Problem B. Binary Matrix

Input file:	`matrix.in`
Output file:	`matrix.out`
Time limit:	4 seconds
Memory limit:	256 megabytes
Grading system:	only full solution for subtask receives points

Instead of a fairy tail about a king and his two sons, who try to share their father's inheritance, you are just given $N \times N$ binary matrix, i.e. matrix which consists of values 0 and 1. You have to find a number of ordered pairs of sub-matrices, that satisfy the following conditions:

- Both sub-matrices should contain only values 1 (one).

- The sub-matrices in the pair shouldn't intersect, i.e. they can not have a common cell.

Input

The first line of the input contains an integer number N ($1 \leq N \leq 4000$).

Each of next N lines contains N integers 0 or 1 without blanks.

Output

Print a number of pair sub-matrices by modulo $1\,000\,000\,007$.

Examples

matrix.in	matrix.out
3 110 000 001	8

Scoring

This problem has five subtasks:

1. $1 \leq N \leq 10$. This subtask costs 18 points.

2. $1 \leq N \leq 50$. This subtask costs 20 points.

3. $1 \leq N \leq 125$. This subtask costs 19 points.

4. $1 \leq N \leq 750$. This subtask costs 20 points.

5. $1 \leq N \leq 4\,000$. This subtask costs 23 points.

Each of the next subtasks will be scored in case of all the previous subtasks are successfully passed.