COMP20012 Tutorial 4: Sorting Algorithms

- 1. Sort the sequence 8, 1, 4, 1, 5, 9, 2, 6, 5 by using
 - a) Insertion sort
 - b) Mergesort
 - c) Quicksort, with the middle element as pivot
- 2. An array contains *N* numbers and you want to determine whether two of the numbers sum to a given number *K*. For example, if the input is 8, 4, 1, 6 and *K* is 10, the answer is yes (4 and 6). A number may be used twice.
 - a) Give an $O(N^2)$ algorithm to solve this problem
 - b) Give an $O(N \log N)$ algorithm to solve this problem. (Hint: first sort the array and then solve the problem in linear time.)
- 3. Investigate the details of the *Shell* sort algorithm, either from a textbook or by finding a suitable web resource.

Explain to your tutor how this algorithm works, illustrating your answer by sorting the array in question 1, using the increment sequence 5, 3, 1.