Jennifer Moutenot

Dr. Binkley

CS 312 – Assignment 7

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<p style="text-align:center">Assignment 7 – Empirical Analysis</p>

In this assignment we compared and contrasted 8 different sorting algorithms based on user, system, and elapsed time. I ran tests on each sort using a value of C for the number of random numbers. which took 10 seconds when using Patrick's bubble sorting algorithm, in which my value of C came out to be 60,000. I then ran tests at 2C, 4C, 8C, and 16C. Overall, the fastest run time for sorting was Linux's sort command at 3.64 seconds when running at a value of 16C. Next fastest being Spongebob's quick sort with an elapsed time of 5.09 seconds. Then, Gary's merge sort at 5.73 seconds, being very close to Spongebob's quick sort. After these sorting algorithms, Sandy's tree sort runs at 6.43 seconds. Next, Planketon's heap sort comes in 6th place at an elapsed time of 10.23 seconds at 16C.

The remaining three algorithms are much longer in terms of run time when compared to the other five. Squidward's selection sort run time at 16C was 6 minutes and 38.77 seconds, which is a dramatic difference compared to the other algorithms as this is the first sorting algorithm to take minutes just to sort. The last two algorithms are exponentially longer, leaving Mr. Krab's insertion sort in 7th place, taking 12 minutes and 17.62 seconds to run and Patrick's bubble sort at a sky-rocketing 37 minutes and 8.18 seconds. These times are significant and show how code can change the time it takes to run. It is imperative to look at the number of bugs, code length, and time to differentiate the most efficient way to go about an algorithm. Moreover, the quick sort, heap sort, and tree sort have the longest code length, yet these three algorithms run at some of the fastest paces in terms of run time. Therefore, having longer code length does not equal

longer run times. Bubble sort's code is fairly short yet has the absolute longest run time by far. However, bubble sort's algorithm is still reliable and stable since it works. The amount of bugs in code many be different in each sorting algorithm's code, so these bugs may be playing a big part in the elapsed time it takes to sort.

Here we have the winners for the sort-fight:

1. Linux
2. Spongebob Quick Sort
3. Gary Merge Sort
4. Sandy Tree Sort
5. Planketon Heap Sort
6. Squidward Selection Sort
7. Mr. Krab's Insertion Sort
8. Patrick's Bubble Sort