

Prominence 2D



SEASON 10 – FOURTH ROUND

Maria is keen on mountain climbing. When her geography teacher understood that, she immediately invited her in the next expedition for measuring prominence of mountain peaks. The field data was gathered and Maria was assigned to analyze it.

Given is a field of $N \times M$ mountain sectors, which is represented by a table with N rows and M columns. Each sector has a certain **unique** height H_{ij} . A peak is such a sector, which is higher than all adjacent sectors (the adjacent sectors of the sector on i -th row and j -th column are $(i - 1, j)$, $(i + 1, j)$, $(i, j - 1)$, $(i, j + 1)$, with the exception of the corner cases for the first and the last rows and columns, where we consider only the existing ones). The prominence of a peak is defined as the minimal height, which we need to descend from the peak in order to reach another sector with strictly bigger height by moving only between adjacent sectors. In other words, if we consider all the paths from the peak to a higher sector, its prominence is the minimal difference between its height and the height of the lowest sector along the path. By definition, the prominence of the highest top in the mountain is equal to its height.

Write a program, which finds the prominence of all peaks in the mountain.

Input

The first line of the input file `prominence2d.in` contains the numbers N and M . Each of the next N lines contain M numbers, separated by a space – the heights of the mountain sectors H_{ij} .

Output

For each peak in the mountain field (in rows from top to bottom and for each row from left to right) on a separate line of the output file `prominence2d.out` print a single number equal to its prominence (relative height).

Constraints

$$1 \leq N, M \leq 500$$

$$1 \leq H_{ij} \leq N \times M$$

Example

Input	Output
5 6	11
28 17 19 26 1 3	8
15 20 18 13 14 2	1
24 16 29 12 8 11	2
27 22 4 7 10 6	1
21 25 23 9 5 30	23
	3
	11
	2
	3
	30

Explanation

The peaks in the mountain are marked in bold. The prominence of the peak located in the first column of the first row is 11, because on the way to the peak with a height of 29 you have to go through a peak with a height of 17. The prominence of the highest peak is 30.

28	17	19	26	1	3
15	20	18	13	14	2
24	16	29	12	8	11
27	22	4	7	10	6
21	25	23	9	5	30