CODEFORCES
Sponsored by **TON**

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PROBLEMS   SUBMIT CODE   MY SUBMISSIONS   STATUS   HACKS   ROOM   STANDINGS   CUSTOM INVOCATION

C. Strictly Positive Matrix

time limit per test: 1 second
memory limit per test: 256 megabytes

You have matrix a of size $n \times n$. Let's number the rows of the matrix from 1 to n from top to bottom, let's number the columns from 1 to n from left to right. Let's use a_{ij} to represent the element on the intersection of the i-th row and the j-th column.

Matrix a meets the following two conditions:

- for any numbers i, j ($1 \leq i, j \leq n$) the following inequality holds: $a_{ij} \geq 0$;
- $\sum_{i=1}^{n} a_{ii} > 0$.

Matrix b is *strictly positive*, if for any numbers i, j ($1 \leq i, j \leq n$) the inequality $b_{ij} > 0$ holds. You task is to determine if there is such integer $k \geq 1$, that matrix a^k is strictly positive.

Input

The first line contains integer n ($2 \leq n \leq 2000$) — the number of rows and columns in matrix a.

The next n lines contain the description of the rows of matrix a. The i-th line contains n non-negative integers $a_{i1}, a_{i2}, ..., a_{in}$ ($0 \leq a_{ij} \leq 50$). It is guaranteed that $\sum_{i=1}^{n} a_{ii} > 0$.
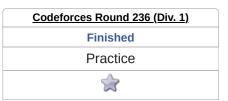
Output

If there is a positive integer $k \geq 1$, such that matrix a^k is strictly positive, print "YES" (without the quotes). Otherwise, print "NO" (without the quotes).

Examples

input	Copy

```
2
1 0
0 1
```

output	Copy

```
NO
```

input	Copy

```
5
4 5 6 1 2
1 2 3 4 5
6 4 1 2 4
1 1 1 1 1
4 4 4 4 4
```

output	Copy

```
YES
```

Codeforces Round 236 (Div. 1)

Finished

Practice

⭐

→ Virtual participation ⌄

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest]

→ Clone Contest to Mashup ⌄

You can clone this contest to a mashup.

[Clone Contest]

→ Submit?

Language: GNU G++17 7.3.0 ⌄

Choose file: [Choose File] No file chosen

[Submit]

→ Contest materials

- Codeforces Round #236   ✕
- Tutorial   ✕