The Agency

Time limit for each test: 1000 miliseconds
Memory limit: 32 megabytes

An intelligence service has n agents, numbered 1 through n. Its hierarchy structure is like a rooted tree. Agent 1 is the root of the tree and the boss.

Sometimes, stubborn reporters go to an agent and try to pry information out of him. To keep the information confidential, it is best at times to give out false information. However, if agents always tell lies, then some information can be extracted from their words. So, they need to be truthful at times, while sometimes changing the truth.

The procedure is that whenever an agent sneezes, his behavior and that of all his subordinates changes. Note that one's subordinate's subordinate is still considered his subordinate. Changing the behavior means that if he told lies upto now, he will be telling the truth from now on, and vice versa. All agents are truthful at the beginning.

A diligent reporter has been able to gather all the information regarding the agents' sneezes. Help her find out which pieces of information are correct and which are false.

Problem

Write a program that

- Reads the hierarchical structure, recording of the agents' sneezes and the given information from the *Standard Input*.

- Finds out about the reliability of each piece of information given.

- Writes the result (each piece being correct or not) to the *Standard Output*.

Input Sepcification

The first line of input contains two integers n (number of agents) and m (number of sneezes and queries).

The next n lines describe the hierarchical structure. The ith from these lines, starts with the number of direct subordinates of the ith and continues with their ID's. These integers are separated by whitespace. On each of the next m lines, there are two integers a and b separated with a single space. If $a = 0$, it means that agent b has sneezed. The case $a = 1$, on the other hand, means that some information has been received through agent b.

Output Specification

Write in the ith line of output the result for the ith query in the input (i.e. the ith line with $a = 1$). If the information given out is wrong, write 1; otherwise, output 0. Note that there should be no whitespace in the output.

Restrictions

$1 \le n, m \le 100,000$.

Example

Standard Input	Standard Output
5 7	0
1 2	1
2 5 4	1
0	
0	
1 3	
1 4	
0 2	
0 4	
1 5	
0 1	
0 3	
1 3	