Homework 5 Part 2 Bryan Greener

Due to the change in the number of items needed to sort, the time scale has been changed to milliseconds instead of seconds.

Bubble Sort:

Bubble sort is an average time complexity of n^2. This is represented in the graph above by the blue line. There is a clear exponential line showing an n^2 increase at the number of items increases.

Insertion Sort:

Insertion sort, like bubble sort, has an average time complexity of n^2. This is represented in the graph above by the orange line. Just like bubble sort, there is a clearly defined exponential increase as the number of items increases. However insertion sort is slightly more optimized than bubble sort for small item numbers so its graph is increasing slightly slower than bubble sort’s.

Quicksort:

Quicksort has a worst case runtime of n^2 however it has an average case runtime on nlogn which is shown in this graph. The green line in the graph above is almost not even visible since it is so much faster than the other algorithms.

Obviously quicksort in this case is the best choice for an algorithm when it comes to runtimes. However due to recursive callstack limitations in python, the best algorithm for sorting larger values out of these three choices in python would be insertion sort.