	Mean Run Times (ms)								
				D					
	A	B	C	50	500	1000	2000	5000	E
Bubble	2870.892	532.295	3805.208	0.079	6.068	25.978	109.927	707.228	679.602
Insertion	1410.634	132.929	2754.732	0.045	3.067	13.326	55.034	344.849	328.231
Selection	1166.091	288.555	1283.630	0.048	3.021	11.896	46.621	286.691	274.029
Quick	9.538	11.357	1977.770	0.027	0.306	0.649	1.411	3.926	3.868
Merge	13.375	5.291	10.843	0.054	0.546	1.106	2.314	6.297	5.890

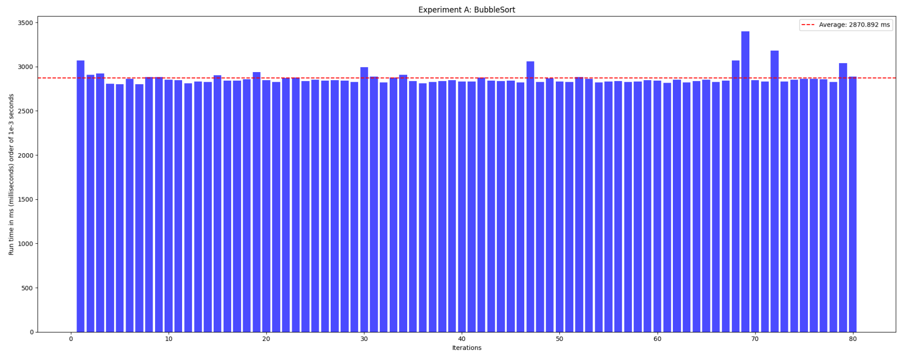
3a. For experiments A,D,E I found that quicksort to perform the best since it has a time complexity of O(nlogn) compared to bubble, insertion, and selection which have O(n^2). It outperforms mergesort because partitioning in place is faster than merging using auxiliary arrays. It loses to mergesort in experiment C because a reverse list is quicksort's worst case.

3b. For all experiments bubble sort had the worst performance because it performs n^2 comparisons and n^2 swaps, brute force checking and swapping will result in the worst performance out of all of these since it often does unnecessary checks.

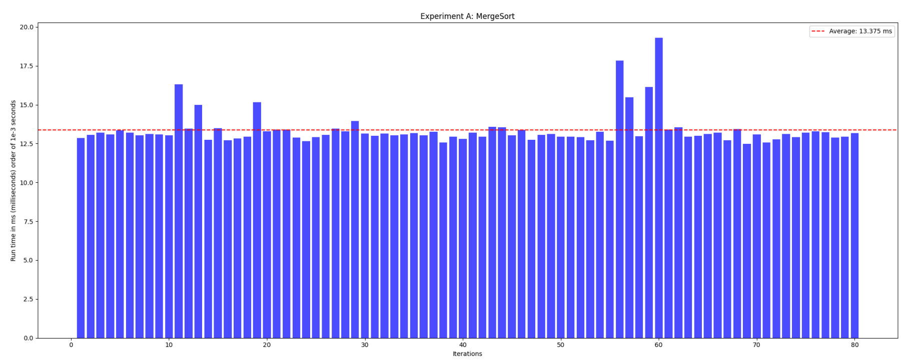
3c. Mergesort outperforms selection sort in every single experiment because selection sort has a time complexity of O(n^2) quadratic time stemming from the fact that it does ((n - 1)*n)/2 comparisons. Merge sort has a much lower time complexity of O(nlogn) linearithmic time since halving a list until singletons is much faster.

