

# HW 1

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## Number of Conditionals and Loops

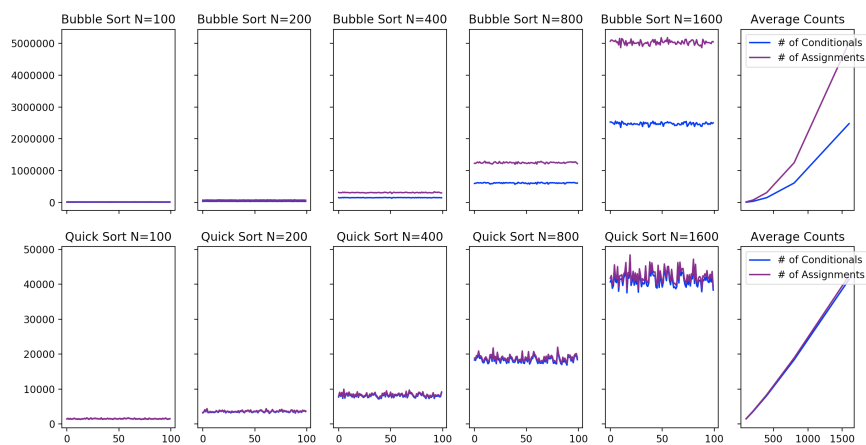


Figure 1: “Number of assignments and conditionals for 100 random vectors.”

## Complexity

My **Bubble sort** algorithm is  $O(n^2)$  because each item in the list is accessed once in the for loop =  $N$  times. If the list was completely sorted, the best case, the loop will finish and the run time would be  $O(n)$ . In the worst case, a completely unsorted list (ex l = [5, 4, 3, 2, 1]) the algorithm will need to go through the list  $N$  times in the original loop, where the 5 will bubble up. Next, bubble sort will go through the loop again until 4 bubbles up. This will continue for each number in the list, a total of  $N$  times. This leads to a total runtime of  $O(n^2)$

**Quick sort** is  $O(n \log(n))$  because the original transversal of the list is  $N$ , needed to partition the list into two lists. With each recursive step my algorithm takes, however, the size of the list the algorithm traverses is halved, meaning each subsequent step in  $\log(n)$ . Thus, the overall average complexity is  $O(n \log(n))$

## **Github Repo**

<https://github.com/christacaggiano/example>

## **Travis Build**

<https://travis-ci.org/christacaggiano/example>