Programming Assignment 2

I/O Times and Sorting times on different input files sizes

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| --- | --- | --- |
| Number of input elements | Sorting Times (s) | I/O Times (s) |
| 15 | 1e-05 | 0 |
| 1000 | 4.26e-03 | 0 |
| 10000 | 4.41e-01 | 0 |
| 100000 | 4.96e+01 | 0 |
| 1000000 | - | - |

The Space complexity of my algorithm is of O(1) complexity. The algorithm works my solely manipulating the address of the existing liked list.

I/O run time of the algorithm is extremely small approximately 0s seconds regardless of the size of the input. But the time complexity of the sorting time varies from O(n) for the best case scenario and O(n^2) as the worst case scenario and O(n^2) for the average time complexity.

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| --- | --- | --- |
| Number of input elements | Sorting Times PA2 (s) | Sorting Times PA1 (s) |
| 15 | 1e-05 | 0 |
| 1000 | 4.26e-03 | 0 |
| 10000 | 4.41e-01 | 0 |
| 100000 | 4.96e+01 | 7.0e-2 |
| 1000000 | - | 1.01 |

There is a significant difference between my implementation of shell sort using arrays and the implementation of shell sort using linked lists. Though both are of the time complexity O(n^2), the rate at which the algorithm increases when using linked lists is much faster than rate of increase of the algorithm when arrays are used.