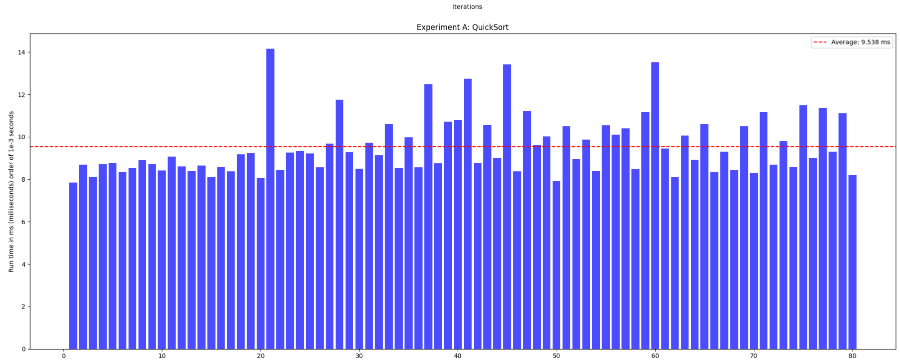
3d. My experiments did not cover such scenarios but the only time insertion sort would beat merge sort is when the list is nearly sorted, more sorted than the 75% near sorted list I had. This happens because insertion sort will only do around n number of comparisons and a few swaps giving it a linear run time O(n) which is faster than merge sort's linearithmic O(nlogn) run time.

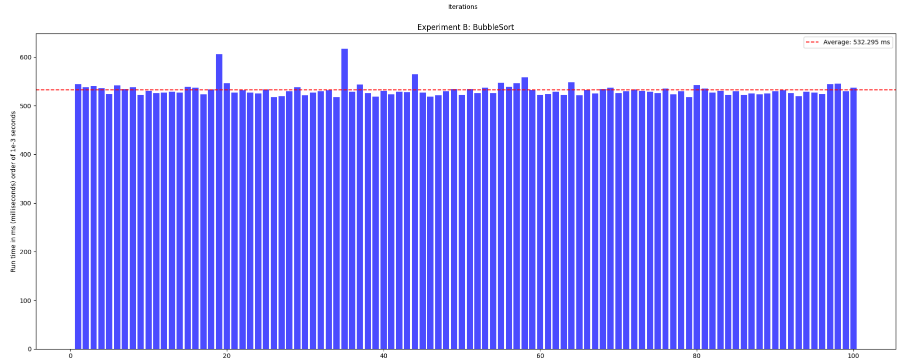
3e. Experiment A represents the average case of quicksort because usually we shuffle the list before performing quicksort to avoid the worst case where we partition around the first/last element and the list is in reversed order. So the randomness of experiment A best reflects the shuffle that is performed before quicksort which closely represents the average case.


Experiment A: BubbleSort
Average: 2870.892 ms
Run time in ms (milliseconds) order of 1e-3 seconds
Iterations

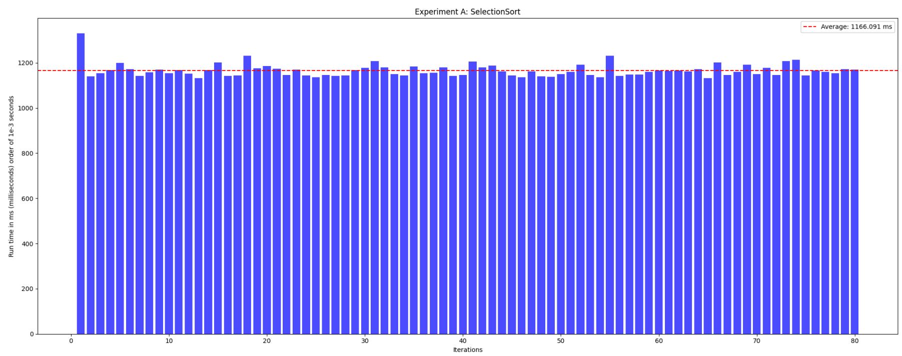

Experiement A: InsertionSort
Average: 1410.634 ms
Run time in ms (milliseconds) order of 1e-3 seconds
Iterations

