

6436 The Busiest City

Tree Land Kingdom is a prosperous and lively kingdom. It has N cities which are connected to each other by roads such that there is exactly one path to go from one city to any other city. Each road in the kingdom connects exactly two different cities.

Every day a lot of merchants travel from one city to other cities in the kingdom making this kingdom famous for its commerce. The king of this kingdom wonders, which city is the busiest one in his entire kingdom. The busyness of a city is defined as the number of merchants who visits this city on each day. A merchant is considered as visiting c city if and only if city c lies on the path when the merchant travels from city a to city b .

Unfortunately, we need a lot of resources and time to answer the king's question. Therefore, the ministers come up with an idea to approximate the answer so they can provide the king with an "early" answer while they are working on the actual answer. To approximate the answer, the ministers modify the definition of a city's busyness a bit. The busyness of a city a is now defined as the number of different pair of cities $a - b$ such that c lies in a simple path from a to b (note that c is neither a nor b). A path is considered simple if and only if it does not visit any city more than once.

Consider the example as shown in Figure 1 below.

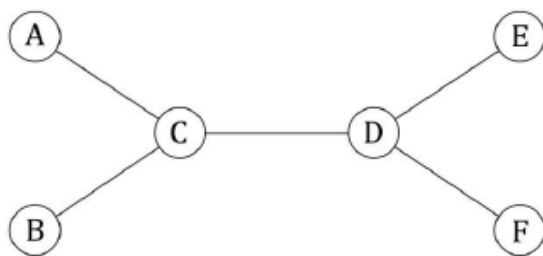


Figure 1

In this example, the busyness of city A, B, E and F are 0 because there is no pair of cities which path visits those nodes. The busyness of city C is 7 (the pairs are: A-B, A-D, A-E, A-F, B-D, B-E, B-F) and the busyness of city D is also 7 (the pairs are: A-E, A-F, B-E, B-F, C-E, C-F, E-F). Therefore, the highest busyness in this example is 7, which occurs in city C and D.

Given the kingdom's road structure, your task is to determine the highest busyness among all cities in the kingdom.

Input

The first line of input contains an integer T ($T \leq 50$) denoting the number of cases. Each case begins with an integer N ($3 \leq N \leq 20,000$) denoting the number of cities in the kingdom. The cities are numbered from 1 to N . The following $N - 1$ lines each contains two integers a and b ($1 \leq a, b \leq N$) denoting a road which connects city a and city b .

Output

For each case, output 'Case # X : Y ', where X is the case number starts from 1 and Y is the highest busyness among all cities in the kingdom for that case.

Notes:

- Explanation for 1st sample case

This sample case corresponds to Figure 1 in the problem statement.

- Explanation for 2nd sample case

The busiest city is city 2 with busyness of 1 (the pair is: 1-3).

- Explanation for 3rd sample case

The busiest city is city 2 with busyness of 3 (the pairs are: 1-3, 1-4, 3-4).

Sample Input

```
4
6
1 3
2 3
3 4
4 5
4 6
3
1 2
2 3
4
1 2
2 3
2 4
7
2 5
1 2
7 4
3 7
2 3
7 6
```

Sample Output

```
Case #1: 7
Case #2: 1
Case #3: 3
Case #4: 9
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