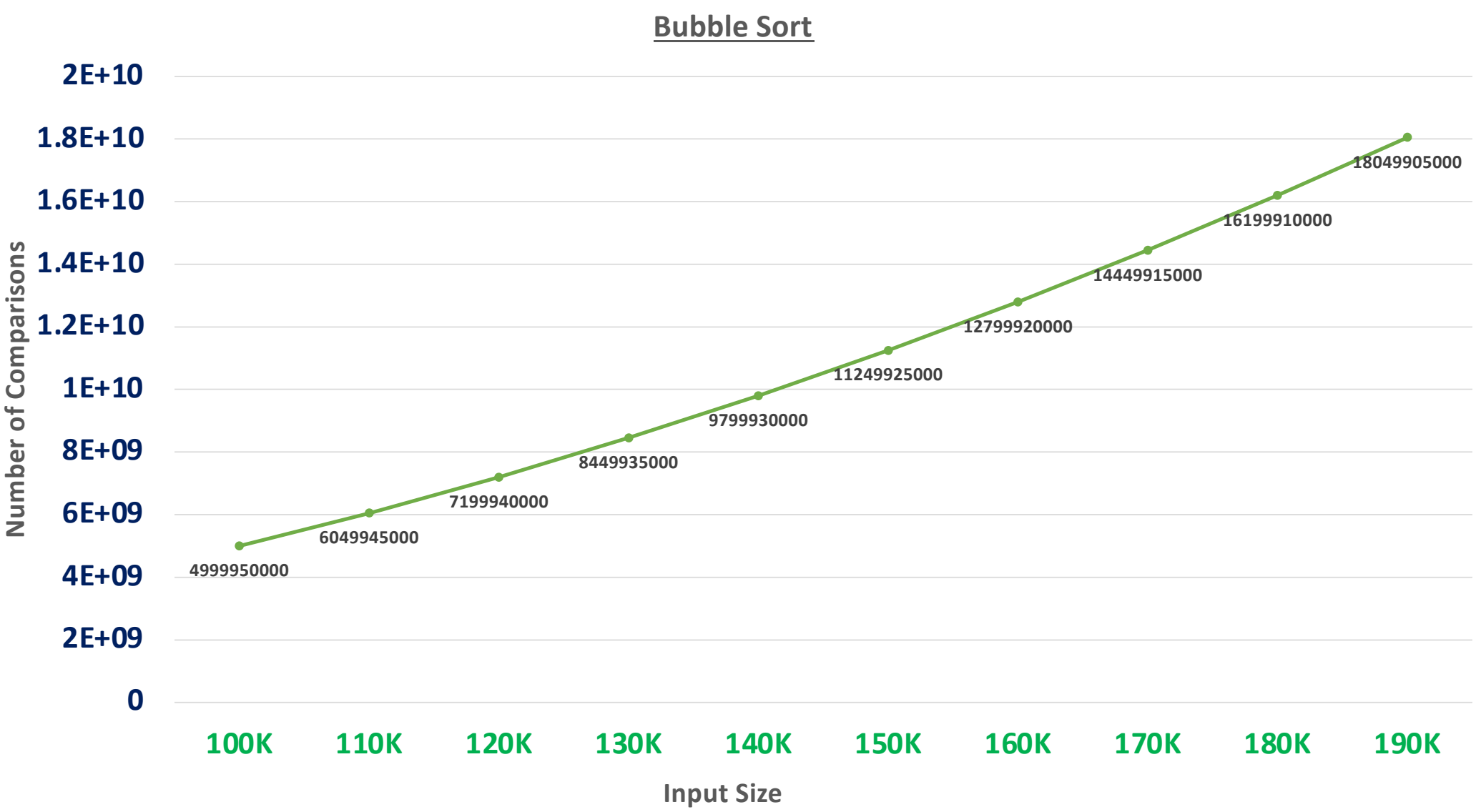

Insertion Sort
190K
180K
170K
160K
150K
140K
130K
120K
110K
100K
0
Size
10
15
20
25
Time (in seconds)