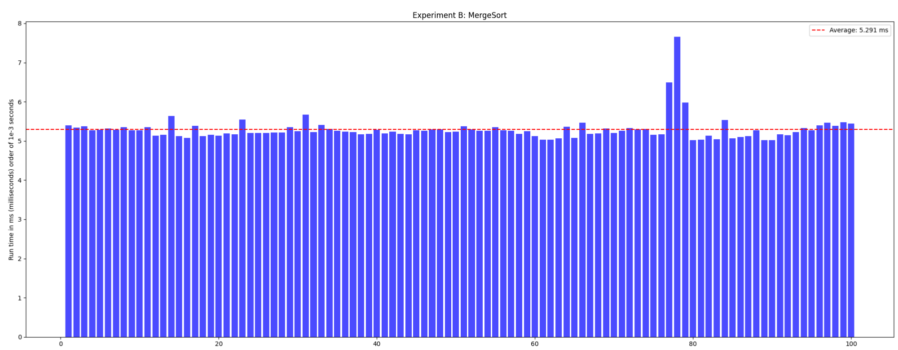

Experiment A: MergeSort
Average: 13.375 ms
Run time in ms (milliseconds) order of 1e-3 seconds
Iterations

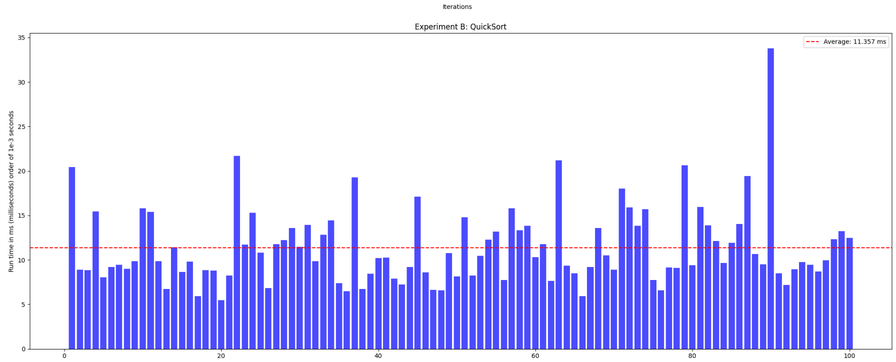

Experiment A: QuickSort
Average: 9.538 ms
Run time in ms (milliseconds) order of 1e-3 seconds
Iterations

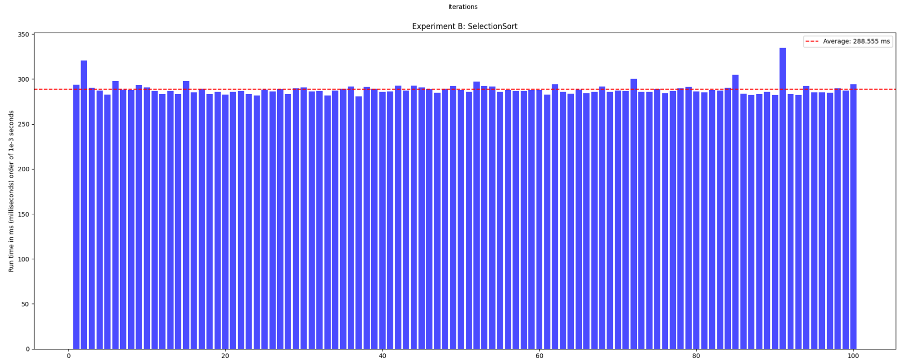

Experiment B: BubbleSort
Average: 532.295 ms
Run time in ms (milliseconds) order of 1e-3 seconds
Iterations

