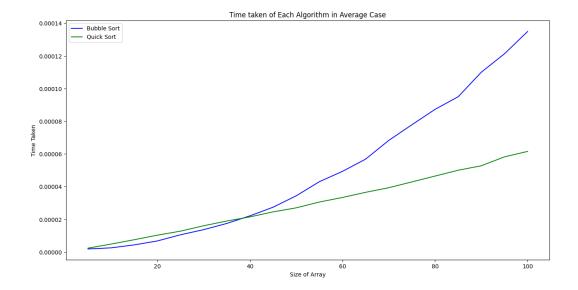
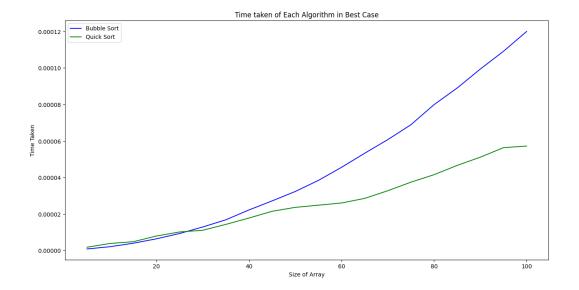


For the worst case, the quicksort algorithm has a better performance than the bubble sort algorithm. Overall the quick sort was faster than the bubble sort. However they both have a time complexity of $O(n^2)$.



For the average case, bubble sort was faster at the beginning however around the size of 40 the quick sort become faster. This is due to the fact that the complexity of bubble sort is $O(n^2)$ and quick sort is $O(n \log n)$ in the average case.



For the best case, bubble sort was faster at the beginning however around the size of 25 the quick sort become faster. This is due to the fact that the complexity of bubble sort is $O(n^2)$ and quick sort is $O(n \log n)$ in the best case.

Question 4

The threshold to determine whether the input is small or not is 30-35 because bubble sort is usually fast than quick sort when the array of elements is considered "small" and in the average case bubble sort was faster until the number of elements hit 40. While in the best case, bubble sort was faster until the number of elements hit 25. So 30-35 is the middle between the best and average case.