O - Matching

Time Limit: 2 sec / Memory Limit: 1024 MB

Score : 100 points

Problem Statement

There are N men and N women, both numbered $1, 2, \ldots, \mathrm{N}$.

For each i, j $(1 \leq \mathrm{i}, \mathrm{j} \leq \mathrm{N})$, the compatibility of Man i and Woman j is given as an integer $\mathrm{a_{i,j}}$. If $\mathrm{a_{i,j}} = 1$, Man i and Woman j are compatible; if $\mathrm{a_{i,j}} = 0$, they are not.

Taro is trying to make N pairs, each consisting of a man and a woman who are compatible. Here, each man and each woman must belong to exactly one pair.

Find the number of ways in which Taro can make N pairs, modulo $10^9 + 7$.

Constraints

- All values in input are integers.
- $1 \leq \mathrm{N} \leq 21$
- $\mathrm{a_{i,j}}$ is 0 or 1.

Input

Input is given from Standard Input in the following format:

$$
\begin{array}{l}
\mathrm{N} \\
\mathrm{a_{1,1}} \quad \ldots \quad \mathrm{a_{1,N}} \\
: \\
\mathrm{a_{N,1}} \quad \ldots \quad \mathrm{a_{N,N}}
\end{array}
$$

Output

Print the number of ways in which Taro can make N pairs, modulo $10^9 + 7$.

Sample Input 1 Copy

Copy

```
3
0 1 1
1 0 1
1 1 1
```

Sample Output 1 Copy

```
3
```

Copy

There are three ways to make pairs, as follows ((i, j) denotes a pair of Man i and Woman j):

- $(1, 2), (2, 1), (3, 3)$
- $(1, 2), (2, 3), (3, 1)$
- $(1, 3), (2, 1), (3, 2)$

Sample Input 2 Copy

```
4
0 1 0 0
0 0 0 1
1 0 0 0
0 0 1 0
```

Copy

Sample Output 2 Copy

```
1
```

Copy

There is one way to make pairs, as follows:

- $(1, 2), (2, 4), (3, 1), (4, 3)$

Sample Input 3 Copy

```
1
0
```

Copy

Sample Output 3 Copy

```
0
```

Copy

Sample Input 4

Copy

```
21
0 0 0 0 0 0 0 1 1 0 1 1 1 1 0 0 0 1 0 0 1
1 1 1 0 0 1 0 0 0 1 0 0 0 0 1 1 1 0 1 1 0
0 0 1 1 1 1 0 1 1 0 0 1 0 0 1 1 0 0 0 1 1
0 1 1 0 1 1 0 1 0 1 0 0 1 0 0 0 0 0 1 1 0
1 1 0 0 1 0 1 0 0 1 1 1 1 0 0 0 0 0 0 0 0
0 1 1 0 1 1 1 0 1 1 1 0 0 0 1 1 1 1 0 0 1
0 1 0 0 0 1 0 1 0 0 0 1 1 1 0 0 1 1 0 1 0
0 0 0 0 1 1 0 0 1 1 0 0 0 0 0 0 1 1 1 1 1
0 0 1 0 0 1 0 0 1 0 1 1 0 0 1 0 1 0 1 1 1
0 0 0 0 1 1 0 0 1 1 1 0 0 0 0 1 1 0 0 0 1
0 1 1 0 1 1 0 0 1 1 0 0 0 1 1 1 1 0 1 1 0
0 0 1 0 0 1 1 1 1 0 1 1 0 1 1 1 0 0 0 0 1
0 1 1 0 0 1 1 1 1 0 0 0 1 0 1 1 0 1 0 1 1
1 1 1 1 1 0 0 0 0 1 0 0 1 1 0 1 1 1 0 0 1
0 0 0 1 1 0 1 1 1 1 0 0 0 0 0 0 1 1 1 1 1
1 0 1 1 0 1 0 1 0 0 1 0 0 1 1 0 1 0 1 1 0
0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 1 1 0 0 1
0 0 0 1 0 0 1 1 0 1 0 1 0 1 1 0 0 1 1 0 1
0 0 0 0 1 1 1 0 1 0 1 1 1 0 1 1 0 0 1 1 0
1 1 0 1 1 0 0 1 1 0 1 1 0 1 1 1 1 1 0 1 0
1 0 0 1 1 0 1 1 1 1 1 0 1 0 1 1 0 0 0 0 0
```

Sample Output 4

Copy

```
102515160
```

Be sure to print the number modulo $10^9 + 7$.