Homework 12 (Deadline 15:00, June 10, submit your files to TronClass)

Please submit the source code only. The file name should include your student ID number. For example, if your ID number is 406290123, then the file names for problems 1 and 2 should be **406290123_hw12_1.txt** and **406290123_hw12_2.txt**, respectively.

1. **Sort elements by frequency**
   Print the elements of an array in the decreasing frequency if 2 numbers have same frequency then print the one which came first. (This requirement needs bubble sort.)

   Input format

   There two lines in the input. The first line has the integer M. The next line has M integers as the elements of a one-dimensional array.

   Output format

   Output the one dimensional in one line.

   Sample input:

   8

   2 5 2 8 5 6 8 8

   Sample output

   8 8 8 2 2 5 5 6

2. **Bingo**
   Task Description

   Write a program to play bingo. A bingo board has 5 rows and 5 columns. Each entry has a different number from 1 to 25, generated by random numbers. Ask the user to input one number between 1 and 25 each time repeatedly. When

the player has all the numbers in a row, a column, or a diagonal, the program will generate message to declare bingo and output the bingo board as an array.

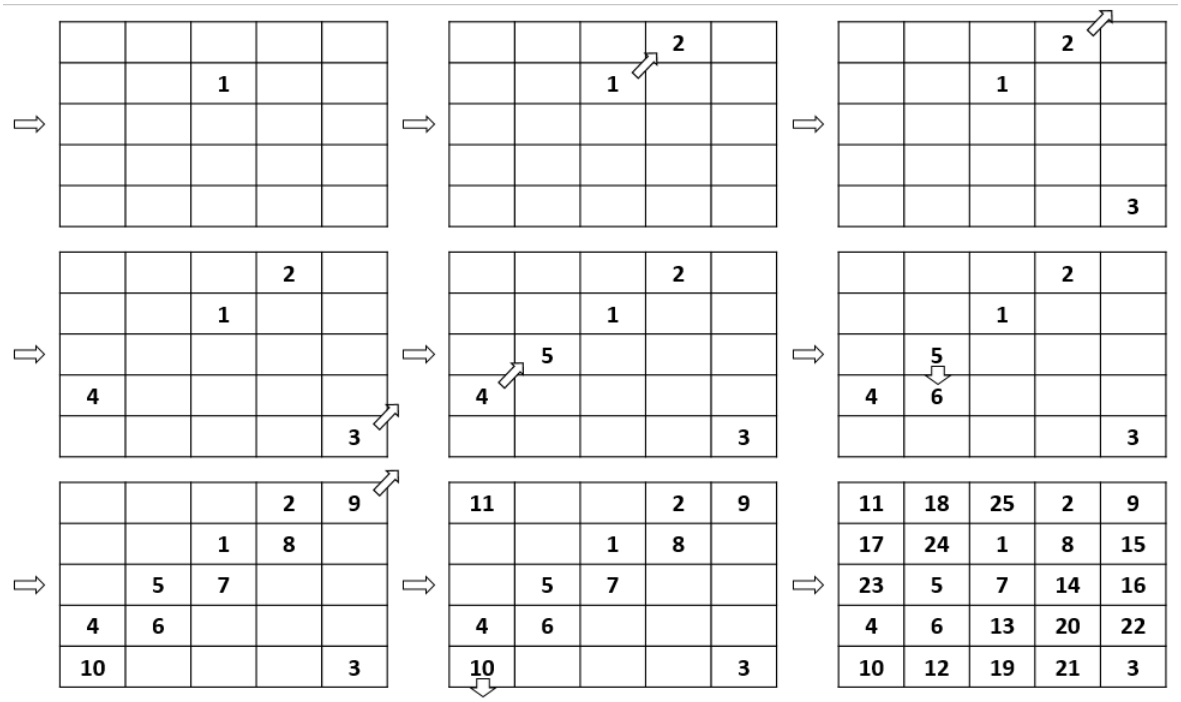
3. Magic Square

Task Description

A magic square is an N×N matrix filled with positive integers 1,2,⋯,N^2 by the following steps:

First fill the initial position in the grid with number 1. After that, fill the diagonally up and right square one step at a time. If we encounter a filled square, moves vertically down one square. Then continue as before until the whole matrix is filled. Note that when an “up and right” or “down” move will leave the square, it is wrapped around to the last row, first column, or first row.

We can see the following figure to understand the steps that fills the matrix if we start from position (1,2) with N=5. Note that the index of the matrix is from 0 to N−1, from top to down, from left to right.



sample

Now we give you the size of matrix N and the position (x,y) where the integer 1 is placed. Write a program to construct the magic square.

Input Format

There are four integers N,k,x and y in a line.

- $1 \le N \le 1000$
- $1 \le k \le N$
- $0 \le x,y < N$

Output Format

Print the magic square.

Sample Input 1

5 1 1 2

Sample Output 1

11	18	25	2	9
17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3