Exchange

Time limit: 1 sec

A general money exchanger is a place that one could bring in money in one currency and exchange it to another currency. There are **N** different currencies, numbered 0 to **N**-1. An exchanger provides a 2D table **R** such that **R[a][b]** indicates the amount of currency **b** that the exchanger will give for one unit of currency **a**. It is possible that **R[a][b]** might not be the reciprocal of **R[b][a]**, i.e., it is possible that R[a][b] ≠ 1/R[b][a].

Sometime, the exchanger made a mistake in calculation, allowing a customer with some amount of currency X to convert the whole amount to currency Y and then convert again to another currency Z and so on. After some exchange, the customer converts the money back to the original currency X and then he ends up with more money than he originally has. This allow us to generate infinite money.

This is possible for some value of table R. For example, let us assume that R[1][2] = 0.7 (indicating that, for one unit of currency 1, the exchanger will give 0.7 unit of currency 2), R[2][3] = 2 and R[3][1] = 0.75. If we start with 1 unit of currency 1 and convert to 2 and to 3 and then back to 1, we will end up with 1.05 unit of currency 1.

You want to detect if for a given table **R**, such infinity exchange is possible.

Input

There are multiple table R that we need to check. The first line contains an integer **K** (1 < K ≤ 20) that indicates the number of exchange rate tables. Each table are given using the following format.

- The first line contains the number of currency **N** (1 ≤ N ≤ 500).

- The next **N** lines give the table **R**. Each line has **N** real numbers. The **i**-th numbers in the **j**-th line of these **N** lines gives the value of **R[i][j]**.

Output

The output must have exactly **K** lines; each line must contain either the word "YES" or "NO" indicating whether we can make infinite profit from the corresponding table in the input.

Example

Input	Output
2 3 1 0.7 1.2 1.1 1 2 0.75 0.7 1 2 1 0.7 1.2 1	YES NO