Correct Rectangles identification

We are given a rectangular matrix filled with 0's and 1's. We want to detect all so called correct rectangles in the matrix.
A **rectangle** in the matrix is any rectangular shaped area of cells.
The **border** of a rectangle is the set of all cells in the rectangle which are adjacent either to the border of the matrix or which are ajacent to at least one cell outside the area. The cell in the rectangle which are not at its border are in its interior.
Note that there are no interior cells in a rectangle which height or width is less than or equal to 2.

A rectangle R is considered to be a **correct rectangle** if

- The border of R contains only 1's, it does not contains any 0.
- All cells, which are not part of R and are adjacent horizontally, vertically or diagonally to the border of R, contain 0's.
- Some cells in the interior of R may be filled with 0's if and only if the following condition holds:
  No two cells in the interior of R which both contain 0's are in the same matrix row or in the same matrix column.

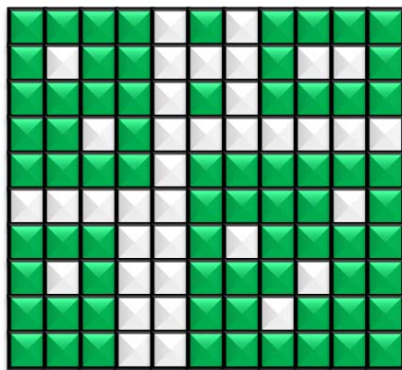The area of a rectangle is equal to the number of cells in the rectangle.

Image 1. A matrix in which 0's are represented by white (lighter) cells, 1's are represented by green (darker) cells. The matrix contains two correct rectangles with area 1, one correct rectangle with area 12, one correct rectangle with area 20 and one correct rectangle with area 36. The 3×4 rectangle in the upper right corner of the matrix is not a correct rectangle. The image illustrates Example 1 below.

The task

Find the number of all correct rectangles in the given matrix and determine the total area they occupy.

Input

The first input line contains two integers M and N representing the number of rows and the number of columns of the input matrix. Next, there are exactly M lines. Each line contains N values, the values correspond to the values in a particular matrix row. Each value is 0 or 1. All values are separated by single space.
It holds $2 \leq M, N \leq 2000$.

Output

The output contains one text line with two integers S, A separated by space. The value S represents number of correct rectangles in the input matrix, the value A represents the total of the areas of all correct rectangles in the matrix.

Example 1

Input

```
10 11
1 1 1 0 1 0 1 0 1 1 1
1 0 1 1 0 0 0 1 0 0 1
1 1 1 1 0 1 0 1 1 1 1
1 1 0 1 0 0 0 0 0 0 0
1 1 1 1 0 1 1 1 1 1 1
0 0 0 0 0 1 1 1 1 0 1
1 1 1 0 0 1 0 1 1 1 1
1 0 1 0 1 1 1 0 1 1 1
1 1 1 0 0 1 1 0 1 1 1
1 1 1 0 0 1 1 1 1 1 1
```

Output

Example 2

Input

```
9 12
0 0 0 0 0 0 1 1 1 1 1 0
1 1 1 1 0 0 1 0 1 1 1 0
1 1 0 1 0 0 1 1 0 1 1 0
1 1 1 1 0 0 1 1 1 0 1 0
1 1 0 1 0 0 1 1 1 1 0
1 1 1 1 0 0 0 0 0 0 0 0
0 0 0 0 1 1 1 1 0 0 0
1 1 0 0 0 1 0 1 1 0 0 1
1 1 0 0 0 1 1 1 0 1 1
```

Output

Example 3

Input

```
15 24
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1
0 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 1 1 1 1 1 0 1
0 1 1 1 1 1 1 1 1 0 1 0 1 1 1 0 1 0 1 0 1 0 0
0 1 1 1 1 1 0 1 1 1 1 0 1 0 1 0 1 1 1 1 1 0 0
0 1 1 1 1 0 1 1 1 1 1 0 1 1 1 0 1 1 1 1 1 0 0
0 1 1 1 0 1 1 1 1 1 1 0 1 1 1 0 1 0 1 0 1 0 0
0 1 1 0 1 1 1 1 1 1 1 1 0 1 1 1 0 1 1 1 1 1 0 0
0 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 1 0 0 0 0 0 0
0 1 1 1 1 1 1 1 1 1 1 0 1 1 1 0 0 0 1 1 1 1 1
0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 1 0 0 0
1 1 0 0 1 1 1 1 1 1 1 0 0 0 0 0 1 1 1 1 0 0 1
```

```
  5 70                          3 41                 0 1 1 0 1 0 1 1 1 1 1 0 1 1 1 1 0 0 0 0 0 0 0 0
                                                     0 0 1 0 1 1 1 1 0 1 1 0 1 1 1 1 0 0 1 1 0 1 1 0
                                                     0 0 0 0 1 1 1 1 1 1 1 0 1 1 1 0 0 0 0 0 0 0 0 0
```

Output

```
8 136
```

Public data

The public data set is intended for easier debugging and approximate program correctness checking. The public data set is stored also in the upload system and each time a student submits a solution it is run on the public dataset and the program output to stdout and stderr is available to him/her.

Link to public data set