Problem H
Hex Activation Key

Time limit: 6 seconds
Memory limit: 2048 megabytes

Problem Description

Joanna has a mysterious machine. To activate the machine, she needs to input the correct activation key. However, she doesn't know what the correct key is.

Luckily, Joanna has an old document that tells her some rules about the activation key. After reading the document, she learns that the activation key is a string that is only composed of hexadecimal symbols (`0123456789abcdef`), and the length of the correct key is n. In addition, there are m additional rules, where every rule is in one of the forms:

- `-` c_1 c_2, which means that symbol c_1 and symbol c_2 must **not** be neighboring. In other words, whenever the symbol c_1 appears, it must not be adjacent to c_2.
- `/` c_1 c_2 c_3, which means that c_1 must **not** be wrapped up by c_2 and c_3. In other words, whenever the symbol c_1 appears, it must not be adjacent to both c_2 and c_3 at the same time.

Because there may be a lot of possible activation keys, Joanna doesn't know how to find the correct one. She wonders, "How hard is it to find the correct activation key?" You don't need to find the correct activation key. Instead, you need to find the number of possible ones.

Input Format

The first line contains two integers n and m. Each of the following m lines contains the description of a rule. Each rule starts with a character t. Then,

- If $t =$ `-`, then two characters c_1 and c_2 follow.
- If $t =$ `/`, then three characters c_1, c_2, and c_3 follow.

The characters in each rule are separated by spaces.

Output Format

Print the number of possible activation keys modulo 998244353.

Technical Specification

- $1 \le n \le 10^6$
- $0 \le m \le 100$
- $t \in \{\texttt{-}, \texttt{/}\}$
- $c_1, c_2, c_3 \in \{\texttt{0}, \texttt{1}, \texttt{2}, \texttt{3}, \texttt{4}, \texttt{5}, \texttt{6}, \texttt{7}, \texttt{8}, \texttt{9}, \texttt{a}, \texttt{b}, \texttt{c}, \texttt{d}, \texttt{e}, \texttt{f}\}$

Sample Input 1

```
2 0
```

Sample Output 1

```
256
```

Sample Input 2

```
3 5
- 0 1
- a b
- 9 9
/ 4 3 5
/ 8 8 8
```

Sample Output 2

```
3938
```