D. Interception

Time Limit: 1 second

Points: 100

Yasmin is the administrator for a network of n computers. There are m connections in the network, each joining a different pair of distinct computers a_i and b_i and allowing messages to be sent in both directions. However, a message may be intercepted by nefarious hackers, with probability p_i.

Yasmin knows that if not for these hackers, a message could be sent from any computer to any other, at least indirectly. Help her figure out the probability that such a message is not intercepted, assuming the optimal route is taken.

Input

The first line of input consists of two integers, n and m.

m lines follow, the ith of which consists of two integers, a_i and b_i, followed by a floating-point number p_i.

Constraints

All input will satisfy the following constraints:

- $1 \leq n \leq 200$.
- $n - 1 \leq m \leq n(n-1)/2$.
- For all $1 \leq i \leq m$, $1 \leq a_i, b_i \leq n$, $a_i \neq b_i$ and $0 < p_i < 1$.

Output

Output n lines, the ith of which consists of n space-separated floating-point numbers, the jth of which is the probability that a message sent from computer i to computer j on an optimal route is received without interception.

Your answer will be considered correct if for each number in the output, its absolute or relative error does not exceed 10^{-6}. Formally, if your program outputs a number a when the official answer is b, your answer will be accepted if and only if $\dfrac{|a-b|}{\max(1,|b|)} \leq 10^{-6}$.

Subtasks

D1 (30 points): for all $1 \leq i \leq m$, $p_i = 0.1$.

D2 (70 points): no restrictions.

Sample Input 1

```
5 5
1 2 0.1
2 3 0.1
3 4 0.1
4 5 0.1
5 1 0.1
```

Sample Output 1

```
1.00 0.90 0.81 0.81 0.90
0.90 1.00 0.90 0.81 0.81
0.81 0.90 1.00 0.90 0.81
0.81 0.81 0.90 1.00 0.90
0.90 0.81 0.81 0.90 1.00
```

Sample Input 2

```
6 7
1 2 0.1
1 3 0.1
2 3 0.1
2 5 0.1
4 5 0.1
4 6 0.1
5 6 0.1
```

Sample Output 2

```
1 0.9 0.9 0.729 0.81 0.729
0.9 1 0.9 0.81 0.9 0.81
0.9 0.9 1 0.729 0.81 0.729
0.729 0.81 0.729 1 0.9 0.9
0.81 0.9 0.81 0.9 1 0.9
0.729 0.81 0.729 0.9 0.9 1
```

Sample Input 3

```
4 4
1 2 0.7
1 3 0.6
2 4 0.7
3 4 0.8
```

Sample Output 3

```
1.00 0.30 0.40 0.09
0.30 1.00 0.12 0.30
0.40 0.12 1.00 0.20
0.09 0.30 0.20 1.00
```

Sample Input 4

```
5 7
1 2 0.8
1 3 0.7
1 4 0.6
2 5 0.4
3 4 0.7
3 5 0.9
4 5 0.6
```

Sample Output 4

```
1 0.2 0.3 0.4 0.16
0.2 1 0.072 0.24 0.6
0.3 0.072 1 0.3 0.12
0.4 0.24 0.3 1 0.4
0.16 0.6 0.12 0.4 1
```

Explanation

In sample 1, consider a message sent from computer 2 to computer 4. For the path $2 \to 3 \to 4$, each step is hacked with probability 0.9, so the probability of success is 0.81. This is better than the path $2 \to 1 \to 5 \to 4$, which succeeds with probability only 0.729. Note also that the probability of sending a message from a computer to itself is 1, as there is no chance of interception when no connections are used.

In sample 3, consider a message sent from computer 1 to computer 4. The path $1 \to 2 \to 4$ succeeds with a probability of just 0.09, but the path $1 \to 3 \to 4$ is marginally worse (0.08).

Note that samples 3 and 4 are not valid inputs for subtask D1.