Kalyn Howes

Lab 2

The table below holds the time (in seconds) each sort took to complete based on the array size and its content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TIMING | Sorted | Backwards | Duplicates | Random |
| 100 | Q: 3.7e-05s  M: 1.3e-05s | Q: 3.1e-05s  M: 2.6e-05s | Q: 1.7e-05s  M: 2e-05s | Q: 1.6e-05s  M: 2.7e-05s |
| 10,000 | Q: 0.265317s  M: 0.001158s | Q: 0.184819s  M: 0.001083s | Q: 0.004026s  M: 0.001594s | Q: 0.003546s  M: 0.00192s |
| 50,000 | Q: 6.0017s  M: 0.006694 s | Q: 4.5205s  M: 0.007075s | Q: 0.069546s  M: 0.007802s | Q: 0.078939s  M: 0.008615s |
| 100,000 | Q: 25.8568s  M: 0.011574s | Q: 17.9099s  M: 0.013166s | Q: 0.275983s  M: 0.017602s | Q: 0.272156s  M: 0.018061s |
| 500,000 | Q: seg fault  M: 0.067164s | Q: seg fault  M: 0.067872s | Q: 6.41163s  M: 0.0838366s | Q: 6.49233s  M: 0.105419s |
| 750,000 | Q: seg fault  M: 0.102055s | Q: seg fault  M: 0.128412s | Q: 14.4112s  M: 0.15743s | Q: 14.7886s  M: 0.146402s |
| 1,000,000 | Q: seg fault  M: 0.159185s | Q: seg fault  M: 0.140582s | Q: 25.8881s  M: 0.184887s | Q: 25.708s  M: 0.192818s |

The table below hold the number of comparisons done during each sort based on array size and its content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| COMPARISONS | Sorted | Backwards | Duplicates | Random |
| 100 | Q: 665649000  M: 771 | Q: 566013000  M: 771 | Q: 564311000  M: 771 | Q: 248120000  M: 771 |
| 10,000 | Q: 952765000  M: 143615 | Q: 213158000  M: 143615 | Q: 95283000  M: 143615 | Q: 709312000  M: 143615 |
| 50,000 | Q: 3561098000  M: 834463 | Q: 442636000  M: 834463 | Q: 747377000  M: 834463 | Q: 466382000  M: 834463 |
| 100,000 | Q: 665356000  M: 1768927 | Q: 210287000  M: 1768927 | Q: 263302000  M: 1768927 | Q: 935209000  M: 1768927 |
| 500,000 | Q: seg fault  M: 15451423 | Q: seg fault  M: 15451423 | Q: 877636000  M: 15451423 | Q: 582835000  M: 9975711 |
| 750,000 | Q: seg fault  M: 15451423 | Q: seg fault  M: 15451423 | Q: 916936000  M: 15451423 | Q: 418363000  M: 15451423 |
| 1,000,000 | Q: seg fault  M: 20951423 | Q: seg fault  M: 20951423 | Q: 725278000  M: 20951423 | Q: 439217000  M: 20951423 |

This graph specifically shows Quick Sort and how the number of seconds increased as the size of the arrays increased. Each line represents the different array contents.

Chart, line chart

Description automatically generated

This graph specifically shows Merge Sort and how the number of seconds increased as the size of the arrays increased. Each line represents the different array contents.

Chart, line chart

Description automatically generated

This graph focuses on random array content only but shows the difference in time between the two sorts as the array size increased.

Chart, line chart

Description automatically generated

Finally, this graph shows the number of comparisons made during each sorting algorithm as the array sizes increased.

Chart, line chart

Description automatically generated