Kalyn Howes

Lab 1

2.4.21

The table below shows the number of seconds it took for each sorting algorithm to sort the array depending on the number of elements in it and its type.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TIMING | Sorted | Backwards | Duplicates | Random |
| 100 | B: 7.5e-05s  I: 3.8e-05s  S: 6.4e-05s | B: 4.8e-05s  I: 3.9e-05s  S: 2.6e-05s | B: 3.8e-05s  I: 2.2e-05s  S: 3.6e-05s | B: 3.9e-05s  I: 2.8e-05s  S: 2.4e-05s |
| 10,000 | B: 0.128169s  I: 0.000131s  S: 0.092693s | B: 0.214747s  I: 0.152028s  S: 0.097516s | B: 0.22509s  I: 0.096769s  S: 0.126283s | B: 0.002304s  I: 0.000958s  S: 0.001591s |
| 50,000 | B: 2.60176s  I: 0.000434s  S: 2.27454s | B: 4.93432s  I: 3.85221s  S: 2.61958s | B: 5.18098s  I: 1.84157s  S: 2.28278s | B: 6.49671s  I: 1.825s  S: 2.35481s |
| 100,000 | B: 9.94976s  I: 0.000876s  S: 9.05214s | B: 21.7208s  I: 12.9781s  S: 10.0844s | B: 20.9142s  I: 7.09589s  S: 9.29487s | B: 26.3399s  I: 7.15s  S: 9.04519s |
| 500,000 | B: 315.521s  I: 0.004156s  S: 229.74s | B: 497.112s  I: 318.541s  S: 230.592s | B: 521.305s  I: 177.095s  S: 225.092s | B: 672.446s  I: 177.712s  S: 225.237s |
| 750,000 | B: 560.705s  I: 0.004537s  S: 506.628s | B: 1246.98s  I:  S: | B:  I:  S: | B: 1504.34s  I: 401.096s  S: 506.979 |
| 1,000,000 | B:  I:  S: | B:  I:  S: | B:  I:  S: | B:  I:  S: |

The table below shows the number of swaps needed for each sorting algorithm to sort the array depending on the number of elements in it and its type.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SWAPS | Sorted | Backwards | Duplicates | Random |
| 100 | B: 0  I: 0  S: 0 | B: 4950  I: 4950  S: 99 | B: 2064  I: 2064  S: 99 | B: 2598  I: 2308  S: 99 |
| 10,000 | B: 0  I: 0  S: 0 | B: 49995000  I: 49995000  S: 9999 | B: 24211724  I: 24211724  S: 9999 | B: 246882  I: 250855  S: 999 |
| 50,000 | B: 0  I: 0  S: 0 | B: 1249975000  I: 1249975000  S: 49999 | B: 617134600  I: 617134600  S: 49999 | B: 615754819  I: 619944176  S: 49999 |
| 100,000 | B: 0  I: 0  S: 0 | B: 704982704  I: 704982704  S: 99999 | B: -1815402724?  I: -1815402724?  S: 99999 | B: -1821479275?  I: -1818692813?  S: 99999 |
| 500,000 | B: 0  I: 0  S: 0 | B: 445698416  I: 445698416  S: 499999 | B: 1858417048  I: 1858417048  S: 499999 | B: 1758644925  I: 1773904882  S: 499999 |
| 750,000 | B: 0  I: 0  S: 0 | B: 2076750760  I:  S: | B:  I:  S: | B: 1589908279  I: 1785160670  S: 749999 |
| 1,000,000 | B  I:  S: | B:  I:  S: | B:  I:  S: | B:  I:  S: |

The graph below shows the comparison of the Bubble sort times and the array sizes/ ypes.

Chart, line chart

Description automatically generated

The graph below shows the comparison of the Insertion sort times and the array sizes/types.

Chart, line chart

Description automatically generated

The graph below shows the comparison of the Selection sort times and the array sizes/types.

Chart, line chart

Description automatically generated

The graph below shows the difference between each sorting algorithm for an array of random elements.

Chart, line chart

Description automatically generated