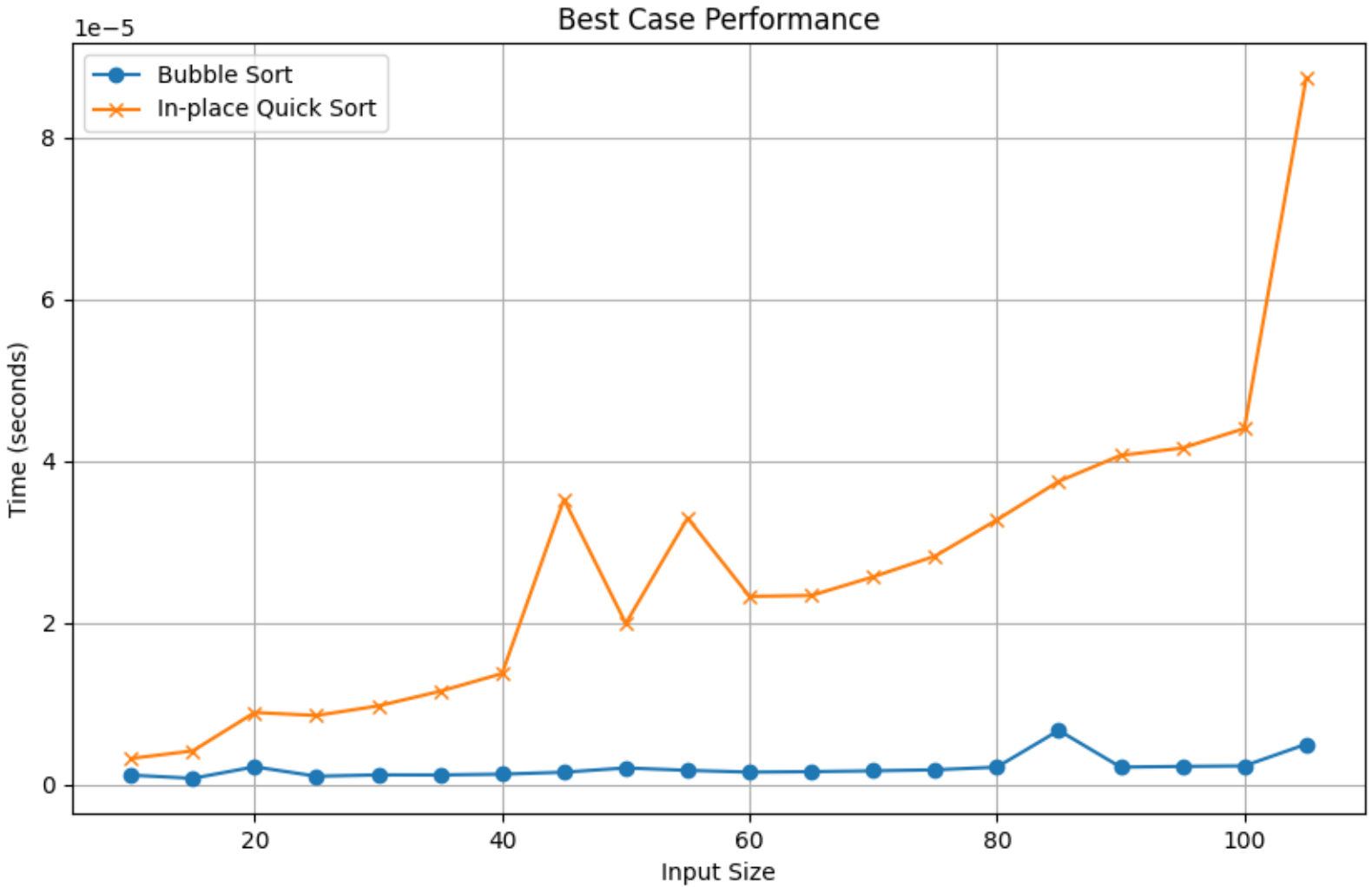
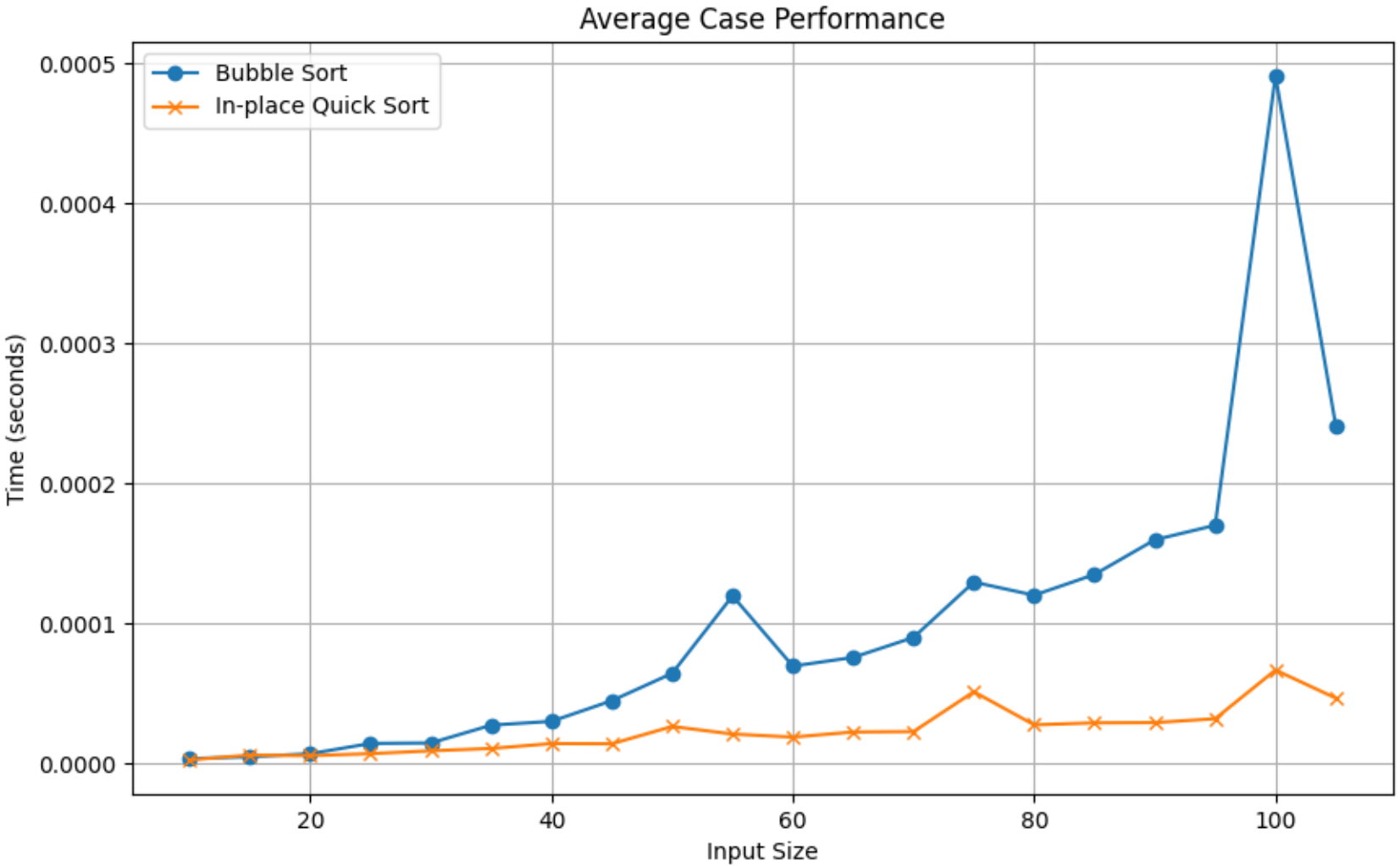
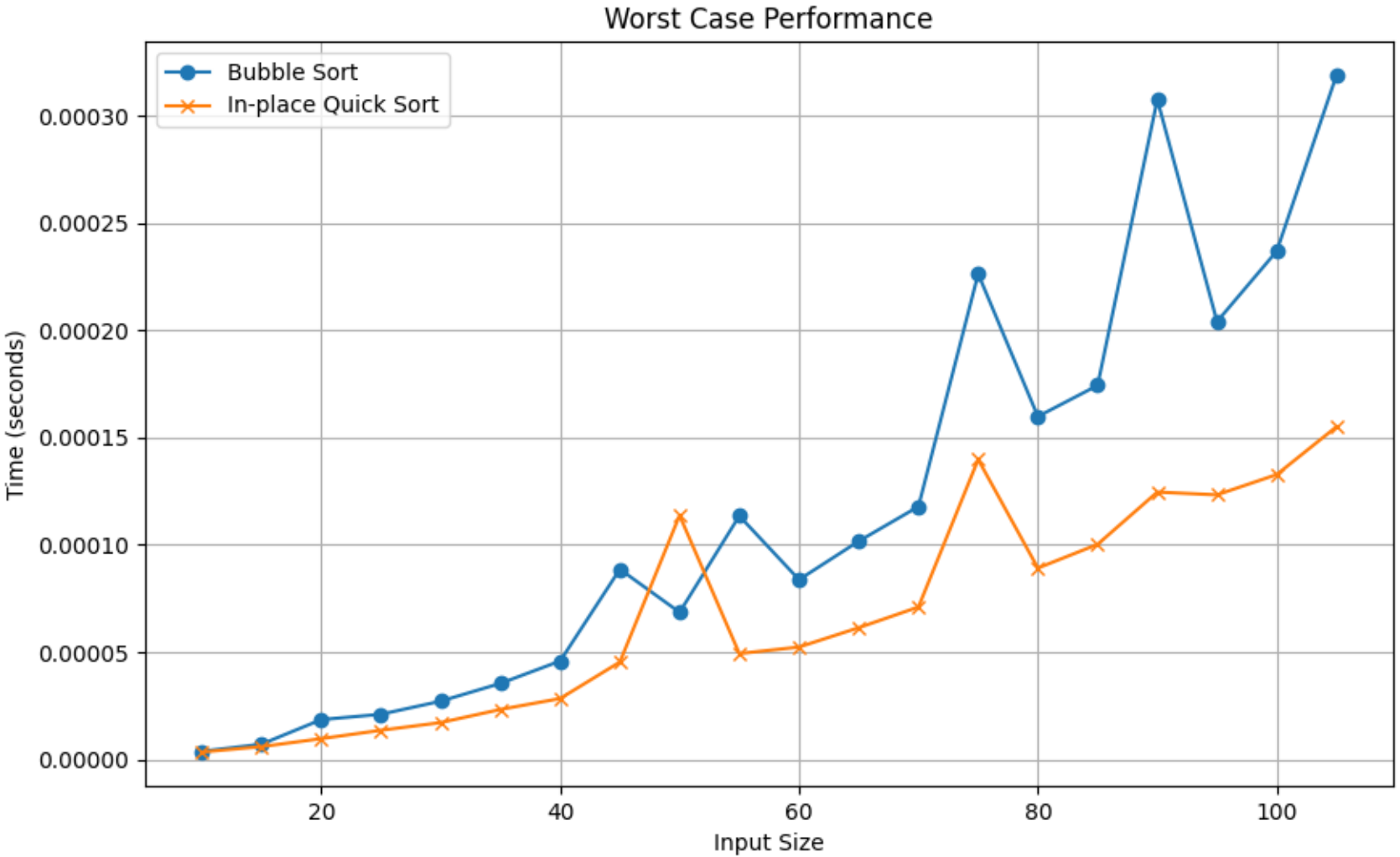

Best Case Performance
1e−5
Bubble Sort
In-place Quick Sort
Time (seconds)
Input Size
0
2
4
6
8
20
40
60
80
100


Average Case Performance
Bubble Sort
In-place Quick Sort
Time (seconds)
0.0000
0.0001
0.0002
0.0003
0.0004
0.0005
20
40
60
80
100
Input Size


Worst Case Performance
Bubble Sort
In-place Quick Sort
Time (seconds)
0.00000
0.00005
0.00010
0.00015
0.00020
0.00025
0.00030
20
40
60
80
100
Input Size

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2.3

Bubble sort performed better than quicksort for all inputs in the best case.
Bubble sort and quicksort performed relatively the same for all inputs <= 30 for average case.
When inputs > 30, quicksort performed better.
Quicksort performed better than bubble sort for all inputs for the worst case.

2.4

An input size <= 30 is considered small (so use bubble sort). This is because in the average case plot, bubble sort was the same in terms of performance as quicksort when input size was <= 30, but then its execution time greatly increased when inputs > 30. The reason why quicksort was the same as or faster than bubble sort is because Python specifically has optimizations that reduce recursion overhead in quicksort. Thus, theoretically, bubble sort should always be faster than quicksort when input size <= 30.