

C: Detective Machine

Being a detective in Binary World is a challenging profession! Even when the detective knows who the guilty person is, proving it to the judges can be a nightmare. Mark is a new detective assigned to a robbery case where a diamond necklace was stolen from Ms. Margarita's neck. She swears her husband was the one who took it, but Mark knows she will not be a good witness, due to her dysfunctional relationship with the thief.



In Binary World, every witness Mark interviews will give him two names, it could be the thief's name or another person at the scene. He always starts by interviewing Ms. Margarita and she always says her husband's name first. Help Mark select the fewest amount of witnesses he needs to interview in order to connect Margarita's husband to the crime. He must always begin with the name of the person (other than her husband) whom Margarita says she saw at the scene. *Note: Margarita cannot mention her husband twice.*

Input

The first line contains C , the number of test cases. This is followed by C different cases, each of them starting with N , the number of people interviewed ($3 \leq N \leq 50000$), including Ms. Margarita and her husband. The next $N-1$ lines each contain three names: the interviewed person and the name of the two people he or she saw at the scene. These lines are in no particular order. In case a person only saw one other person at the scene, that person's name will appear twice on the same line. Each name is unique, and no longer than 50 characters. Remember that Ms. Margarita is always the first witness and she mentions her husband first.

Output

Print the minimum amount of witnesses required for each case in a single line, without counting Ms. Margarita, which will help Mark to solve the case. In case no one else saw Ms. Margarita's husband taking the necklace, print "-1".

Sample Input	Sample Output
3	1
4	2
Margarita James Eva	-1
Eva James Cloud	
Cloud James Eva	
4	
Margarita James Eva	
Eva Cloud Cloud	
Cloud James Eva	
4	
Margarita James Eva	
Eva Cloud Cloud	
Cloud Eva Eva	