

APCS

Due 1/26/15

5- Sudoku
Input File: SudokuIn.txt

A Sudoku puzzle consists of a rectangular grid of cells arranged in C columns and R rows. Within the grid the cells are grouped into rectangular groupings each of which are W cells in width and H cells in height. W is always a factor of C , and H is always a factor of R . Initially, the cells contain numbers in the range 0 to $W \cdot H$. During the solution to the puzzle, the zeros within the cells of a grouping are replaced with numbers in the range 1 to $W \cdot H$. Below is an initialized puzzle for $C = 8$, $R = 10$, $W = 2$, $H = 5$.

	0	1	2	3	4	5	6	7
0	8	4	0	4	8	8	1	2
1	1	2	0	5	0	0	0	6
2	0	6	0	0	8	4	1	5
3	0	7	0	6	0	0	6	0
4	1	1	8	0	8	8	0	0
5	0	1	0	7	0	4	7	9
6	0	0	0	0	0	0	4	7
7	0	9	4	0	0	7	7	7
8	0	4	0	0	2	0	9	9
9	0	4	0	0	2	0	4	7

Given a cell's column and row number, determine if there are any duplicate numbers in the cell's grouping, ignoring the zeros. If there are no duplicates output zero. Otherwise output the total number of reoccurrences of the numbers within the cell's grouping, ignoring zeroes and not counting the original occurrences. For example, given row 9 and column 6 in the above puzzle, the output should be 7.

Inputs

The first line of input contains the number of puzzles to consider. This will be followed by one data set for each puzzle. The first line of a data set contains the number of columns and rows (C and R) in the puzzle, followed by the width and height (W and H) of the cell groupings. Each of the next R lines of a puzzle's data set contains W integers, that are the values contained in one row of the puzzle beginning with row 0 and ending with row $R-1$. The last line of a data set will contain an integer, n , followed by the column and row numbers of n cells in the puzzle. The row and column numbers start from zero, and all inputs on a line are separated by a space.

Outputs

For each puzzle there will be n lines of output, one line for each cell whose row and column number was specified on the last line of the puzzle's data set. If there are no duplicate numbers in

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that row and column number's W by H grouping output zero, otherwise output the total number of reoccurrences of the numbers within the cell's grouping, ignoring zeroes and not counting the original occurrence.

Sample inputs

```
2
8 10 2 5
8 4 0 4 8 8 1 2
1 2 0 5 0 0 0 6
0 6 0 0 8 4 1 5
0 7 0 6 0 0 6 0
1 1 8 0 8 8 0 0
0 1 0 7 0 4 7 9
0 0 0 0 0 0 4 7
0 9 4 0 0 7 7 7
0 4 0 0 2 0 9 9
0 4 0 0 2 0 4 7
4 7 7 0 0 3 2 4 4
12 8 3 8
8 2 0 4 0 0 1 2 3 0 0 0
1 2 0 5 8 0 0 6 0 1 1 3
0 6 0 4 0 4 0 5 0 8 0 0
0 7 0 6 0 0 0 0 0 0 6 0
0 0 0 0 0 8 0 0 4 2 0 5
0 1 0 0 0 4 9 8 0 4 9 7
0 0 0 0 0 0 0 0 0 0 0 0
0 9 4 0 0 7 0 7 0 0 0 1
4 0 7 6 7 11 7 5 2
```

Sample output

```
7
2
0
4
2
0
2
4
```

You must use text files