

[A. Odd Man Out](#)[B. Get to Work](#)[C. Qualification Round](#)**D. Polygraph**[Contest Analysis](#)[Questions asked](#) **1**

## Submissions

## Odd Man Out

7pt Not attempted  
**209/214 users**  
correct (98%)7pt Not attempted  
**206/209 users**  
correct (99%)

## Get to Work

9pt Not attempted  
**127/149 users**  
correct (85%)9pt Not attempted  
**124/127 users**  
correct (98%)

## Qualification Round

11pt Not attempted  
**47/87 users** correct  
(54%)22pt Not attempted  
**4/32 users** correct  
(13%)

## Polygraph

12pt Not attempted  
**14/30 users** correct  
(47%)23pt Not attempted  
**0/2 users** correct  
(0%)

## Top Scores

RalfKistner	77
mohamedafattah	65
Ahmed.Kamel	65
gwylin	65
Nooodles	55
amrSamir	55
Blazerfrost	55
naguib	55
Kosie	55
mRefaat88	55

## Problem D. Polygraph

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the [Quick-Start Guide](#) to get started.

Small input  
12 points

Solve D-small

Large input  
23 points

Solve D-large

## Polygraph

On the distant isle of Googlia, there are two cities, Truthtown and Liarville. People from Truthtown always tell the truth and people from Liarville always lie. While exploring Googlia, you have run across a group of  $N$  inhabitants, and you want to figure out which city each one came from.

To make life simpler, you begin by numbering these people 1 through  $N$ . You then question each person, and record their  $M$  statements in the short-hand described below.

Short-hand	Meaning
i T j	Person #i says, "Person #j is from Truthtown."
i L j	Person #i says, "Person #j is from Liarville."
i S j k	Person #i says, "Persons #j and #k are from the same city."
i D j k	Person #i says, "Persons #j and #k are from different cities."

Your task is to deduce which city each person came from. It is guaranteed that there will always be at least one solution.

For example, suppose you were given the following statements:

1 D 2 3, 1 D 2 4, 1 D 3 4, and 2 L 1.

Then, you could reason as follows:

- There are only two cities, so persons #2, #3, and #4 could not all have come from different cities.
- Therefore, at least one of person #1's claims must have been a lie.
- Therefore, person #1 is from Liartown, and all of his claims must have been lies.
- Therefore, persons #2, #3, and #4 must all be from the same city.
- Person #2's claim is true, so he must be from Truthtown.
- Therefore, persons #3 and #4 are also from Truthtown.

## Input

The first line of the input gives the number of test cases,  $T$ .  $T$  test cases follow. Each case begins with a line containing the integers  $N$  and  $M$ . The following  $M$  lines each contain a single statement from one inhabitant, formatted as described above.

## Output

For each test case, output one line containing "Case #x:  $y_1 y_2 \dots y_N$ ", where  $x$  is the case number (starting from 1) and  $y_i$  is a single letter indicating which city person #i is from:

- If the statements you have been given imply person #i must be from Truthtown, then  $y_i$  should be 'T'.
- If the statements you have been given imply person #i must be from Liarville, then  $y_i$  should be 'L'.
- If the statements you have been given are not enough information to determine where person #i is from, then  $y_i$  should be '-'.

## Limits

$1 \leq T \leq 100$   
 $1 \leq i, j, k \leq N$   
 $j$  and  $k$  are distinct

## Small dataset

$1 \leq N \leq 10$   
 $1 \leq M \leq 500$

### Large dataset

$1 \leq N \leq 500$   
 $1 \leq M \leq 500$

### Sample

Input	Output
2	Case #1: L T T T
4 4	Case #2: - T -
1 D 2 3	
1 D 2 4	
1 D 3 4	
2 L 1	
3 1	
1 S 1 2	

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