Problem F. Digit-only subrectangles

- Time Limit: 3 sec

Problem Statement

There are H rows and W columns of square cells. Each cell has either a digit or an asterisk (‘*’). The cell at the i-th row from the top and the j-th column from the left is denoted by (i, j).

In this problem we consider subrectangles, each of which is the set of cells which forms a rectangle. More precisely, a set of cells S is a subrectangle if there are four integers t, b, l and r such that $1 \leq t \leq b \leq H$, $1 \leq l \leq r \leq W$ and $S = \{(i, j) \mid t \leq i \leq b \wedge l \leq j \leq r\}$. A subrectangle is digit-only if every cell in the subrectangle has a digit. The score of a digit-only subrectangle is defined as the square of the sum of digits in cells in the subrectangle.

Your task is to calculate the sum of scores of all digit-only subrectangles. Since the answer may be large, output it modulo $998{,}244{,}353$.

Input

The input consists of a single test case of the following format.

$$
\begin{aligned}
&H\ W\\
&A_{1,1}A_{1,2}\cdots A_{1,W}\\
&A_{2,1}A_{2,2}\cdots A_{2,W}\\
&\vdots\\
&A_{H,1}A_{H,2}\cdots A_{H,W}
\end{aligned}
$$

The first line consists of two integers H and W, which satisfy $1 \leq H \leq 2{,}000$ and $1 \leq W \leq 2{,}000$. Each of the following H lines consists of W characters. Here, $A_{i,j}$ is the character in the cell (i, j), and it is either a digit between 0 and 9, inclusive, or an asterisk (‘*’). It is guaranteed that there is at least one digit-only subrectangle.

Output

Output in a line the sum of scores of all digit-only subrectangles modulo $998{,}244{,}353$.

Sample Input 1	Sample Output 1
2 2 44 9*	346

Sample Input 2	Sample Output 2
2 3 314 28*	601

Sample Input 3	Sample Output 3
4 6 314159 2*6535 *89793 238*4*	37655

Sample Input 4	Sample Output 4
18 20 65929431919981098712 34182289733359024486 *5999742744659484782 03563591172305229098 55764088882794210744 65542986390400199274 24954674699538357427 65448003011829165060 0570520*394989799204 21113635765787241691 24382969673042349665 04571518994293776944 42950768895299998684 02191975238817773041 08629513210946362875 91583470151322043009 00337992511803056114 59396973995193492513	78257625

In Sample Input 1, there are five digit-only subrectangles as illustrated below. The sum of their scores is $4^2 + 4^2 + 9^2 + (4+4)^2 + (4+9)^2 = 346$.

Figure F.1. Digit-only subrectangles in Sample Input 1