Find Max in 2D Matrix

Given an integer matrix of size **N** by **M**, the task is to find the maximum value within given rectangular regions described by its top-left and bottom-right coordinate.

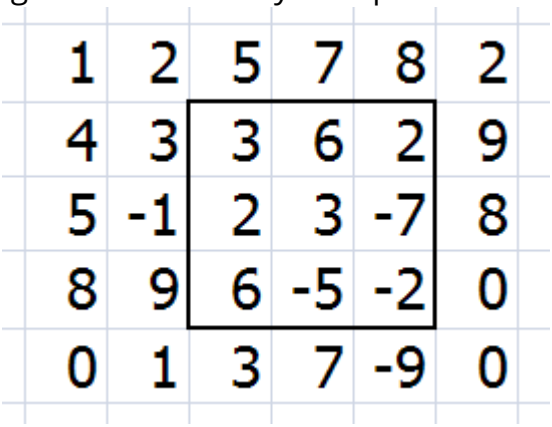

Fig. 1: A 5 x 6 matrix. The region is described by (2,3) and (4,5). The maximum value in the region is 6

For the given matrix, there are several regions that we need to find maximum value. It is possible that the given region is not valid. The program should detect this case as well. The region described by a top-left coordinate of $(r1, c1)$ and a bottom-right coordinate of $(r2, c2)$ is invalid when $(r1 > r2)$ or $(c1 > c2)$.

It is also possible that a region is valid but it is not entirely contained in the matrix, we will consider only the part of the region that is in the matrix. Additionally, when a region does not intersect the matrix, the program should also report this case. If the region is both non-intersect and invalid, the region should be reported as invalid.

Input

- The first line contains the number N and $M(1 \le N, M \le 100)$, that describes the number of row and column of a matrix.
- The second line gives the number **R** that describes the number of regions of interest.
  - Each of the following R lines describes four integer $r1, c1, r2$ and $c2$ that are the coordinate of top-left and bottom-right of the region of interest.

Output

The output must have **R** lines. Each line must describe the maximum value in the respective region. The i^{th} line must contain maximum value of element within the region given by the $(i+N+2)^{th}$ line in the input. If the respective region in the input is not valid, print the word “INVALID” instead. If the region is entirely outside the matrix, print the word “OUTSIDE”

Example

Input	Output
5 6 3 1 2 5 7 8 2 4 3 3 6 2 9 5 -1 2 3 -7 8 8 9 6 -5 -2 0 0 1 3 7 -9 0 2 3 4 5 2 3 100 5 1 1 1 1	6 7 1
3 3 4 -1 -2 -3 -4 -5 -6 -7 -8 -9 1 1 3 3 3 3 1 1 4 0 5 1 5 5 4 4	-1 INVALID OUTSIDE INVALID