Please subscribe to the official Codeforces channel in Telegram via the link https://t.me/codeforces_official.

E. Fish

time limit per test: 3 seconds
memory limit per test: 128 megabytes

n fish, numbered from 1 to n, live in a lake. Every day right one pair of fish meet, and the probability of each other pair meeting is the same. If two fish with indexes i and j meet, the first will eat up the second with the probability a_{ij}, and the second will eat up the first with the probability $a_{ji} = 1 - a_{ij}$. The described process goes on until there are at least two fish in the lake. For each fish find out the probability that it will survive to be the last in the lake.

Input

The first line contains integer n ($1 \le n \le 18$) — the amount of fish in the lake. Then there follow n lines with n real numbers each — matrix a. a_{ij} ($0 \le a_{ij} \le 1$) — the probability that fish with index i eats up fish with index j. It's guaranteed that the main diagonal contains zeros only, and for other elements the following is true: $a_{ij} = 1 - a_{ji}$. All real numbers are given with not more than 6 characters after the decimal point.

Output

Output n space-separated real numbers accurate to not less than 6 decimal places. Number with index i should be equal to the probability that fish with index i will survive to be the last in the lake.

Examples

input Copy

```
2
0 0.5
0.5 0
```

output Copy

```
0.500000 0.500000
```

input Copy

```
5
0 1 1 1 1
0 0 0.5 0.5 0.5
0 0.5 0 0.5 0.5
0 0.5 0.5 0 0.5
0 0.5 0.5 0.5 0
```

output Copy

```
1.000000 0.000000 0.000000 0.000000 0.000000
```

→ Attention

The package for this problem was not updated by the problem writer or Codeforces administration after we've upgraded the judging servers. To adjust the time limit constraint, a solution execution time will be multiplied by 2. For example, if your solution works for 400 ms on judging servers, then the value 800 ms will be displayed and used to determine the verdict.

Codeforces Beta Round 16 (Div. 2 Only)
Finished
Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
327108154	Jul/02/2025 18:12	Accepted

→ Problem tags

bitmasks dp probabilities *1900

No tag edit access

→ Contest materials

- Announcement
- Tutorial

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The only programming contests Web 2.0 platform
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