Assignment 3 Lab Report 1

Part 1: Experimental Discovery of Running Time

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**Abstract.**

Our assignment was to experimentally find the running time of a given method. We were given a randomized number, which would determine which method we should find the running time for. Then, using different size values to test our method, get the altered running times. Finally, we had to find the O[N] value, or the efficiency of the method.

**Introduction.**

In Part 1, we calculate the O[N] value for a method. We were given a parameter seed number, and the code for RunningTimeClient.java, and were assigned to calculate the O[N] value for our given seed number. Our seed number was 31. The seed number was randomized based on one’s assigned group.

**Procedures.**

We let N be the problem size for the RunningTime.timeTrial() method. To find the O[N] value, we plugged in different values for N, keeping the seed the same at 31. What this did was increase the amount of data that had to analyzed be RunningTime.timeTrial(). We plugged in various values from 1-50000, and did two independent runs to make sure that the results stayed consistent. All tests were done on a 1.86GHz Core 2 Duo with 2GB RAM, on OS X 10.7. We had a timer, clock.elapsedTime(), that calculated how long RunningTime.timeTrial() needed to run certain N values. We put the results from these two trials in Table 1.

**Results and Discussion.**

We determined that RunningTime.timeTrial() was O[N^2], by looking at the data generated from the N values. We also graphed both of the timeTrial results, and they are shown in Figure 1.

**Conclusions.** The purpose of Part 1 of this lab was to learn how to analyze, experiment, and use the scientific method to better understand how to work with source code. We learned how to find the O[N] value through experimentation, and learned more about what the O[N] value represents.

**Appendices.**

Table 1. Results of timeTrial1 and timeTrial2

|  |  |  |
| --- | --- | --- |
| N | timeTrial1 (sec) | timeTrial2 (sec) |
| 1 | 0 | 1 |
| 10 | 0.001 | 0.001 |
| 50 | 0.013 | 0.013 |
| 100 | 0.035 | 0.035 |
| 200 | 0.057 | 0.061 |
| 250 | 0.07 | 0.064 |
| 400 | 0.094 | 0.093 |
| 700 | 0.169 | 0.152 |
| 1000 | 0.235 | 0.218 |
| 2500 | 1.013 | 1.034 |
| 5000 | 4.049 | 4.152 |
| 10000 | 20.673 | 23.691 |
| 15000 | 74.733 | 66.143 |
| 20000 | 85.078 | 87.017 |
| 50000 | 640.617 | 790.737 |

Figure 1. The results of Table 1 in a graph.