

SPOJ Problem Set (classical)

206. Bitmap

Problem code: BITMAP

There is given a rectangular bitmap of size $n*m$. Each pixel of the bitmap is either white or black, but at least one is white. The pixel in i -th line and j -th column is called the pixel (i,j) . The distance between two pixels $\mathbf{p}_1=(i_1,j_1)$ and $\mathbf{p}_2=(i_2,j_2)$ is defined as:

$$d(\mathbf{p}_1,\mathbf{p}_2)=|i_1-i_2|+|j_1-j_2|.$$

Task

Write a program which:

- reads the description of the bitmap from the standard input,
- for each pixel, computes the distance to the nearest white pixel,
- writes the results to the standard output.

Input

The number of test cases t is in the first line of input, then t test cases follow separated by an empty line. In the first line of each test case there is a pair of integer numbers n, m separated by a single space, $1 \leq n \leq 182, 1 \leq m \leq 182$. In each of the following n lines of the test case exactly one zero-one word of length m , the description of one line of the bitmap, is written. On the j -th position in the line $(i+1), 1 \leq i \leq n, 1 \leq j \leq m$, is '1' if, and only if the pixel (i,j) is white.

Output

In the i -th line for each test case, $1 \leq i \leq n$, there should be written m integers $f(i,1), \dots, f(i,m)$ separated by single spaces, where $f(i,j)$ is the distance from the pixel (i,j) to the nearest white pixel.

Example

Sample input:

```
1
3 4
0001
0011
0110
```

Sample output:

```
3 2 1 0
2 1 0 0
1 0 0 1
```

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Source limit:50000B
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