

Equivalent Pipelines

Input file: **standard input**
Output file: **standard output**
Time limit: 3 seconds
Memory limit: 1024 megabytes

You are planning to construct a water pipeline network, connecting n buildings in KAIST. Due to budget problems, you can only use $n - 1$ pipes. Each pipe is undirected and connects two different buildings, and all n buildings must be pairwise connected through some sequence of pipes. These pipes form a network.

As a careful planner, you designed d different networks and want to compare them. One can describe each pipe in the network with a durability, which is a single positive integer. Given a network T , define the **vulnerability** $v_T(i, j)$ of two distinct buildings i and j to be the minimum durability of a pipe whose removal separates buildings i and j . In other words, $v_T(i, j)$ is the minimum durability over all pipes on the path connecting i to j .

If two networks T_1 and T_2 satisfy $v_{T_1}(i, j) = v_{T_2}(i, j)$ for all $1 \leq i < j \leq n$, we say T_1 and T_2 are **equivalent**. To filter out unnecessary plans, group the d designs up to equivalency.

Input

The first line contains two integers d and n ($d \geq 1$, $n \geq 2$, $d \cdot n \leq 500\,000$), separated by a space.

From the second line, the descriptions for the d designs are given. Each design is described over $n - 1$ lines, each line consisting of three integers a , b and c ($1 \leq a, b \leq n$, $a \neq b$, $1 \leq c \leq 10^9$), indicating there is a pipe connecting buildings a and b directly, whose durability is equal to c .

Output

Output d integers in a line. For $1 \leq i \leq d$, the i -th number should be the minimum index j , where the j -th network in the input is equivalent to the i -th network in the input.

Examples

standard input	standard output
3 3 1 2 1 1 3 1 1 2 1 2 3 1 1 2 1 2 3 2	1 1 3
3 4 1 2 2 2 3 1 3 4 2 1 3 2 2 4 2 2 3 1 1 2 2 1 3 1 3 4 2	1 2 1