End-To-End

Elly has a matrix of digits with **N** rows and **M** columns. In each cell of the matrix there is exactly one digit between 0 and 9, inclusive.

The girl can alter the matrix by changing the digits in the cells (potentially in none or all of them). Changing a digit X to digit Y takes |X-Y| seconds (that is, the absolute difference between the digits).

Ellys says that she has connected the ends of the matrix (the top with the bottom row or the most-left with the most-right columns) if there is a path of neighboring (sharing a side) cells containing the same digit. The girl wants to connect the top with the bottom end, as well as the left with the right one. Please note that in order to do so, she has to use the same digit for both paths, since they intersect.

Let's look at the following example:

2753852 9567342 5294979 3180559	2753**8**52 **8888**42 52**8**4**888** 31**8**0559	275**3**852 9**333333** 5**3**94979 **33**80559	2**7**53852 **7777**342 529**7777** 31805**7**9
The initial matrix has four rows and seven columns.	*One way to "meet the ends" is the following, achieving it for 16 seconds using the digit 8.*	*Another way to do so is the following. It requires 14 seconds using the digit 3.*	*A third way to achieve the goal (again for 14 seconds) is using the digit 7.*

Given the initial matrix which Elly has, can you determine the minimum required time to connect its ends?

Input
On the first row of the standard input will be given the integers **N** and **M**. On each of the following **N** lines will be given a string of **M** digits.

Output
On a single line of the standard output print one integer – the minimum number of seconds sufficient to alter the matrix in the desired way.

Constraints
- $1 \leq \mathbf{N}, \mathbf{M} \leq 500$

Sample Input	*Sample Output*
4 7 2753852 9567342 5294979 3180559	14