Homework lecture 7

Introduction to Algorithms

1. Given a list of real numbers, your task is to write a program to sort these numbers increasingly.

Input: The file 'numbers.txt' consists of n real numbers separated by spaces or new line characters.

Output: The sorted numbers are written to file 'numbers.sorted', two numbers are separated by a space character.

numbers.txt	numbers.sorted
3 5 2 2 1 8	1 2 2 3 5 8

2. Given a matrix A of m rows (numbered from 1 to m) and n columns (numbered from 1 to n) containing integer numbers, your task is to write a program to find the rectangle with the largest sum.

Input: The file 'matrix.txt' consists of $m + 1$ lines. The first line consists of m and n. The next m lines each has n integer numbers separated by a spaces.

Output: Write to file 'matrix.out' 5 numbers: $r1$ $c1$ $r2$ $r2$ s indicating that the rectangle from ($r1, c1$) to ($r2, c2$) has the largest sum (i.e. s).

Example

Matrix.txt	Matrix.out
3 5 -1 -1 -1 -1 2 -1 2 -2 1 3 2 -1 -1 -1 -1	1 4 2 5 5

3. Given two integer number X and Y, your task is to write a program to find the greatest common divisor of X and Y using recursion.

Input: Input   come   from   keyboard   containing   two   number   X   and   Y
Output: Ouput are written to screen contaning the greatest common divisor.

Example:

Keyboard	Screen
10 50	10

4. Given an integer number *n*, your task is to list all binary number of length *n*.

Input: The number *n* comes from the Keyboard

Output: Binary numbers of length *n* are written to the screen each in one line.

Example:

Keyboard	Screen
3	000
	001
	010
	011
	100
	101
	110
	111

5. Given an integer number *n*, your task is to list all permutations of length *n*.

Input: The number *n* comes from the Keyboard

Output: Permutations of length *n* are written to the screen each in one line.

Example:

Keyboard	Screen
3	123
	132
	213
	231
	312

	321