Data Structures & Algorithms 2
Tutorial 7
Sorting

Exercise 1 (Insertion Sort)

1) Sort the sequence 3, 1, 4, 1, 5, 9, 2, 6, 5 using insertion sort.
2) What is the running time of insertion sort if all elements are equal?

Exercise 2 (Shellsort)

- Show the result of running Shellsort on the input 9, 8, 7, 6, 5, 4, 3, 2, 1 using the increments {7, 3 , 1}.

Exercise 3 (Heapsort)

1) Show how heapsort processes the input 142, 543, 123, 65, 453, 879, 572, 434, 111, 242, 811, 102.
2) What is the running time of heapsort for presorted input?

Exercise 4 (Merge sort)

1. Sort 3, 1, 4, 1, 5, 9, 2, 6 using mergesort.
2. Determine the running time of mergesort for
   a. sorted input
   b. reverse-ordered input
   c. random input

Exercise 5 (Quick sort)

1) Sort 3, 1, 4, 1, 5, 9, 2, 6, 5, 3, 5 using quicksort with median-of-three partitioning and a cutoff of 3

2) Using the quicksort implementation in the textbook, determine the running time of quicksort for:

a) sorted input

b) reverse-ordered input

c) random input