Educational DP Contest AtCoder O - Matching

Time limit: 1.4s **Memory limit:** 1G

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

For each i, j $(1 \leq i, j \leq N)$, the compatibility of Man i and Woman j is given as an integer $a_{i,j}$. If $a_{i,j} = 1$, Man i and Woman j are compatible; if $a_{i,j} = 0$, 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.
- $1 \leq N \leq 21$
- $a_{i,j}$ is 0 or 1.

Input Specification

The first line will contain the integer N.

The next N lines will each contain N integers, $a_{i,j}$.

Output Specification

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

Sample Input 1

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

Sample Output 1

```
3
```

Explanation For Sample 1

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

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

Sample Output 2

```
1
```

Explanation For Sample 2

There is one way to make pairs, as follows:

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

Sample Input 3

```
1
0
```

Sample Output 3

```
0
```

Sample Input 4

```
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 1 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

```
102515160
```

Explanation For Sample 4

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