Columbia

Time limit: 1 sec

There is an imaginary city named Columbia where the city can be described as a grid of **R** rows and **C** column. Each cell in the grid is a block of the city. Each block has its own dweller and they don't want other people to pass by easily. Hence, they set up entrance fee. To travel into any block, we have to pay the entrance fee which may vary among blocks.

You are a member of the block at the top right corner of Columbia. Since you have a lot of friends in every block, you want to know the minimum cost of traveling from your block to all other blocks. You don't have to pay the fee for your starting block.

Input

- The first line contains two integers that describe the size of the city **R** and **C.**
- The next **R** lines describe the entrance fee. Each line gives the cost of each row, starting from the top row to the bottom row using the following format.
    - For each row, there are **C** integers that indicate the entrance fee of each block in that row, starting from the leftmost block to the rightmost block. The fee is non-negative integer not exceeding 1,000.

Output

Your program should output a grid of R row and C columns which give the minimal cost of traveling to each block in the city.

Limits

- For 50% of the test data, **R*C** will not exceeding 10,000
- For 100% of the test data, **R*C** will not exceeding 200,000

Example

Input	Output
4 4 1 1 1 1 9 8 7 1 1 1 1 1 1 2 4 9	0 1 2 3 9 9 9 4 8 7 6 5 9 9 10 14