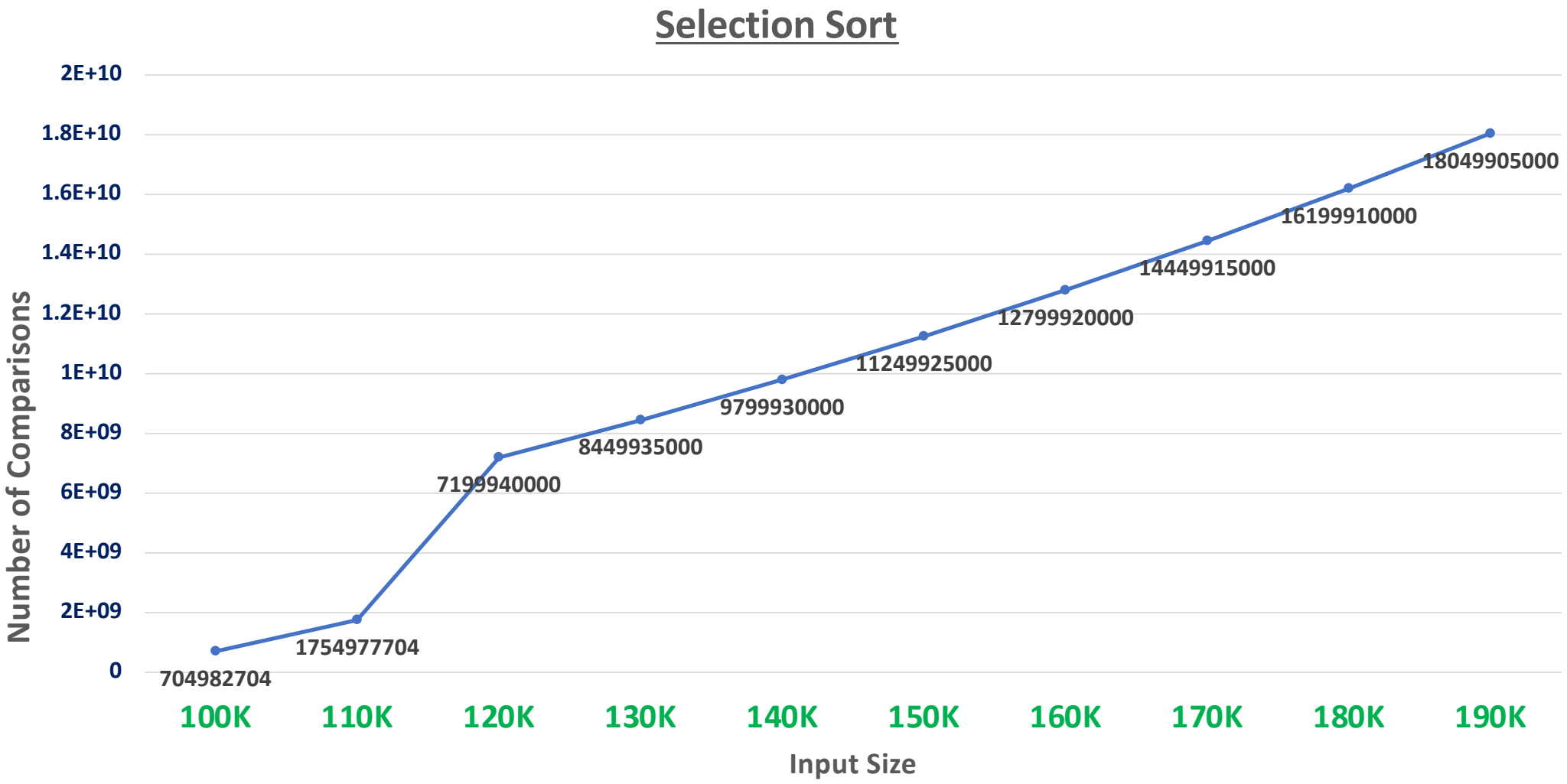

Quick Sort
190K
180K
170K
160K
150K
140K
130K
120K
110K
100K
0
Size
0.018
0.02
0.022
0.024
0.026
0.028
0.03
0.032
Time (in seconds)

