

Problem I. A Possible Tree

Alice knows that Bob has a secret tree (in terms of graph theory) with n nodes with $n - 1$ weighted edges with integer values in $[0, 2^{60} - 1]$. She knows its structure but does not know the specific information about edge weights.

Thanks to the awakening of Bob's conscience, Alice gets m conclusions related to his tree. Each conclusion provides three integers u, v and val saying that the exclusive OR (XOR) sum of edge weights in the unique shortest path between u and v is equal to val .

Some conclusions provided might be wrong and Alice wants to find the maximum number W such that the first W given conclusions are compatible. That is say that at least one allocation of edge weights satisfies the first W conclusions all together but no way satisfies all the first $W + 1$ conclusions (or there are only W conclusions provided in total).

Help Alice find the exact value of W .

Input

The input has several test cases and the first line contains an integer t ($1 \leq t \leq 30$) which is the number of test cases.

For each case, the first line contains two integers n ($1 \leq n \leq 100000$) and c ($1 \leq c \leq 100000$) which are the number of nodes in the tree and the number of conclusions provided. Each of the following $n - 1$ lines contains two integers u and v ($1 \leq u, v \leq n$) indicating an edge in the tree between the u -th node and the v -th node. Each of the following c lines provides a conclusion with three integers u, v and val where $1 \leq u, v \leq n$ and $val \in [0, 2^{60} - 1]$.

Output

For each test case, output the integer W in a single line.

Example

standard input	standard output
2	3
7 5	4
1 2	
2 3	
3 4	
4 5	
5 6	
6 7	
1 3 1	
3 5 0	
5 7 1	
1 7 1	
2 3 2	
7 5	
1 2	
1 3	
1 4	
3 5	
3 6	
3 7	
2 6 6	
4 7 7	
6 7 3	
5 4 5	
2 5 6	