IOI Training Camp 2013 – Online Test 1, 13–14 April, 2013

Sorted vectors

Vectors are sequences of M integers, where M is a fixed integer. For two vectors A and B, we define the ordering $A \leq B$ if for each coordinate i, at least one of three following conditions hold:

1. $A[i] \leq B[i]$
2. $A[i] = -1$
3. $B[i] = -1$

For example, if $M = 3$, $(1, 2, 3) \leq (2, 2, 4)$, and $(1, -1, 3) \leq (1, 0, -1)$. But it is not true that $(1, 2, 3) \leq (1, -1, 2)$.

Given N vectors, numbered from 1 to N, find if they can be sorted according to the ordering $\leq$. If it is not possible to sort them, output `NO`. Otherwise, output `YES` and the lexicographically smallest sorted ordering of the N vectors.

Input format

- Line 1 contains two space-separated integers, N and M.
- The following N lines each contain M space-separated integers. Each line describes one vector.

Output format

If the vectors cannot be sorted, output `NO` in a single line. Otherwise, output two lines. The first line should contain `YES`. The second line should contain a permutation of $\{1, 2, \ldots, N\}$ as a space-separated list of integers in a single line, corresponding to the lexicographically smallest sorted ordering.

Test data

In all the subtasks N, M are positive integers. Coordinates are either -1, or are non-negative integers no greater than 10^9.

- Subtask 1 (50 marks) : $N \leq 300$ and $M \leq 300$.
- Subtask 2 (50 marks) : $N \cdot M \leq 500,000$.

Sample input 1

```
3 3
1 -1 -1
1 2 1
2 -1 1
```

Sample output 1

```
YES
1 2 3
```

Sample input 2

```
2 3
1 2 3
3 2 1
```

Sample output 2

```
NO
```

Limits

- *Memory limit* : 128 MB
- *Time limit* : 4s