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APP 1

|  |  |  |
| --- | --- | --- |
| BubbleSort | NumberOfItems | Time Taken (ms) |
|  | 10 | 0 |
|  | 100 | 2 |
|  | 500 | 13 |
|  | 1000 | 33 |
|  | 10000 | 1646 |
|  | 25000 | 11003 |
|  | 75000 | 131184 |
|  | 99171 | 237199 |
|  |  |  |
| SelectionSort | NumberOfItems | Time Taken (ms) |
|  | 10 | 0 |
|  | 100 | 0 |
|  | 500 | 7 |
|  | 1000 | 15 |
|  | 10000 | 839 |
|  | 25000 | 11003 |
|  | 75000 | 57714 |
|  | 99171 | 108826 |
|  |  |  |
| InsertionSort | NumberOfItems | Time Taken (ms) |
|  | 10 | 0 |
|  | 100 | 1 |
|  | 500 | 8 |
|  | 1000 | 24 |
|  | 10000 | 493 |
|  | 25000 | 3419 |
|  | 75000 | 35198 |
|  | 99171 | 66630 |

BubbleSort, SelectionSort and InsertionSort are all big O(N^2), with BubbleSort having the most comparisons since it takes longer.

Sort Sorted:

Bubble: 240141 ms

Selection: 44418 ms

Insertion: 14 ms

App 2

|  |  |  |
| --- | --- | --- |
| Linear | NumberOfWords | Time Taken (ms) |
|  | 10 | 1 |
|  | 100 | 25 |
|  | 500 | 96 |
|  | 2500 | 441 |
|  | 5000 | 888 |
|  | 7500 | 1364 |
|  | 9000 | 1653 |
|  | 10000 | 1823 |
|  |  |  |
| Binary | NumberOfItems | Time Taken (ms) |
|  | 10 | 1 |
|  | 100 | 2 |
|  | 500 | 3 |
|  | 2500 | 7 |
|  | 5000 | 9 |
|  | 7500 | 11 |
|  | 9000 | 12 |
|  | 10000 | 13 |

Linear is O(N) and Binary is O(logN). Both are linear trends. Time increases as the number of words increases linearly.

App 3

The big-O for the insert method:

1. if the dictionary is unsorted is O(N). N is one insertion
2. if it is sorted is O(MNlogN). LogN is used to find the correct insertion position. MN is the shifts and insertion.

App 5

Words found:

euro

sumo

soap

errs

eras

elks

elmo

sump

trap

elms

loss

sows

toms

tors

lows

lump

slaw

toss

slap

slag

sums

tums

tows