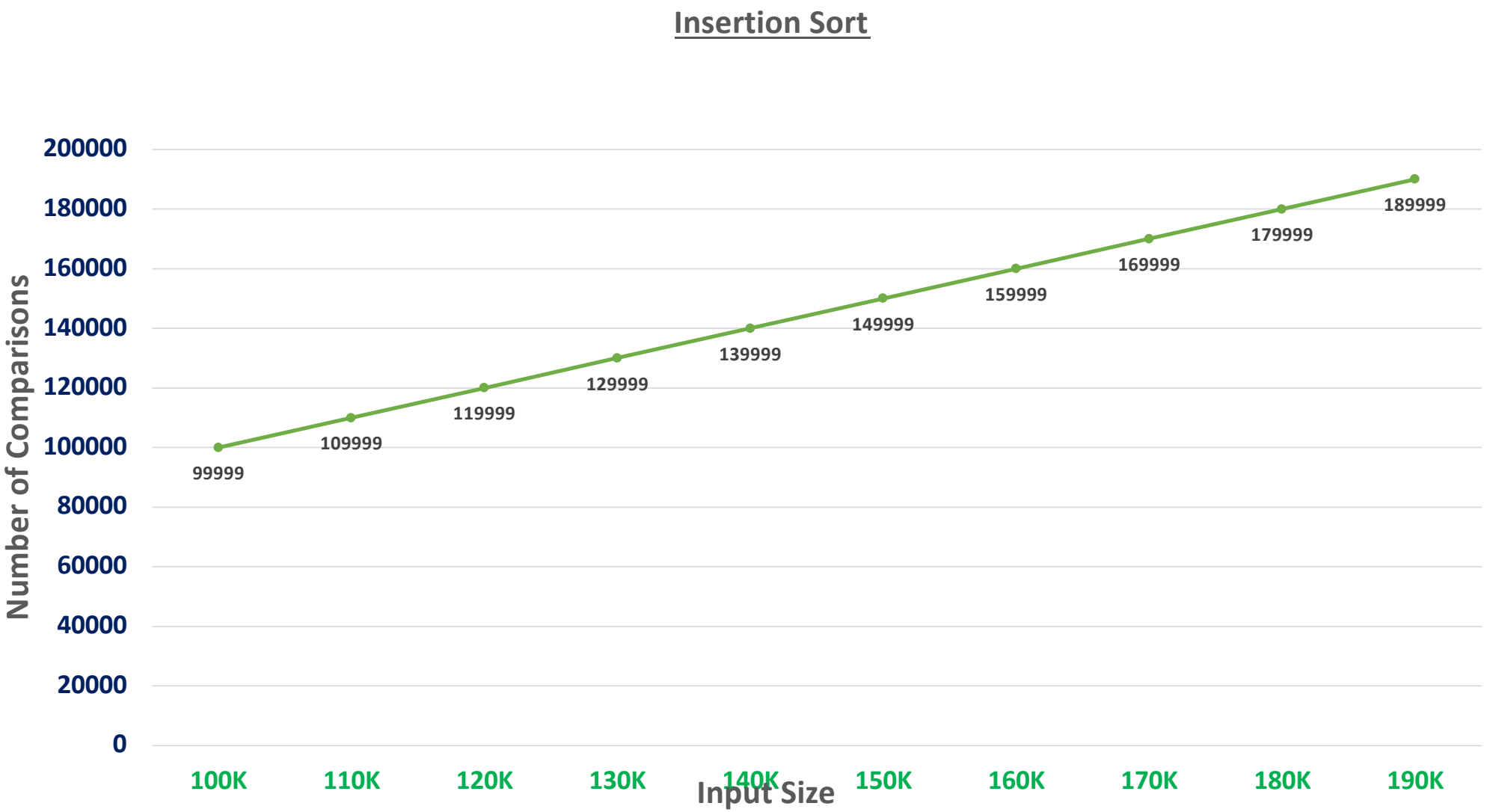

Merge Sort
190K
180K
170K
160K
150K
140K
130K
120K
110K
100K
0
Size
0.025
0.03
0.035
0.04
Time (in seconds)

