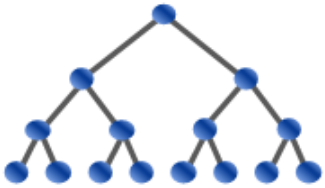

USACO 2020 US Open Contest, Platinum
Problem 3. Circus

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Contest has ended.

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English (en)

The N cows of Farmer John's Circus ($1 \le N \le 10^5$) are preparing their upcoming acts. The acts all take place on a tree with vertices labeled $1 \ldots N$. The "starting state" of an act is defined by a number $1 \le K \le N$ and an assignment of cows $1 \ldots K$ to the vertices of the tree, so that no two cows are located at the same vertex.

In an act, the cows make an arbitrarily large number of "moves." In a move, a single cow moves from her current vertex to an unoccupied adjacent vertex. Two starting states are said to be equivalent if one may be reached from the other by some sequence of moves.

For each $1 \le K \le N$, help the cows determine the number of equivalence classes of starting states: that is, the maximum number of starting states they can pick such that no two are equivalent. Since these numbers may be very large, output their remainders modulo $10^9 + 7$.

INPUT FORMAT (file circus.in):

Line 1 contains N.

Lines $2 \le i \le N$ each contain two integers a_i and b_i denoting an edge between a_i and b_i in the tree.

OUTPUT FORMAT (file circus.out):

For each $1 \le i \le N$, the i-th line of output should contain the answer for $K = i$ modulo $10^9 + 7$.

SAMPLE INPUT:

```
5
1 2
2 3
3 4
3 5
```

SAMPLE OUTPUT:

```
1
1
3
24
120
```

For $K = 1$ and $K = 2$, any two states can be transformed into one another.

Now consider $K = 3$, and let c_i denote the location of cow i. The state $(c_1, c_2, c_3) = (1, 2, 3)$ is equivalent to the states $(1, 2, 5)$ and $(1, 3, 2)$. However, it is not equivalent to the state $(2, 1, 3)$.

SAMPLE INPUT:

```
8
1 3
2 3
3 4
4 5
5 6
6 7
6 8
```

SAMPLE OUTPUT:

```
1
1
1
6
30
180
5040
40320
```

SCORING:

- Test cases 3-4 satisfy $N \leq 8$.
- Test cases 5-7 satisfy $N \leq 16$.
- Test cases 8-10 satisfy $N \leq 100$ and the tree forms a "star;" at most one vertex has degree greater than two.
- Test cases 11-15 satisfy $N \leq 100$.
- Test cases 16-20 satisfy no additional constraints.

Problem credits: Dhruv Rohatgi

Contest has ended. No further submissions allowed.