

Problem F: Patio

Advanced Algorithms for Programming Contests

Restrictions

Time: 2 seconds

Memory: 512 MB

Problem description

As the summers tend to get hotter and hotter, you decided to equip your patio with two large, convex, polygonal canvasses. You already made some sketches of where exactly to put them, but you are having doubts they will provide enough shadow, especially since the areas they shield from the sun have some overlap. Thus, before you start implementing your plan, you want to calculate the ratio of shadowy area to overall area of the patio that would result from it, and – just to be safe – the shadowy area itself.

Input

The input consists of

- one line containing four integers n, m ($3 \leq n, m \leq 1000$) – the number of corners in the canvasses – and w, l ($2 \leq w, l \leq 10^7$) – the width and length of the patio (it encompasses the area $[0, w] \times [0, l]$)
- n lines giving the corner coordinates of the first canvas in clockwise order – all corners are located in integer coordinates and for each corner (x_i, y_i) it is guaranteed that $0 \leq x_i \leq w$ and $0 \leq y_i \leq l$
- m lines giving the corner coordinates of the second canvas in clockwise order – all corners are located in integer coordinates and for each corner (x_i, y_i) it is guaranteed that $0 \leq x_i \leq w$ and $0 \leq y_i \leq l$

It is guaranteed that the canvasses are convex and that there is some overlap (with non-zero area) between them. Furthermore, the corner coordinates are unique (i.e. there is no point in which both canvasses have a corner).

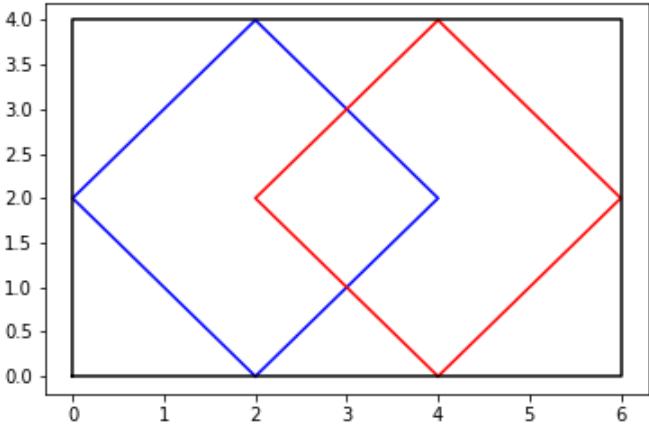
Output

First print fraction between shadowy area and total area under the given plan. Then output the shadowy area, by first printing the number s of its corners and then s lines giving the corners in clock-wise order, beginning with the lexicographically smallest one (to make the result unique). Ratio and coordinates should have an absolute or relative precision of 10^{-4} .

Sample input and output

Input	Output
4 4 6 4	0.58333333
2 0	8
0 2	0 2
2 4	2 4
4 2	3 3
4 0	4 4
2 2	6 2
4 4	4 0
6 2	3 1
	2 0

Visualization of the Sample:



Remark: $0.58\overline{3} = 14/24$