Katu Puzzle

Time Limit: 1000MS **Memory Limit:** 65536K
Total Submissions: 11212 **Accepted:** 4157

Description

Katu Puzzle is presented as a directed graph $G(V, E)$ with each edge $e(a, b)$ labeled by a boolean operator op (one of AND, OR, XOR) and an integer c ($0 \le c \le 1$). One Katu is solvable if one can find each vertex V_i a value X_i ($0 \le X_i \le 1$) such that for each edge $e(a, b)$ labeled by op and c, the following formula holds:

$$X_a \ op \ X_b = c$$

The calculating rules are:

AND	0	1
0	0	0
1	0	1

OR	0	1
0	0	1
1	1	1

XOR	0	1
0	0	1
1	1	0

Given a Katu Puzzle, your task is to determine whether it is solvable.

Input

The first line contains two integers N ($1 \le N \le 1000$) and M,($0 \le M \le 1{,}000{,}000$) indicating the number of vertices and edges.
The following M lines contain three integers a ($0 \le a < N$), b($0 \le b < N$), c and an operator op each, describing the edges.

Output

Output a line containing "YES" or "NO".

Sample Input

```
4 4
0 1 1 AND
1 2 1 OR
3 2 0 AND
3 0 0 XOR
```

Sample Output

```
YES
```

Hint

$X_0 = 1, X_1 = 1, X_2 = 0, X_3 = 1$.

Source

POJ Founder Monthly Contest – 2008.07.27, Dagger

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