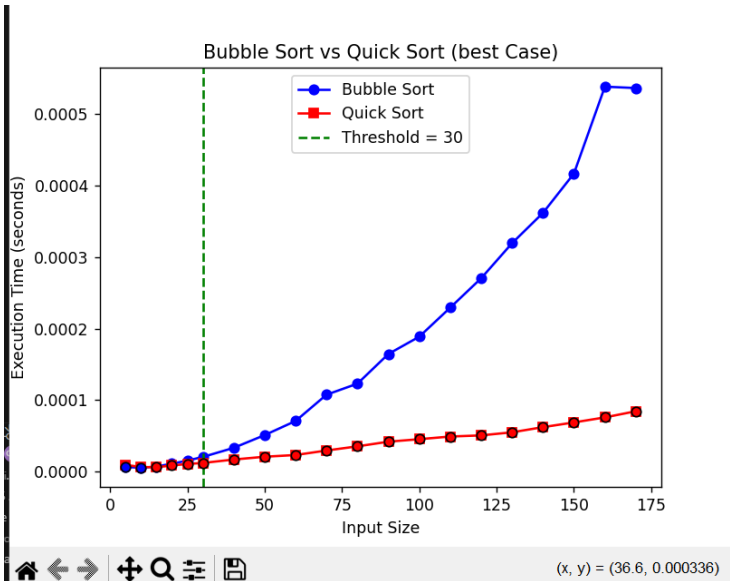
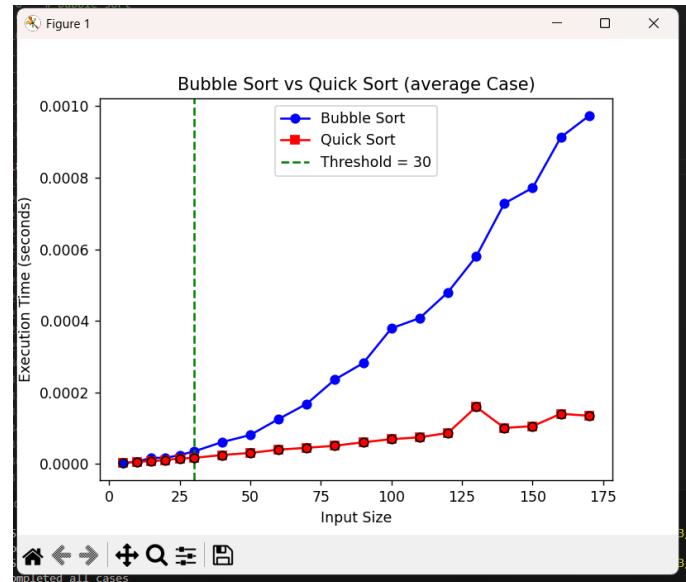


## Answer to question 3:

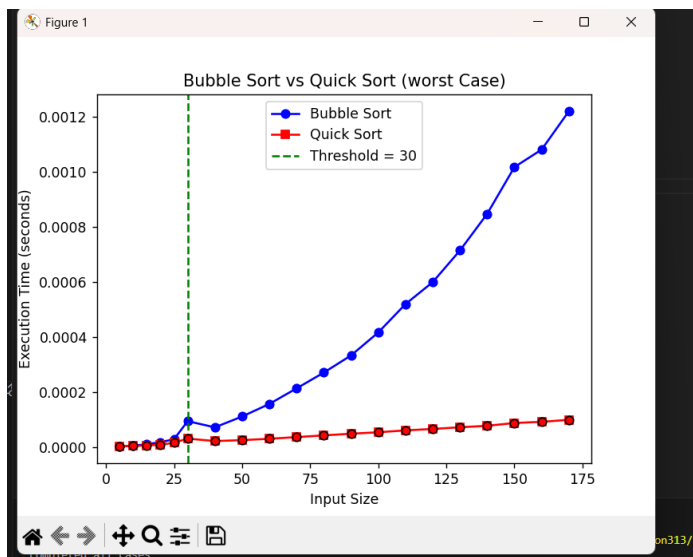
### Best Case



### Average Case



### Worst Case



### Justification For Threshold – Question 4

Based on the time plots, we chose a threshold of size 30 to determine whether the input is small. From the course notes, we know that bubble sort has a  $O(n^2)$  time complexity which would make it efficient for smaller input sizes. Quick sort has a best case, as well as an average case time complexity of  $O(n \log n)$  making it efficient for larger inputs. The plot indicates that for sizes below 30, Bubble sort and Quick sort perform very similarly. For some cases, Bubble sort even

outperforms Quick sort. However, for any input larger than 30, Quick sort performs much better than bubble sort.