## Jigsaw Puzzle

A jigsaw puzzle is a puzzle that requires arranging a number of differently shaped tiles so that they fit together and form a picture. In this problem we consider rectangular puzzles with almostsquare tiles:

The edges between the tiles are symmetrical, and there is a special edge type on the boundary of the puzzle.

Write a program that solves a jigsaw puzzle. It should read the descriptions of puzzle pieces and find an alignment in which all edges fit. There always is a solution, and if a puzzle has multiple solutions you only need to print one of them.

## Input

The first line of the input will contain two integers $w h$ : widht and hieght of the puzzle (see notes below on input size), followed by $w^{*} h$ lines containg 4 integers - edge types starting from top and moving clockwise. Edge type 0 means that the tile is on the border of the puzzle.

## Output

Output $h$ lines in the following format:
$p_{1, y} a_{1, y} p_{2, y} a_{2, y} \ldots p_{w, y} a_{w, y}$
Where $p_{x, y}$ is the number of puzzle that goes into position $(x, y)$ and $a_{x, y}$ contains the number of clockwise rotations it needs to fit. The pieces are numbered from 1.

## Examples

## Example 1

Input:
32
0130
0151
0031
3300
5203
3002
Output:
102030
405060

## Example 2

Input:
32
0130
0151

3100
3300
2035
0023
Output:
102032
405161

## Example 3

Input:
32
5203
0031
0130
0151
3300
3002
Output:
304020
501060

## Example 4

Input:
32
5203
0031
3001
0151
3003
0023
Output:
324020
511061

## Notes on input size

The score for this problem is proportional to the number of test cases solved. The sizes are as follows:

W H E TL
4 3~10 1s.
$45 \sim 10$ 1s.
$76 \sim 15$ 1s.
8 8~25 1s.
$1010 \sim 25$ 1s.
$1111 \sim 25$ 1s.
$1212 \sim 25$ 1s.
$1312 \sim 25 \mathrm{ls}$.
$1313 \sim 25$ 1s.
$1414 \sim 25$ 1s.
$2525 \sim 1005 \mathrm{~s}$.
$2525 \sim 905 \mathrm{~s}$.
$2525 \sim 805 \mathrm{~s}$.
$1212 \sim 25$ 10s.
$1313 \sim 25$ 10s.
$1414 \sim 25$ 10s.

The last week tests
1414 ~25 2s.
$1313 \sim 25$ 2s.
1515 ~ 25 2s.
1414 ~25 2s.
1515 ~25 2s.
1414 ~25 2s.
1616 ~30 2s.
W - widht of the puzzle
H - height of the puzzle
$E$ - number of different edge types
TL - time limit

## Points

The score awarded to your program is proportional to the number of correctly solved test cases (100 points is equivalent to the situation in which all tests have been solved correctly).

The number of points given in the ranking is scaled so that it is equal to 10 for the registered contestant whose solution has the highest score, and proportionally less for all solutions with lower scores.

## Pleas note

- For the first five weeks of the series (till Saturday, January 3) all submissions to this problem will be visible to all users and tested on temporary data sets only.
- For the last week of the series, submissions will be visible to the submitting contestant, only, and tested on the full set of test cases. (Earlier solutions will be rejudged).

