Task: ZAW
Sports competition

Olimpiada Informatyczna

XXIV OI, Stage II, Day trial. Source file `zaw.*` Available memory: 256 MB. *14.02.2017*

There are n participants competing in a sports tournament, each representing a different country. Furthermore, each competing country sent their sports correspondent so that they report their representative's standing in the ranking. Unfortunately, some correspondents are so overcome with emotions that they forget which spot their national champion secured; in such case, they announce two possible positions.

Given the correspondents reports, find out whether they determine the ranking uniquely (there are no *ex aequo* spots). If so, provide this unique order, and tell the number of possible orders otherwise.

Input

The first line of the standard input contains a positive integer n that specifies the number of participating countries.

The following n lines contain the reports, the i-th such line giving the one from the i-th country's correspondent. If a correspondent is confident about the position of their representative, their report consists of the letter `T` followed by an integer a_i ($1 \leq a_i \leq n$), which is the i-th participant's position. If a correspondent is unsure, then their report consists of the letter `N` followed by two distinct integers $a_{i,1}$ and $a_{i,2}$ ($1 \leq a_{i,j} \leq n$), which specify the i-th participant's two possible positions.

Output

If the correspondents' reports uniquely determine the ranking, then the first line of the standard output should contain the word `TAK` (Polish for *yes*). In such case, the following n lines should describe the standings as follows: The i-th such line should contain the number equal to the position of the i-th participant.

If on the other hand the relations are contradictory or the ranking is not unique, then the first line of the standard output should contain the word `NIE` (Polish for *no*), and the second line the number of possible orders modulo 1 000 000 007.

Example

For the input data:

```
3
N 2 3
T 3
N 2 1
```

the correct result is:

```
TAK
2
3
1
```

whereas for the following input data:

```
3
N 2 1
T 3
N 2 1
```

the correct answer is:

```
NIE
2
```

Sample grading tests:

`1ocen:` $n = 5$, each correspondent is unsure, and their reports are contradictory;

`2ocen:` $n = 10$, each correspondent is unsure, and there are 32 possible orders;

`3ocen:` $n = 1\,000\,000$, each correspondent is confident ($a_i = i$), and the answer is `TAK`.

Grading

The set of tests consists of the following subsets. Within each subset, there may be several test groups.

Subset	Property	Score
1	$n \leq 10$	20
2	$n \leq 2000$	30
3	$n \leq 1\,000\,000$ and there is a unique order	20
4	$n \leq 1\,000\,000$	30