

Problem D

Identifying Normal Samples

Time limit: 5 seconds

Ben is analyzing a collection of n tumor samples $S_1, S_2, \dots, S_n$. Each tumor sample is represented by a set of mutations. All samples are nonempty and distinct. Ben suspects that some of the samples are corrupted. Based on his knowledge in biology, Ben believes that some of the samples, called *normal samples*, are more reliable and worth further investigation. Let us say that a pair of two distinct samples (S_i, S_j) is a *conflicting pair* if $S_i \not\subset S_j$ and $S_j \not\subset S_i$ (i.e., neither of them is a subset of the other). A sample S_k is *normal* if there does not exist any conflicting pair (S_i, S_j) such that $S_k \subset S_i$ and $S_k \subset S_j$. For example, let $n = 6, S_1 = \{a, b, c\}, S_2 = \{a, b, d\}, S_3 = \{b, c\}, S_4 = \{c\}, S_5 = \{a, b\}$, and $S_6 = \{a\}$. The sample S_4 is contained in S_1 and S_3 . Since (S_1, S_3) is not a conflicting pair, S_4 is normal. The sample S_6 is contained in S_1, S_2 , and S_5 . Since (S_1, S_2) is a conflicting pair, S_6 is not normal. Similarly, the set S_5 is not normal because it is contained in S_1 and S_2 and (S_1, S_2) is a conflicting pair. Ben wants to find all normal samples. Please write a program to help him.

In this problem, the input is an $n \times n$ matrix M which represents the relations between any two samples. More specifically, for $1 \leq i \neq j \leq n$, $M_{i,j} = 1$ if $S_i \subset S_j$, $M_{i,j} = 2$ if $S_i \supset S_j$, and $M_{i,j} = 3$ if (S_i, S_j) is a conflicting pair. For $1 \leq i \leq n$, $M_{i,i} = 0$. For the example mentioned above, the matrix M is illustrated as follows.

	S_1	S_2	S_3	S_4	S_5	S_6
S_1	0	3	2	2	2	2
S_2	3	0	3	3	2	2
S_3	1	3	0	2	3	3
S_4	1	3	1	0	3	3
S_5	1	1	3	3	0	2
S_6	1	1	3	3	1	0

Technical Specification

1. $1 \leq n \leq 4000$.
2. M is consistent with a set of distinct nonempty samples $S_1, S_2, \dots, S_n$.

Input File Format

The first line of the input file contains an integer indicating the number of test cases. Each test case begins with a line containing an integer n . Each of the next n lines gives a row of M : the j^{th} character of the i^{th} line represents the entry $M_{i,j}$.

Output Format

For each test case, print a line containing the number of normal samples.

Sample Input

```
3
6
032222
303322
130233
131033
113302
113310
7
0223322
1021133
1101133
3220133
3222033
1333303
1333330
1
0
```

Output for the Sample Input

```
4
5
1
```