B 2 Sat

Time limit: 1.0s
Memory limit: 256MB

You are given a boolean formula in conjunctive normal form (CNF) where each clause has exactly two literals (a literal is a variable or its negation). Determine whether the formula is satisfiable, and if it is, produce one satisfying assignment.

Input

The first line contains an integer T, the number of test cases. Each test case describes a 2-CNF formula with variables $1..n$:

- A line with two integers n and m, the number of variables and clauses.
- The next m lines each contain two integers a and b, representing the clause $(a \vee b)$.

Each literal is encoded as an integer in $[-n, n]$ excluding 0:

- x means variable x is true.
- $-x$ means variable x is false.

- $1 \leq T \leq 1000$
- $1 \leq n \leq 1e5$
- $1 \leq m \leq 1e5$
- Sum of n over all test cases $\leq 1e5$
- Sum of m over all test cases $\leq 1e5$
- Each literal value a and b is an integer in $[-n, n]$ excluding 0.

Output

For each test case:

- If the formula is unsatisfiable, output `IMPOSSIBLE`.
- Otherwise, output one line with n integers. The i-th integer is 1 if variable i is true and 0 if it is false.

Samples

Sample input 1	Sample output 1
2 3 3 1 -2 -1 3 2 -3 2 2 1 2 -1 2	0 0 0 0 1

Sample input 2	Sample output 2
1 1 2 1 1 -1 -1	IMPOSSIBLE

Notes

Scoring

- 10%: sample tests.
- 30%: $n \leq 20, m \leq 40$.
- 30%: $n, m \leq 10^3$.
- 30%: $n, m \leq 10^5$.