In the current business world there are many situations of participation of a company in the capital of another, of cross-participations and of partnerships. The amount of capital owned by each participant determines the number of votes. An entity possessing 50%+1 votes controls the company. This entity may be a single company or a partnership of several companies. To make the process more complex, a company may control another indirectly, because if company $A$ controls company $B$, and $B$ controls $C$, then $A$ controls $C$. Thus it is not always clear who controls what.

In order to understand the power relationships among companies, a knowledgeable stock exchange broker writes down some facts of the form $A > B$, meaning company $A$ controls company $B$. He also writes more generic facts like $A_1 \ldots A_n > B$ meaning that a possible partnership of companies $A_1 \ldots A_n$ is able to control $B$. Due to the empiric process used, the set of facts may include many redundancies, of two types:

**Type 1:** if $A\ B\ C > D$ is a fact but it can be concluded from the set of facts that $A$ and $B$ together are enough to control $D$ (directly or indirectly), then $C$ can be deleted from the former fact because it is irrelevant.

**Type 2:** if there is a fact $A > B$ but it can be concluded just from the other facts that $A$ controls $B$, then $A > B$ may be deleted because it is redundant.

To get a clearer picture of the essential relationships, an analyst would like to have a minimal version of the set of facts without redundancies, but also without loosing information. There may be several alternative minimal sets of facts.

Given an initial set of facts of the form $A_1 \ldots A_n > B$ a minimal set is an equivalent set that contains neither redundancies of type 1 nor of type 2. Which is the number of facts of the smallest minimal set?

## Input

The input begins with a single positive integer on a line by itself indicating the number of the cases following, each of them as described below. This line is followed by a blank line, and there is also a blank line between two consecutive inputs.

The first line of the input contains the integer number $N$ of facts. Each of the following $N$ lines contains a string of $k$ ($1 \leq k \leq 26$) capital letters, the symbol '>' and a single capital letter. Each capital letter represents a company.

## Output

For each test case, the output must follow the description below. The outputs of two consecutive cases will be separated by a blank line.

One line containing the number of facts of the smallest minimal set.

## Sample Input

```
1

11
AB>C
C>A
BC>D
ACD>B
D>E
D>G
BE>C
CG>B
CG>D
CE>A
CE>G
```

## Sample Output

```
8
```