

## Problem J. Jailing

Input file: *standard input*  
 Output file: *standard output*  
 Time limit: 10 seconds  
 Memory limit: 512 mebibytes

Bobo has a matrix of size  $n \times m$  filled with integers. It is guaranteed that all cells which contain the same value are 4-side connected.

Let's define a *jailing*  $J_x$  of a connected component with value  $x$  as minimum-area rectangle (with sides parallel to the matrix sides) that covers all cells of the component.

For each jailing  $B_x$ , Jessica would like to find the value of

$$s(B_x) = \sum_{B_y \in A \setminus \{x\}} f(B_x, B_y) \cdot y$$

where  $A$  is the set of all integers in the matrix and

$$f(B_x, B_y) = \begin{cases} 0 & \text{the area of intersection of } B_x \text{ and } B_y \text{ is } 0 \\ 0 & B_x \text{ is completely inside } B_y \text{ or vice versa} \\ 1 & \text{Otherwise} \end{cases}$$

### Input

The input consists of several test cases terminated by end-of-file. For each test case:

The first line contains two integers  $n$  and  $m$  – the size of the matrix.

The second line contains  $n \cdot m$  integers  $a_{1,1}, a_{1,2}, \dots, a_{1,m}, a_{2,1}, a_{2,2}, \dots, a_{2,m}, \dots, a_{n,1}, a_{n,2}, \dots, a_{n,m}$ , where  $a_{i,j}$  is the value in the  $i$ -th row and the  $j$ -th column.

- $1 \leq n \cdot m \leq 10^6$
- $1 \leq a_{i,j} \leq nm$
- It is guaranteed that all cells which contain the same value are 4-side connected.
- It is guaranteed that the sum of  $n \cdot m$  in all test cases does not exceed  $10^7$ .

### Output

For each test case, output an integer denoting the value of  $\sum_{x \in A} s(x) \oplus x$ , where  $\oplus$  denotes the exclusive-or (XOR) operator.

### Example

standard input	standard output
4 2	20
4 8 4 4 4 2 2 2	93
2 7	56
12 12 12 13 8 9 14 12 12 7 4 10 11 5	
3 5	
13 13 3 3 14 2 2 1 1 11 2 2 1 5 7	