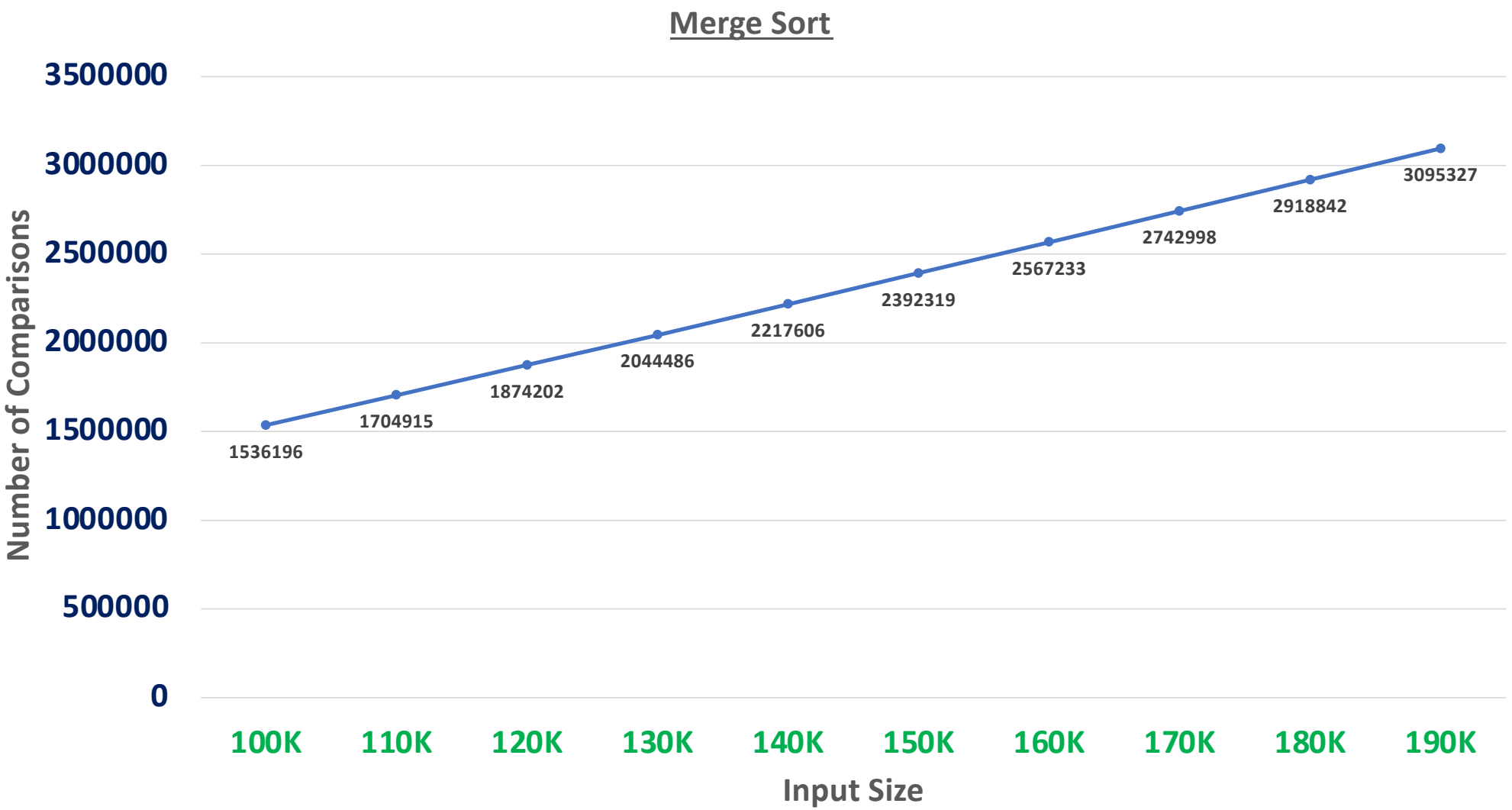
NUMBER OF COMPARSIONS ANALYSIS

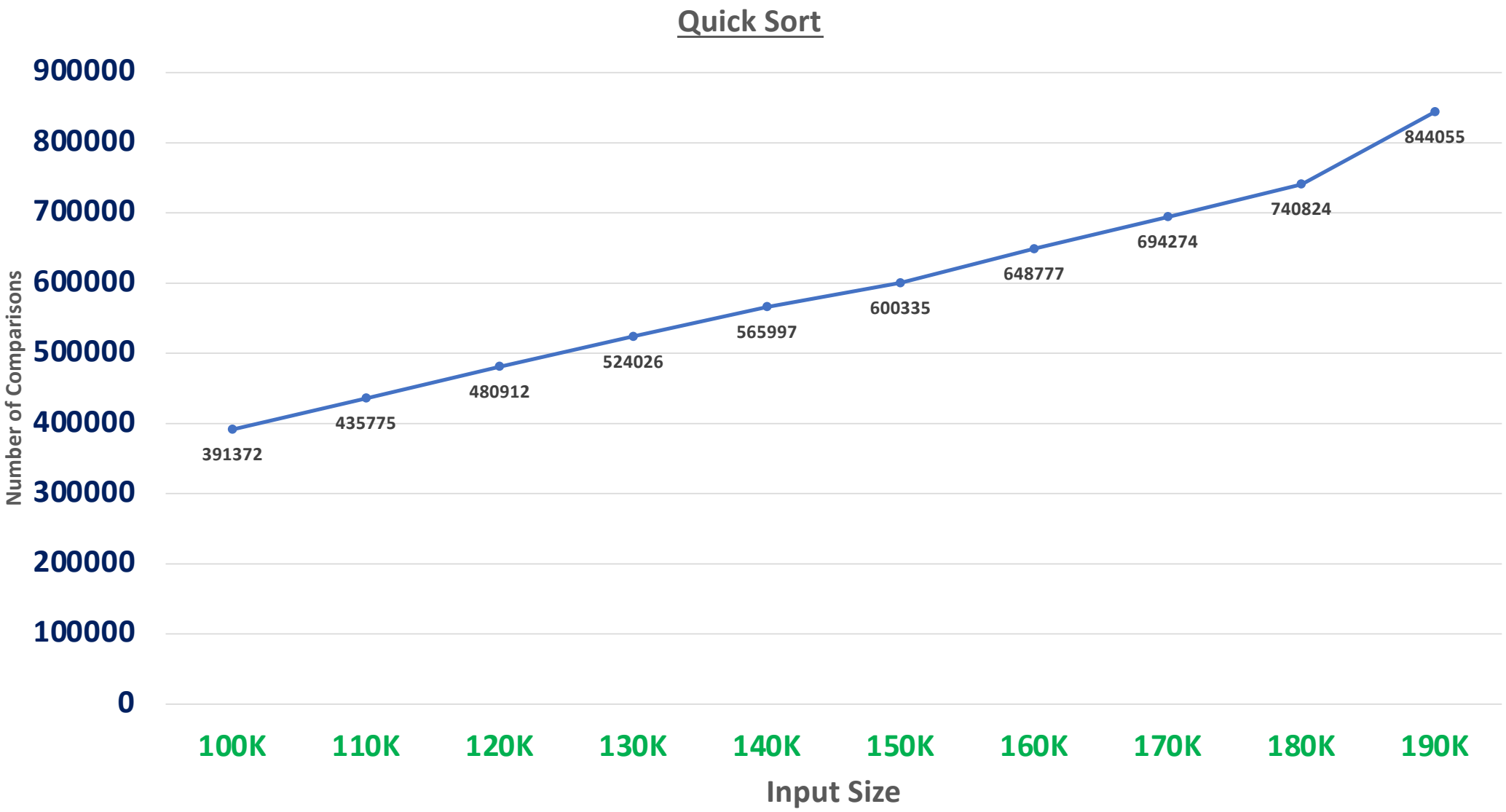
Size	Bubble Sort	Selection Sort	Insertion Sort	Merge Sort	Quick Sort
100K	4999950000	704982704	99999	1536196	391372
110K	6049945000	1754977704	109999	1704915	435775
120K	7199940000	7199940000	119999	1874202	480912
130K	8449935000	8449935000	129999	2044486	524026
140K	9799930000	9799930000	139999	2217606	565997
150K	11249925000	11249925000	149999	2392319	600335
160K	12799920000	12799920000	159999	2567233	648777
170K	14449915000	14449915000	169999	2742998	694274
180K	16199910000	16199910000	179999	2918842	740824
190K	18049905000	18049905000	189999	3095327	844055


Bubble Sort
2E+10
1.8E+10
1.6E+10
1.4E+10
1.2E+10
1E+10
8E+09
6E+09
4E+09
2E+09
0
Number of Comparisons
4999950000
6049945000
7199940000
8449935000
9799930000
11249925000
12799920000
14449915000
16199910000
18049905000
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input Size


Selection Sort
2E+10
1.8E+10
1.6E+10
1.4E+10
1.2E+10
1E+10
8E+09
6E+09
4E+09
2E+09
0
Number of Comparisons
704982704
1754977704
7199940000
8449935000
9799930000
11249925000
12799920000
14449915000
16199910000
18049905000
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input Size


Insertion Sort
Number of Comparisons
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
99999
109999
119999
129999
139999
149999
159999
169999
179999
189999
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input Size


Merge Sort
Number of Comparisons
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
1536196
1704915
1874202
2044486
2217606
2392319
2567233
2742998
2918842
3095327
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input Size


Quick Sort
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
Number of Comparisons
391372
435775
480912
524026
565997
600335
648777
694274
740824
844055
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K
Input Size