CSC 402 Programming Assignment 9 Report 1.0 Name: Giries Hattar

1. *Describe how you checked to see which sorts worked.*

I wrote a static function “isSorted” which was used to check if the array passed to it is sorted. If it is sorted it returns Boolean “True” else “False”. I then tested each Sort method prior to it being utilized in the experiment by using a test array the experiment only began if it was told that the sort method passed the “isSorted” test.

1. *Describe how you used your java program to gather the data.*

My program was completely automated to run all the tests and print out all the results. I just copied the output to the form.

1. *Based on the evidence, which sorting routine is the best? Sort4 Worst? Sort2*

For your reference: You should be able to answer the following questions.

// can be on final exam.

What are the reasons that your program had to run multiple repetitions of each sorting test?

To have more data input and then take the average time it took from the entire data set. This allows for precise experimental data.

What is the purpose of the *control loop?*

*The control loop is meant to mimic the experiment loop being done without performing the sort on the array only generating the array. Gives us a more accurate time for how much work is being done by the sort itself.(so the time it takes to make the array is taken out from the total time of the experimental loop each time.)*

*(“The experimental loop will then exclude the cost of creating the array…”)*

Sort# 1 . (fill in blank)

|  |  |  |  |
| --- | --- | --- | --- |
| N | Time | #of Reps | Doubling Ratio |
| 1024 | 0.000430 | 100 | ------------------ |
| 2048 | 0.001160 | 100 | 2.70E+00 |
| 4096 | 0.001160 | 100 | 1.00E+00 |
| 8192 | 0.001890 | 100 | 1.63E+00 |
| 16384 | 0.005620 | 100 | 2.97E+00 |
| 32768 | 0.017080 | 25 | 3.04E+00 |
| 65536 | 0.040400 | 25 | 2.37E+00 |
| 131072 | 0.100480 | 25 | 2.49E+00 |
| 262144 | 0.231320 | 25 | 2.30E+00 |

For the model T(N) = cNb , what is the of order of growth exponent b: 1.137

Plot of N vs Time

Is the plot consistent with your order of growth estimate?

Yes

Sort# 2 . (fill in blank)

|  |  |  |  |
| --- | --- | --- | --- |
| N | Time | #of Reps | Doubling Ratio |
| 1024 | 0.002590 | 100 | ------------------ |
| 2048 | 0.007430 | 100 | 2.87E+00 |
| 4096 | 0.024480 | 100 | 3.29E+00 |
| 8192 | 0.114770 | 100 | 4.69E+00 |
| 16384 | 0.631000 | 100 | 5.50E+00 |
| 32768 | 3.434760 | 25 | 5.44E+00 |
| 65536 | 15.384320 | 25 | 4.48E+00 |
| 131072 | 65.913840 | 25 | 4.28E+00 |
| 262144 | 245.232920 | 25 | 3.72E+00 |

For the model T(N) = cNb , what is the of order of growth exponent b: 2.16

Plot of N vs. Time:

Is the plot consistent with your order of growth estimate?

Yes

Sort# 4 . (fill in blank)

|  |  |  |  |
| --- | --- | --- | --- |
| N | Time | #of Reps | Doubling Ratio |
| 1024 | 0.000090 | 100 | ------------------ |
| 2048 | 0.000160 | 100 | 1.78E+00 |
| 4096 | 0.000220 | 100 | 1.38E+00 |
| 8192 | 0.000340 | 100 | 1.55E+00 |
| 16384 | 0.000740 | 100 | 2.18E+00 |
| 32768 | 0.001880 | 25 | 2.54E+00 |
| 65536 | 0.004360 | 25 | 2.32E+00 |
| 131072 | 0.007160 | 25 | 1.64E+00 |
| 262144 | 0.015160 | 25 | 2.12E+00 |

For the model T(N) = cNb , what is the of order of growth exponent b: 0.925

Plot of N vs. Time:

Is the plot consistent with your order of growth estimate? Yes

Comparison plot page.

Replace the plot below with your plot of all the sort data sets.

What conclusions can you draw about the sorting routines from your plot?

I can conclude that sort2 is the slowest method tested.