

Programming Assignment 2

Results:

SHELL SORT (IMPLEMENTING INSERTION SORT)

Test Cases	Sorting Time	I/O Time
15	Approximately 0	Approximately 0
1000	Approximately 0	Approximately 0
10000	0.17	Approximately 0
100000	43.200001	0.01
1000000	N/A	N/A

From the tables, you can see that the sorting time and the I/O time increases as the number needing to be sorted gets larger. Based off of the five test cases, if n represents the number of elements in the sequence, the space complexity is $O(n)$, with an additional $O(1)$ because of the sequence linked list. The time complexity is probably closer to $O(n^2)$ due to how long each test case takes.

SHELL SORT WITH INSERTION SORT

Test Case	Total Time
15	Approximately 0
1000	Approximately 0
10000	Approximately 0
100000	0.02
1000000	0.038

This table from the first assignment shows that the shell sort with an array may be faster than a linked list. This is probably because it divided up the array instead of having to traverse through it every single time. The I/O run time seems to be near the same though. Therefore, although space is optimized in this algorithm, the time is not optimized very well.