Appendix: Experiment B

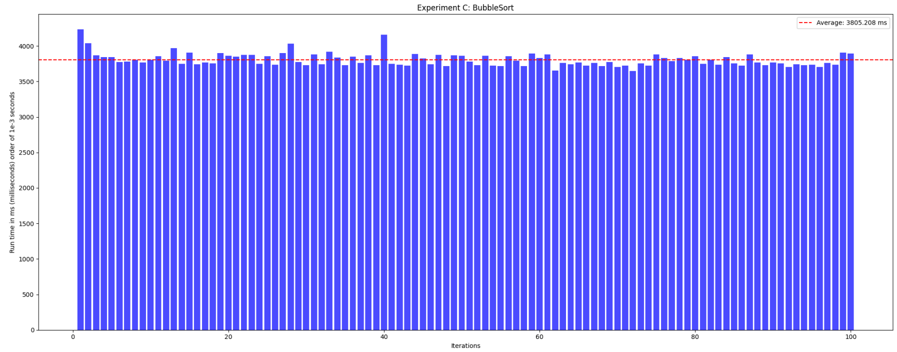


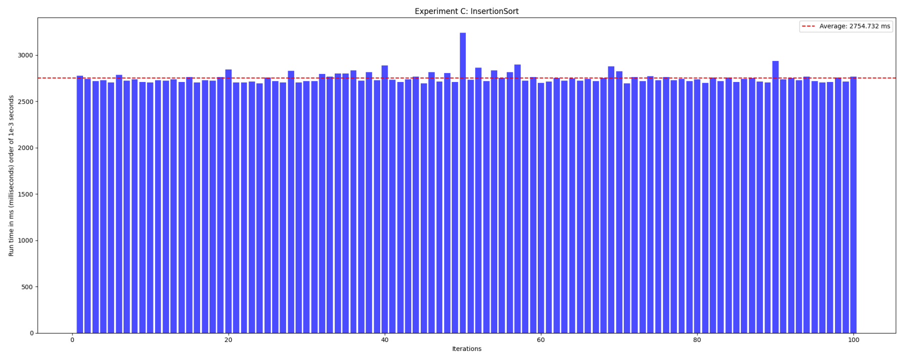


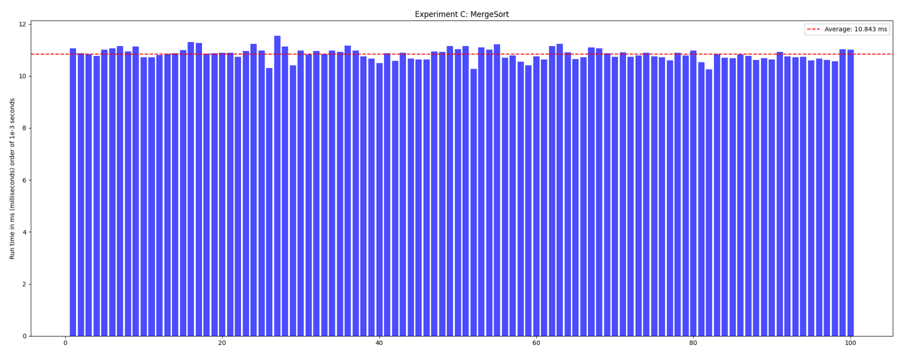


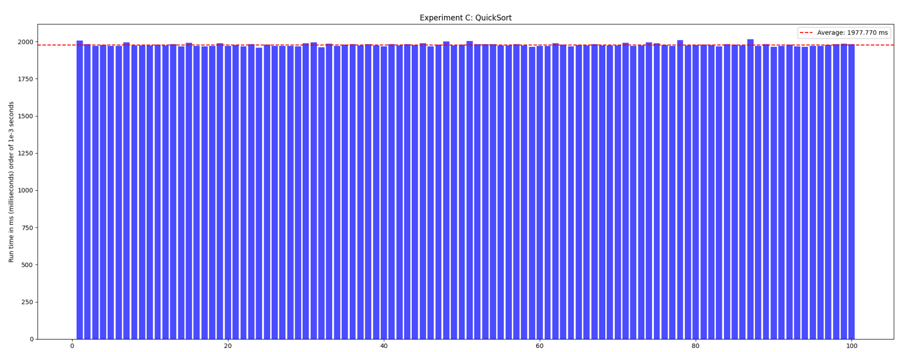


