Problem F. Planar graph connectivity

Input file:	`stdin`
Output file:	`stdout`
Time limit:	2 seconds
Memory limit:	512 megabytes

bobo has a connected planar graph with n vertices.

He subsequently presents q questions of the following 2 types:

- *-* a_i b_i - Remove the edge between vertices a_i and b_i, and ask for the number of connected components.
- *?* a_i b_i - Ask if vertices a_i and b_i are connected.

Answer his questions.

Input

The first line contains 2 integers n, q $(1 \le n \le 100000, 1 \le q \le 200000)$.

Vertices are numbered by $1, 2, \ldots, n$ for convenience.

Each of the following n lines starts with an integer k_i which denotes the number of neighbors of vertex i, followed by k_i integers $v_{i,1}, v_{i,2}, \ldots, v_{i,k_i}$ which denote the neighbors, ordered in clockwise direction $(0 \le k_i \le n-1, 1 \le v_{i,j} \le n)$.

The following q lines denote the questions.

Note that the numbers (in the questions) are encoded. If the answer of the last question is last, then number x appears as $x \oplus \text{last}$. (Assume $\text{last} = 0$ at the beginning. "$\oplus$" denotes bitwise exclusive-or.)

Output

For the first type of questions, a single integer denotes the number of components.

For the second type of questions, "1" for connected and "0" for disconnected.

Sample input and output

stdin	stdout
4 3 3 2 3 4 2 1 4 1 1 2 1 2 - 1 2 - 0 2 ? 3 1	1 2 0