



HOME TOP CATALOG CONTESTS GYM PROBLEMSET GROUPS RATING EDU API CALENDAR HELP RAYAN

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

E. Control of Randomness

time limit per test: 2 seconds memory limit per test: 256 megabytes

You are given a tree with n vertices.

Let's place a robot in some vertex $v \neq 1$, and suppose we initially have p coins. Consider the following process, where in the i-th step (starting from i = 1):

- If i is odd, the robot moves to an adjacent vertex in the direction of vertex 1;
- Else, i is even. You can either pay one coin (if there are some left) and then the robot moves
 to an adjacent vertex in the direction of vertex 1, or not pay, and then the robot moves to an
 adjacent vertex chosen uniformly at random.

The process stops as soon as the robot reaches vertex 1. Let f(v,p) be the minimum possible expected number of steps in the process above if we spend our coins optimally.

Answer q queries, in the i-th of which you have to find the value of $f(v_i, p_i)$, modulo* $998\,244\,353$.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^3$). The description of the test cases follows.

The first line of each test case contains two integers n and q ($2 \le n \le 2 \cdot 10^3$); $1 \le q \le 2 \cdot 10^3$) — the number of vertices in the tree and the number of queries.

The next n-1 lines contain the edges of the tree, one edge per line. The i-th line contains two integers u_i and v_i ($1 \le u_i, v_i \le n$; $u_i \ne v_i$), denoting the edge between the nodes u_i and v_i .

The next q lines contain two integers v_i and p_i ($2 \le v_i \le n$; $0 \le p_i \le n$).

It's guaranteed that the given edges form a tree.

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^3$.

It is guaranteed that the sum of q over all test cases does not exceed $2 \cdot 10^3$.

Output

For each test case, print q integers: the values of $f(v_i, p_i)$ modulo $998\ 244\ 353$.

Formally, let $M=998\,244\,353$. It can be shown that the answer can be expressed as an irreducible fraction $\frac{p}{q}$, where p and q are integers and $q\not\equiv 0\pmod M$. Output the integer equal to $p\cdot q^{-1}\mod M$. In other words, output such an integer x that $0\le x< M$ and $x\cdot q\equiv p\pmod M$.

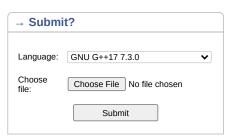
Example

input	Сору
2	
4 4	
1 2	
2 3	
2 4	
2 0	

Codeforces Round 992 (Div. 2) Finished Practice







→ Contest materials	
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^{*} Formally, let $M=998\,244\,353$. It can be shown that the answer can be expressed as an irreducible fraction $\frac{p}{q}$ where p and q are integers and $q\not\equiv 0\pmod M$. Output the integer equal to $p\cdot q^{-1}\mod M$. In other words, output such an integer x that $0\le x< M$ and $x\cdot q\equiv p\pmod M$.