Ultra Low-Def (300 points)

Introduction

Several students at Orange University designed a simple type of mechanical screen consisting of **N** by **M** tiles that are black on one side and white on the other. Tapping a tile makes it flip to expose its opposite face.

The intention was to display black and white patterns on this screen by tapping the appropriate tiles. Unfortunately, there is a design flaw such that tapping one tile causes all neighboring tiles to flip too. Two tiles are considered neighbors if they touch each other along one side (touching corners is not sufficient). You've been tasked with writing an application that will take the current layout of a screen and find the fastest way to reset it to all white.

Input Specifications

The first line of the input will contain 2 numbers, **M** ($1 \leq M \leq 16$) and **N** ($1 \leq N \leq 16$) denoting the size of the screen.

This will be followed by M lines, each containing N characters, which will be either 0 or 1. "0" will denote white and "1" will denote black.

Output Specifications

Your program will output the minimum possible number of taps required to reset all tiles to white. If it's not possible to do so, your program must output "NaN".

Sample Input/Output

Input

```
5 5
11011
10101
01110
10101
11011
```

Output

```
5
```

Explanation

5 taps are needed to reset all tiles.

Input

```
5 5
01101
00000
```

```
00111
00101
00100
```

Output

NaN

Explanation

It's impossible to reset this screen.