



Hello, 2024101067.

Interstellar Network Disruption

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C, C++

In the interstellar federation, star systems are connected by hyperspace routes that form a minimal network - a tree that guarantees a unique path between every pair of systems. Due to unpredictable cosmic disturbances, some hyperspace routes occasionally become disabled (forever), causing parts of the network to lose connectivity.

You are given Q queries.

The Queries of two types:

- In query type R you receive a hyperspace route that got disabled forever.
- In query type Q Your task is to determine the number of unordered pairs of star systems (x, y) (with $(1 \leq x < y \leq N)$ such that there is no available path between x and y in the network after the disabled routes are removed.

Constraints

Number of test cases ≤ 5 .

Number of star systems, $N \leq 20,000$.

Number of queries, $Q \leq 20,000$.

Input

The first line contains T , the number of test cases. Each test case is described as follows:

The first line contains N , the total number of star systems.

The next $N - 1$ lines each contain two integers x and y , indicating that there is a hyperspace route between systems x and y ($1 \leq x < y \leq N$). The routes are numbered from 1 to $N - 1$.

The following line contains Q , the total number of queries



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R x - Disable the hyperspace route numbered x . It is guaranteed that this route is currently active and has not already been disabled.

Q - Output the total number of unordered pairs (x, y) such that $1 \leq x < y \leq N$ for which there is no path connecting star systems x and y .

Output

For each test case, output a line for each query of type Q containing the required value.

Print a blank line after the output of each test case.

Example 1

Input

```
2
3
1 2
1 3
5
Q
R 1
Q
R 2
Q
4
1 2
1 3
1 4
7
Q
R 1
Q
R 2
Q
R 3
Q
```

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Output

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2
3
0
3
5
6

? Clarifications

[Request clarification](#)

No clarifications have been made at this time.