Yet Another Contest 2 P5 - Mirror Maze

Time limit: 2.0s **Memory limit:** 512M
Java: 3.0s
Python: 4.0s

Josh is trapped inside a mirror maze!

The maze consists of N small rooms connected by mirrored hallways, such that there is exactly one bidirectional mirrored hallway between any two rooms. This maze is weird - hallways are not flat and can tunnel underneath each other as to not intersect each other, and there is no exit!

The hallway connecting the i-th and j-th room is associated with a value $d_{i,j}$, representing the dizziness of the mirrors in that hallway. When Josh passes through a hallway, his dizziness will become the bitwise OR of his previous dizziness and the dizziness of that hallway.

Initially, Josh begins with a dizziness of 0, and starts in an unknown room. He will traverse exactly L hallways. Unfortunately, Josh's poor memory and poor sense of orientation results in him being unable to differentiate between the hallways coming out from a room - he can't even remember the hallway he just came from! Therefore, for each of the L hallways that Josh traverses, he will pick a hallway uniformly at random out of the hallways connected to his current room, and then traverse that hallway.

For each possible starting room, help Josh find the **expected value** of his dizziness after traversing all L hallways.

Constraints

$2 \leq N \leq 50$

$1 \leq L \leq 10^9$

$0 \leq d_{i,j} \leq 10^9$

$d_{i,j} = d_{j,i}$

$d_{i,i} = 0$ for $1 \leq i \leq N$. Note that there is no hallway connecting a room to itself, and that this value is included just for easier input processing.

Subtask 1 [20%]

$2 \leq N \leq 25$

$1 \leq L \leq 50$

$0 \leq d_{i,j} \leq 50$

Subtask 2 [60%]

$2 \leq N \leq 25$

Subtask 3 [20%]

No additional constraints.

Input Specification

The first line contains two space separated integers containing the values of N and L.

The i-th of the following N lines contains N space separated integers, $d_{i,1}, d_{i,2}, \ldots, d_{i,N}$.

Output Specification

Print a single line containing N space separated integers, with the i-th integer representing the expected value of Josh's final dizziness if he was to start in the i-th room. It can be shown that this expected value can be expressed in the form $\frac{P}{Q}$, where P and Q are integers with no common divisor greater than 1. Instead of printing the expected value as a floating point number, print $PQ^{-1} \bmod 10^9 + 7$, where Q^{-1} is an integer such that $QQ^{-1} \equiv 1 \pmod{10^9 + 7}$.

Sample Input

```
3 2
0 2 4
2 0 5
4 5 0
```

Sample Output

```
500000008 500000008 500000009
```

Explanation

Consider the case where Josh starts in the 1-st room. There are four possible moves that Josh could make, with equal probability:

- Travel to the 2-nd room and then back to the 1-st room. Josh's final dizzyness is $2 \mid 2 = 2$.
- Travel to the 2-nd room and then to the 3-rd room. Josh's final dizzyness is $2 \mid 5 = 7$.
- Travel to the 3-rd room and then back to the 1-st room. Josh's final dizzyness is $4 \mid 4 = 4$.
- Travel to the 3-rd room and then to the 2-nd room. Josh's final dizzyness is $4 \mid 5 = 5$.

Here, $\mid$ denotes the bitwise OR operator.

Therefore, the expected value of Josh's final dizziness is $\frac{2+7+4+5}{4} = \frac{9}{2}$.

The answer for the first room is therefore $9 \times 2^{-1} \equiv 9 \times 500\,000\,004 \equiv 500\,000\,008 \pmod{10^9 + 7}$.