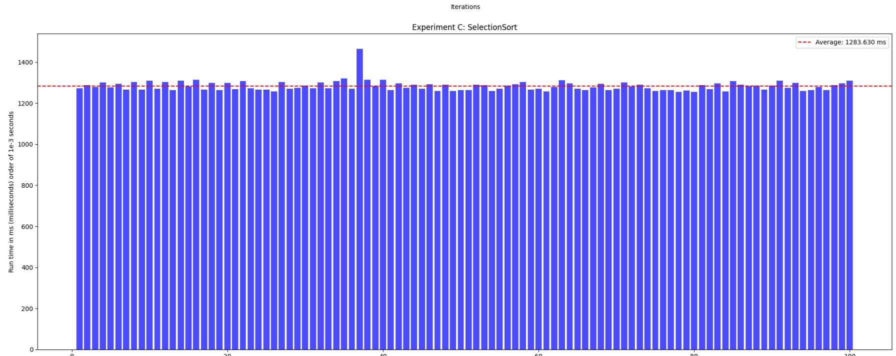
Appendix: Experiment C



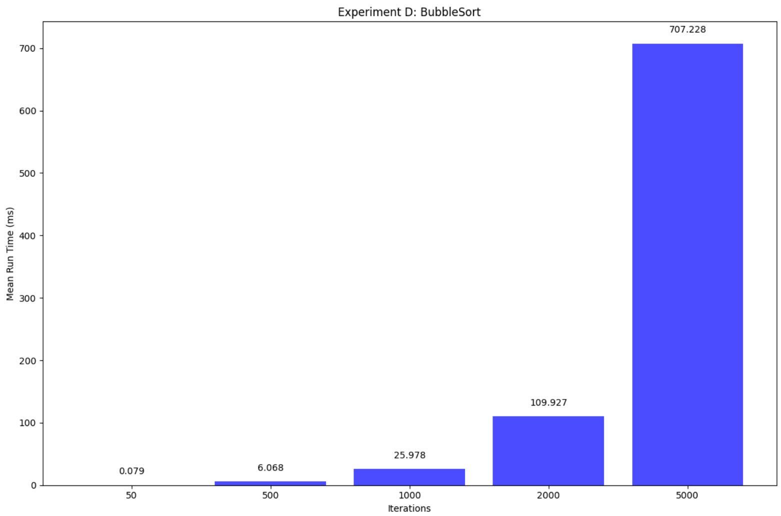


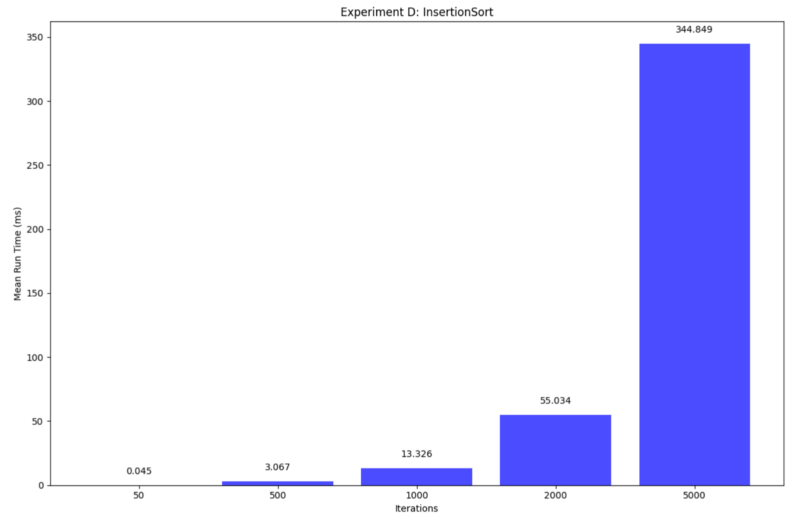


