Data Structures Assignment 6, Sorting Write-up

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***Abstract*—This paper is a write up for my final assignment in data structures. In this paper, I am to explain my result of trying to test the run-times of four sorting algorithms: Bubble, Selection, Insertion, and Quick sort.**

I. Introduction

I implemented and tried to test four sorting algorithms on their run-time. I tried to test it on 500 random numbers.

A. Results of Sorting Algorithms

For this assignment, I tried writing the code for bubble, selection, insertion, and quick. Due to issue of my terminal refusing to update the times I fixed the errors in my code, I am unsure if my code will compile or not. Therefore this will be more of a hypothesis rather than stating my results. I hypothesis that bubble sort and selection sort will have very similar time, but it would not be surprising if selection sort had a bit of a shorter run-time. I state this because bubble sort would perform exactly n^2 iterations, while selection sort preforms $n^2 - n$ iterations, which in turn leads to less swaps. For insertion, it will of course be slower than quick sort, but it will be faster than both bubble sort and selection sort. Even though insertion sort has a run-time of $O(n^2)$, it only reaches this on its worst case.

Because I am using empirical and not mathematical analysis, the programming language is something to take into consideration. Using C++, which is a compiled language runs naturally on my operating systems, but if I was to use an interpreted language to code this, it would most likely be a longer run-time. But shortcomings of empirical analysis is that it does take more time. A test environment would not be need to collect run-time if this was not empirical.