COS212 (Data Structures and Algorithms)

Tutorial 10 Exercise
2021/06/22

Question 1 .....(1 marks)

1.1 [1 point] What is the complexity of shell sort if the gap shrinks via linear decrements (`gap--`)?

Question 2 .....(7 marks)

The following unsorted array is given:

8	3	14	2	9	1	25	7

2.1 [2 points] Show the array after 3 passes of comb sort through the entire array. Assume shrink factor = 1.3, array is to be sorted in ascending order, comparisons start on the right hand side of the array.

2.2 [2 points] Show the array after 2 passes of shell sort through the entire array. Assume the following gap sequence: {`5,3,1`}.

2.3 [1 point] How many calls to the recursive `quickSort(T [] data, int first, int last)` function are necessary to sort the given array? Assume the first element is chosen as the pivot. Assume `quickSort` is not executed on subarrays of `length == 1`.

2.4 [2 points] The array above has been heapified and is now:

25	9	14	7	3	1	8	2

Show the array after 3 elements have been placed into their final positions using heap sort. Assume array is to be sorted in ascending order.