R - Walk

Time Limit: 2 sec / Memory Limit: 1024 MB

Score : 100 points

Problem Statement

There is a simple directed graph G with N vertices, numbered $1, 2, \ldots, N$.

For each i and j $(1 \leq i, j \leq N)$, you are given an integer $a_{i,j}$ that represents whether there is a directed edge from Vertex i to j. If $a_{i,j} = 1$, there is a directed edge from Vertex i to j; if $a_{i,j} = 0$, there is not.

Find the number of different directed paths of length K in G, modulo $10^9 + 7$. We will also count a path that traverses the same edge multiple times.

Constraints

- All values in input are integers.
- $1 \leq N \leq 50$
- $1 \leq K \leq 10^{18}$
- $a_{i,j}$ is 0 or 1.
- $a_{i,i} = 0$

Input

Input is given from Standard Input in the following format:

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

Output

Print the number of different directed paths of length K in G, modulo $10^9 + 7$.

Sample Input 1 Copy

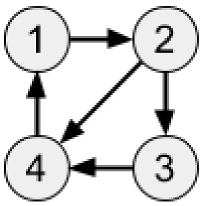
Copy

```
4 2
0 1 0 0
0 0 1 1
0 0 0 1
1 0 0 0
```

Sample Output 1 Copy

```
6
```

G is drawn in the figure below:



There are six directed paths of length 2:

- $1 \to 2 \to 3$
- $1 \to 2 \to 4$
- $2 \to 3 \to 4$
- $2 \to 4 \to 1$
- $3 \to 4 \to 1$
- $4 \to 1 \to 2$

Sample Input 2 Copy

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

Sample Output 2 Copy

```
3
```

G is drawn in the figure below:

There are three directed paths of length 3:

- $1 \to 2 \to 1 \to 2$
- $2 \to 1 \to 2 \to 1$
- $2 \to 1 \to 2 \to 3$

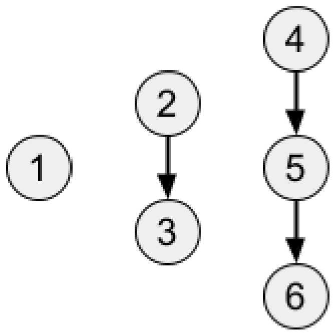
Sample Input 3 Copy

```
6 2
0 0 0 0 0 0
0 0 1 0 0 0
0 0 0 0 0 0
0 0 0 0 1 0
0 0 0 0 0 1
0 0 0 0 0 0
```

Sample Output 3 Copy

```
1
```

G is drawn in the figure below:



There is one directed path of length 2:

- $4 \to 5 \to 6$

Sample Input 4 Copy

```
1 1
0
```

Sample Output 4 Copy

```
0
```

Sample Input 5 Copy

```
10 1000000000000000000
0 0 1 1 0 0 0 1 1 0
0 0 0 0 0 1 1 1 0 0
0 1 0 0 0 1 0 1 0 1
1 1 1 0 1 1 0 1 1 0
0 1 1 1 0 1 0 1 1 1
0 0 0 1 0 0 1 0 1 0
0 0 0 1 1 0 0 1 0 1
1 0 0 0 1 0 1 0 0 0
0 0 0 0 0 1 0 0 0 0
1 0 1 1 1 0 1 1 1 0
```

Sample Output 5 Copy

```
957538352
```

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