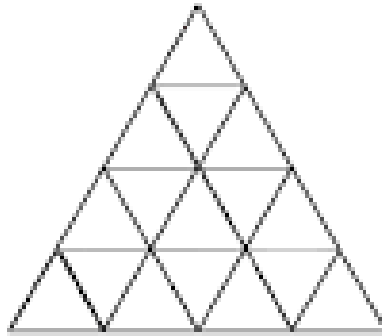

Meow Christmas Tree

Input file: standard input
Output file: standard output
Time limit: 4 seconds
Memory limit: 512 megabytes

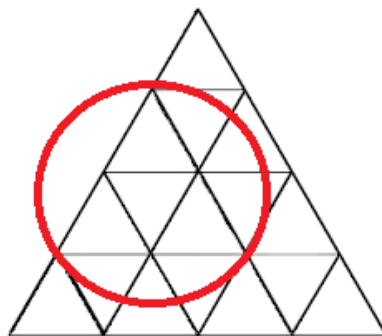
Meow is celebrating Christmas. Naturally, there's a large Christmas Tree in his house. In fact, the Christmas Tree is different from what we usually see. A Christmas Tree of size n consists of n "rows" where row i has $2i - 1$ equilateral triangles. You can see how it looks like from the photo below (which shows a Christmas Tree of size 4) :



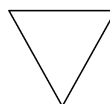
You can check that there are a total of n^2 small triangles in a Christmas Tree of size n . Now, Meow painted each small triangle with either black or white color. Now, he has a black and white Christmas Tree!

Now, Meow wonders: For each i , how many small Christmas Trees of size i are there in the painted Christmas Tree has its interior entirely covered with black color and also how many small Christmas Trees of size i are there in the painted Christmas Tree has its interior entirely covered with white color. Can you answer his question?

The figure below shows one of the Christmas Trees of size 2 in a Christmas Tree of size 4.



Note that the following is **not** a Christmas Tree. (and similarly larger versions of this) An inverted Christmas Tree doesn't count.



Input

The first line of input contains a single integer, n ($1 \leq n \leq 3000$). The next n lines each contain a string. The i -th line contains a string of length $2i - 1$, denoting the colors of the small triangles in the i -th row. The number 1 denotes the white color and the number 0 denotes black.

Output

Output two lines. Each line contains n space-separated integers. The i -th integer of the first line should denote the number of Christmas Trees of size i which is completely painted by black. The i -th integer of the second line should denote the number of Christmas Trees of size i which is completely painted by white.

Examples

standard input	standard output
4 1 111 11111 1011101	0 0 0 0 10 4 1 0
3 1 000 00111	3 0 0 3 0 0
5 1 011 00111 0000111 000001111	7 3 1 0 0 8 3 0 0 0