Lying Faces 2025

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

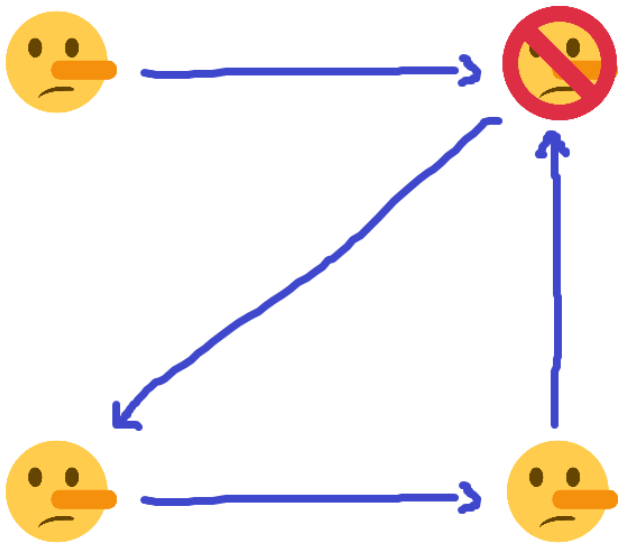
This problem is in no way affiliated to "Lying Faces", a problem from an earlier iteration of OCPC.

There are n faces in a room. Each face has a **state**, either lying or truthful. Also, each face has some other face as its best friend, which you already know.

You, right now, do not know which are lying and which are truthful. Therefore, you ask each face a certain question. The question is as follows:

- What are the states of yourself and your best friend?

Then, if the face is truthful, it **either** speaks the truth about both **or lies about both**. If the face is lying, it lies about **exactly one of the two**.



Above is a drawing showing the friendship relation and a possible assignment for the example input.

Given the best friend of each face and the responses after asking them the question, find the answer to the following problem.

- Find the number of different ways to assign a state to each face, so that it is possible to get the exact same responses as you received.

Here, two assignments of states are different if there is a face with a different state in the two assignments.

As the answer may be huge, print the answer modulo 998 244 353. Do note that the answer may be 0.

Input

The first line contains a single integer n ($2 \leq n \leq 200\,000$).

Each of the n following lines contains f_i, a_i, b_i. The description of each is as follows:

- The f_i on the i-th line is the index of the best friend of the i-th face ($1 \leq f_i \leq n$, $f_i \neq i$);
- The a_i on the i-th line is the response to the state of itself ($a_i \in \{\texttt{L}, \texttt{T}\}$);
- The b_i on the i-th line is the response to the state of its best friend ($b_i \in \{\texttt{L}, \texttt{T}\}$).
- For a_i and b_i, `L` corresponds to "lying" and `T` corresponds to "truthful".

Note that a_i and b_i correspond to responses to the questions, and not necessarily the actual states.

Output

Output the number of different ways to assign a state to each face, modulo 998 244 353.

Example

standard input	standard output
4 2 L L 3 T L 4 L T 2 T T	2

Note

In the example, there are 2 different ways to assign states: [🤥,😡,🤥,🤥] and [😡,😡,🤥,🤥].

Here, 🤥 corresponds to **lying** and 😡 corresponds to **truthful**.