Linear Programming

Time Limit: 1 Second
Memory Limit: 2048 MB

Linear programming (LP) is a classic algorithm that can solve a wide range of problems. A standard form of an LP problem is as follows:

$$\begin{aligned} &\max_{\vec{x}} \vec{c} \cdot \vec{x} \\ s.t. \quad & A\vec{x} \le \vec{b} \\ & \vec{x} \le \vec{0} \end{aligned}$$

where $\vec{c}$ is the objective vector, A is the constraint matrix, and $\vec{b}$ is the offset vector. LP problems can be solved with simplex algorithm (take CS 473 if you want to learn more about it!) in exponential time. However, with proper constraints, LP problems can be solved in polynomial time.

You are asked to solve a constrained LP problem using what you have learned in this class. In specific, each row of A contains exactly two non-zero entries, one is 1 and the other is -1. To make things a little bit easier for you, you only need to answer if the given LP has a solution.

Hint: Linear programming can be used to solve single source shortest path problem.

Input

The first line of input contains two integers n and m ($1 \le n, m \le 5000$) - number of variables and number of constraints.

The next m lines describe the constraints. Each line is in the following format:

`x`i `-` `x`j `<=` b

where $1 \le i, j \le n$, $i \ne j$, $|b| \le 10^4$.

Output

Output `YES` if there exists a solution to the following constrained LP problem:

$$\begin{aligned} &\max_{x} x \\ s.t. \quad & x_{i_k} - x_{j_k} \le b_k \quad \forall k \in [1, m] \\ & x_i \le 0 \quad \forall i \end{aligned}$$

Sample Inputs

```
3 4
x2 - x1 <= -2
x3 - x1 <= 3
x1 - x2 <= -5
x2 - x3 <= 0
```

Sample Outputs

```
NO
```