

Maybe you wonder what an annoying painting tool is? First of all, the painting tool we speak of supports only black and white. Therefore, a picture consists of a rectangular area of pixels, which are either black or white. Second, there is only one operation how to change the colour of pixels:

Select a rectangular area of r rows and c columns of pixels, which is completely inside the picture. As a result of the operation, each pixel inside the selected rectangle changes its colour (from black to white, or from white to black).

Initially, all pixels are white. To create a picture, the operation described above can be applied several times. Can you paint a certain picture which you have in mind?

Input

The input contains several test cases. Each test case starts with one line containing four integers n , m , r and c . ($1 \leq r \leq n \leq 100, 1 \leq c \leq m \leq 100$), The following n lines each describe one row of pixels of the painting you want to create. The i -th line consists of m characters describing the desired pixel values of the i -th row in the finished painting ('0' indicates white, '1' indicates black).

The last test case is followed by a line containing four zeros.

Output

For each test case, print the minimum number of operations needed to create the painting, or '-1' if it is impossible.

Sample Input

```
3 3 1 1
010
101
010
4 3 2 1
011
110
011
110
3 4 2 2
0110
0111
0000
0 0 0 0
```

Sample Output

```
4
6
-1
```