Data Structures and Algorithms
Homework 02[1]

Note: You are required to submit your answer in *hand-written* form at the beginning of the next lecture.

Question 1.
Order the following functions by asymptotic growth rate:

$4n\log n + 2n$	2^{10}	$2^{\log n}$
$3n + 100\log n$	$4n$	2^n
$n^2 + 10n$	n^3	$n\log n$

Question 2.
Describe a method for finding both the minimum and maximum of n numbers using fewer than 3n/2 comparisons.

Question 3.
Give an *n*-element array *X*, algorithm D calls algorithm E on each element *X*[*i*]. Algorithm E runs in O(*i*) time when it is called on element *X*[*i*]. What is the worst-case running time of algorithm D?

Question 4.
Suppose that each row of an *n* x *n* array *A* consists of 1's and 0's such that, in any row of *A* all the 1's come before any 0's in that row. Assuming *A* is already in the memory, describe a method running in O(*n*) time for finding the row of *A* that contains the most 1's.

[1] *Adapted from Pham Bao Son's DSA-09s2*