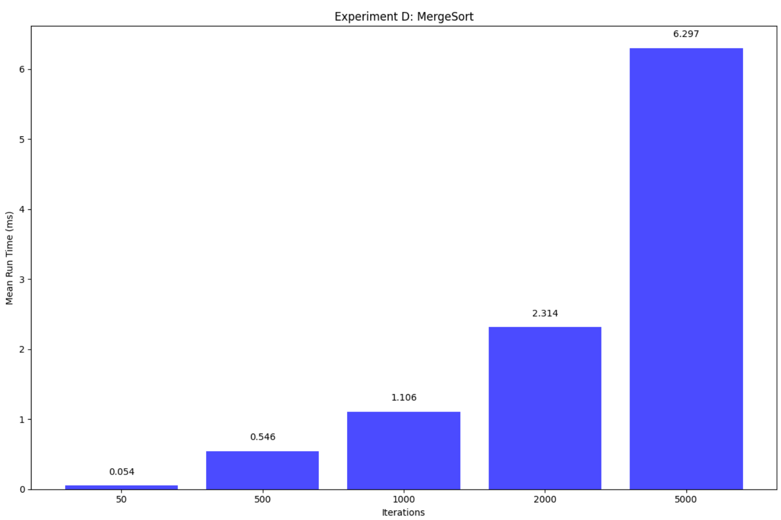


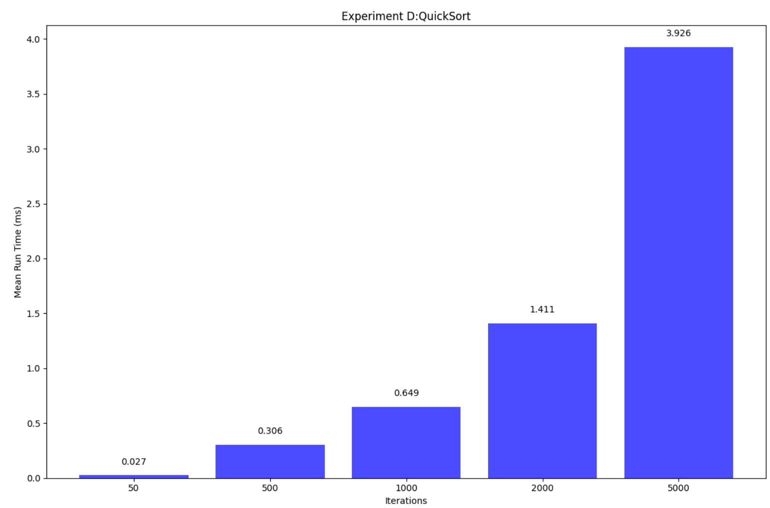


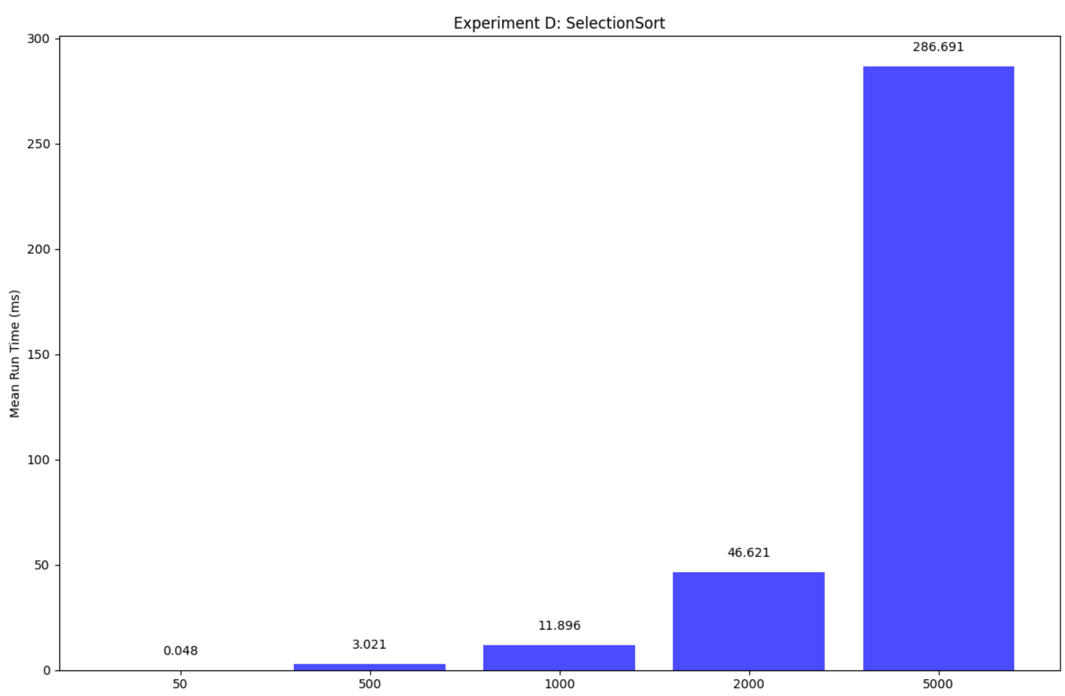
Appendix: Experiment D











Appendix: Experiment E