Matrix Classification

Given an $n \times n$

square matrix M

, figure out if the matrix is

- symmetric matrix, i.e. the matrix is equal to it's transpose
- triangular matrix, i.e. either all elements in the lower triangle are 0 or all elements in the upper triangle are 0 (excluding the main diagonal)
- diagonal matrix, i.e. all non-zero elements lie on the main diagonal

Let $s = 1$

if the matrix is symmetric and 0

otherwise

Let $t = 1$

if the matrix is triangular and 0

otherwise

Let $d = 1$

if the matrix is diagonal and 0

otherwise

Find $s + 2t + 4d$

Input

First line contains a single integer T

, the number of testcases.

First line of each testcase contains a single integer n

the number of rows and columns of the matrix M

.

Next n

lines, each contain n

space separated integers, the elements of the matrix.

The jth

integer in the ith row is the value of the element Mij

.

Output

For each testcase print a single integer, the value of $s+2t+4d$

as defined in the problem statement