Problem A: Beautiful Triangles

Filename: `triangles`
Time limit: `5 seconds`

When exploring the vast field of mathematics, you eventually encounter Pascal's triangle – a device that can be used to determine binomial coefficients. The key detail with Pascal's triangle is that each element in Pascal's triangle is the exact sum of the two "parent" elements in the row directly above it (notice that a child and its two parent elements form a sub-triangle of sorts).

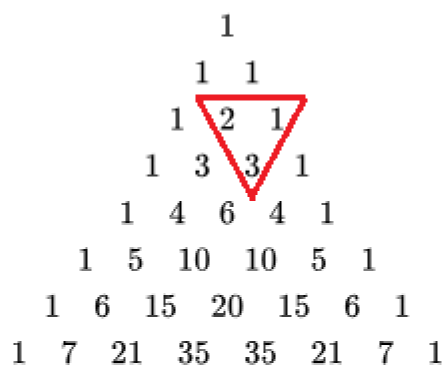

Figure 1. Pascal's triangle. Note the 3 numbers surrounded by the red inverted triangle follow the rule of Pascal's triangle, since 2 + 1 = 3.

This piques your interest and you research it a little more, eventually classifying it as a "beautiful triangle" because each inverted subtriangle of 3 elements follows a common rule. You then start creating your own triangles and want to classify some as beautiful, but want to be selective in this process. Therefore, you redefine what it means for a triangle to be beautiful to the following:

1. Each element in the triangle must be either 1, 2, or 3.
2. The sum of all elements in each subtriangle of 3 elements must be divisible by 3.
3. Each and every possible subtriangle containing 3 elements (whether inverted or not) must follow rule 1.

As you finish redefining what a "beautiful triangle" is, you realize you have several unfinished triangles that you were in the midst of constructing, with some spots in the triangle being left empty instead of having a number there. You want to determine how many different beautiful triangles can be constructed from each of your sketches. Two triangles **a** and **b** are different if there exists a row i and column j such that $\mathbf{a}_{i,j} \neq \mathbf{b}_{i,j}$.

Problem

From your sketches of unfinished triangles, determine how many possible beautiful triangles you can create from each of them as per your new definition.

Input

The first line of input contains one integer **c**, representing the number of sketches of unfinished triangles you are considering.

The first line of each test case contains 1 integer: **n**, representing the number of rows the triangle has.

There will be **n** lines that follow, the i^{th} of which contains **i** integers (1 ≤ **i** ≤ n). The j^{th} integer in the i^{th} row (1 ≤ **j** ≤ **i**) is $a_{i,j}$, which represents the j^{th} integer in the i^{th} row of the triangle. Each $a_{i,j}$ takes on 4 values: 0 if the element is missing, and either $1, 2,$ or 3 otherwise, indicating the element's value.

Output

For each test case, print one integer on its own line, representing the number of different beautiful triangles that can be formed from the given sketch.

Input Bounds and Corresponding Credit

100 Points
• 1 ≤ **c** ≤ 30 • 1 ≤ **n** ≤ 100 • 0 ≤ $\mathbf{a_{i,j}}$ ≤ 3

Samples

Input	**Output**
3 3 1 0 2 0 0 3 3 1 0 1 0 2 3 3 1 0 0 0 1 0	1 0 3