Problem E. Lui and Lines

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

Lui is a magician, and recently he mastered traveling in n-dimensional space. In order to adjust the settings of his new multidimensional spaceship, he has to find the distance between two lines in n-dimensional space. Each line is defined by two distinct points lying on it. The distance between lines is the smallest distance between a pair of points (x, y) such that x lies on the first line and y lies on the second one.

The distance between the points $(x_1, \ldots, x_n)$ and $(y_1, \ldots, y_n)$ in n-dimensional space is defined as

$$\sqrt{\sum_{i=1}^{n}(x_i - y_i)^2}.$$

The n-dimensional line containing two points a and b could be formally defined as the set of points $(ta_1 + (1-t)b_1, ta_2 + (1-t)b_2, \ldots, ta_n + (1-t)b_n)$ for all real values of t.

Input

The first line contains the integer n ($1 \le n \le 100\,000$), the number of dimensions. The next four lines contain the description of four points a, b, c, d in n-dimensional space. The points a and b lie on the first line, and the points c and d lie on the second one ($a \ne b$, $c \ne d$). Each of these four lines contains n integers. All the numbers in the input do not exceed 10^5 by absolute value.

Output

Let d be the distance between the lines. Print d^2 as a fraction x/y such that $x \ge 0$, $y > 0$, and the greatest common divisor of x and y is equal to 1.

Examples

standard input	standard output
2 0 0 1 0 0 1 1 1	1/1
2 0 0 1 1 1 0 2 1	1/2