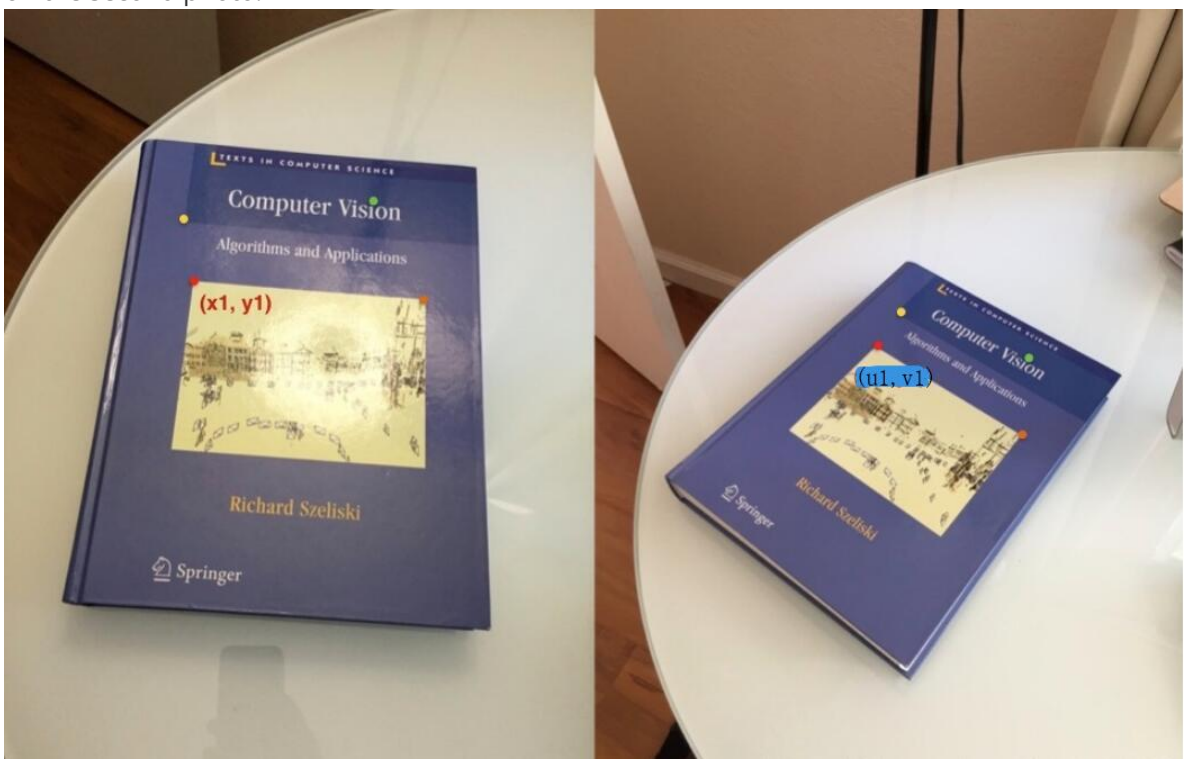
E - Transform

Description

We use different camera angles to take two photos. You are given four distinct points $(x_i, y_i)(1 \leq i \leq 4)$ on the first photo and four related points $(u_i, v_v)(1 \leq i \leq 4)$ on the second photo. No three of the four points on the first photo lie on the same line.
You are give another point (x_q, y_q) on the first photo. The task is to find the related point (u_q, v_q) on the second photo.



Input

There are at most 3000 test cases.
Each of the first four lines contains four real number x_i, y_i, u_i and v_i.
The fifth line contains two real number x_q and y_q.
For all numbers, there are at most two digits after the decimal point and the absolute value is not more than 10^4.

Output

In a single line print the point (u_q, v_q).
Your answer will be accepted if absolute or relative error does not exceed 10^{-6}. Formally, let your answer be a, and the judge's answer be b. Your answer is considered correct if $\frac{|a-b|}{\max(1,|b|)} \leq 10^{-6}$.

Sample Input

```
0.00 0.00 0.00 0.00
4.00 0.00 4.00 0.00
4.00 4.00 5.00 2.00
0.00 4.00 2.00 3.00
2.00 2.00
0.00 0.00 1.00 0.00
0.00 10.00 -0.79 8.17
-10.00 -10.00 4.95 -50.99
10.00 -10.00 3.51 -6.73
15.00 -15.00
```

Sample Output

```
3.15789473684 1.26315789474
4.29614002313 -8.83785751222
```

Note

The homography transformation formula is

$$\begin{bmatrix} u' \\ v' \\ w' \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

where (x, y) is on the first photo and $(u, v) = (u'/w', v'/w')$ is on the second photo.