Problem A. Integer area

Input file:	`area.in`
Output file:	`area.out`
Time limit:	0.5 seconds
Memory limit:	256 megabytes

You are given N different points on a plane. Count number of ways to select 3 of them in such way that area of this triangle is an integer number. Degenerate triangles have 0 area.

Input

First line contain integer number N ($1 \leq N \leq 100\,000$). Next N lines contain pairs of integers — coordinates of points. All coordinates don't exceed $1\,000\,000\,000$ by its absolute value.

Output

Output one number — answer for the problem.

Examples

area.in	area.out
4	4
0 0	
0 2	
2 2	
2 0	

Problem B. Postcard and envelope

Input file:	postcard.in
Output file:	postcard.out
Time limit:	0.5 seconds
Memory limit:	256 megabytes

You are given rectangular postcard and envelope. You must decide if you can fit postcard inside envelope or not.

Input

First line contains two numbers — dimensions of the postcard, second line contains dimensions of the envelope in the same format. All dimensions are positive integer numbers not exceeding 100.

Output

if you can fit postcard inside envelope, then output "Possible", otherwise — "Impossible".

Examples

postcard.in	postcard.out
10 15 15 10	Possible

Problem C. Rectangle Puzzle

Input file:	rotate.in
Output file:	rotate.out
Time limit:	0.5 seconds
Memory limit:	256 megabytes

You are given two rectangles on a plane. The centers of both rectangles are located in the origin of coordinates (meaning the center of the rectangle's symmetry). The first rectangle's sides are parallel to the coordinate axes: the length of the side that is parallel to the Ox axis, equals w, the length of the side that is parallel to the Oy axis, equals h. The second rectangle can be obtained by rotating the first rectangle relative to the origin of coordinates by angle α.
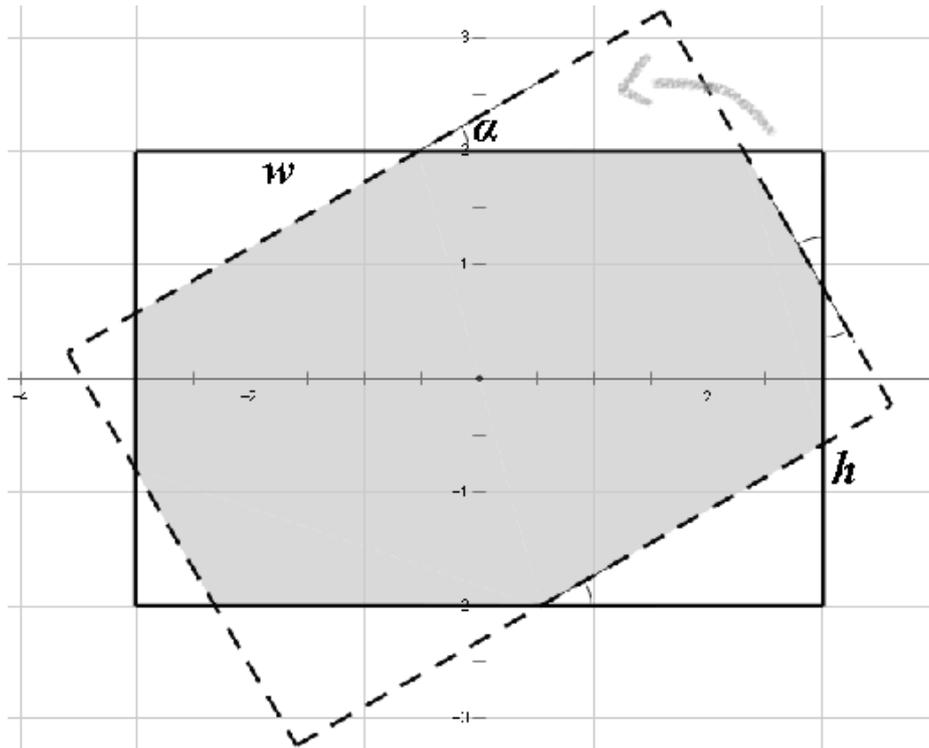
Your task is to find the area of the region which belongs to both given rectangles. This region is shaded in the picture.

Input

The first line contains three integers w, h, α ($1 \le w, h \le 10^6$; $0 \le \alpha \le 180$). Angle α is given in degrees.

Output

In a single line print a real number — the area of the region which belongs to both given rectangles.

The answer will be considered correct if its relative or absolute error doesn't exceed 10^{-6}.

Examples

rotate.in	rotate.out
1 1 45	0.8284271247
6 4 30	19.6683849254

Note

The second sample has been drawn on the picture above.

Problem D. Where are we going with Piglet?

Input file:	`hole.in`
Output file:	`hole.out`
Time limit:	0.5 seconds
Memory limit:	256 megabytes

> Tra-la-la, tra-la-la,
> Tra-la-la, tra-la-la,
> Rum-tum-tiddle-um-tum.
> Tiddle-iddle, tiddle-iddle,
> Tiddle-iddle, tiddle-iddle,
> Rum-tum-tum-tiddle-um.
>
> Winnie-The-Pooh

Piglet and Winnie-The-Pooh are walking every morning to Rabbit to drink tea. Obviously they are using the shortest path.

Unfortunately one day Winnie-The-Pooh and Piglet made a trap in form of a hole for catching Heffalump.

Now every morning they fear that they will fall in it.

Help Winnie-The-Pooh to calculate the shortest safe path to the Rabbit's house.

Trap for Heffalump is a hole in form of an ideal circle. Path is considered safe if it doesn't intersect the hole (but it can go along its circumference).

Input

Input file contains descriptions of Winnie-The-Pooh's home, Rabbits's home, center of a trap and its radius. All coordinates are integer numbers not exceeding 32000 by its absolute value. Radius is positive integer number not exceeding 32000.

Houses can't be strictly inside trap.

Output

Output one number — length of a shortest path. Absolute or relative error of your answer shouldn't exceed 10^{-6}.

Examples

hole.in	hole.out
0 0 10 0 5 5 1	10.000000000000000
3 4 4 4 0 0 5	1.000000000000000

Problem E. Equilateral triangle approximation

Input file:	`equilateral.in`
Output file:	`equilateral.out`
Time limit:	0.5 seconds
Memory limit:	256 megabytes

You are given three points A, B and C. You must find such equilateral (all its sides are equal) triangle $A_1 B_1 C_1$, that $r = \max(|AA_1|, |BB_1|, |CC_1|)$ is minimal.

Input

Three lines describe points A, B, C. Each line consists of two real numbers not exceeding 100 by its absolute value.

Output

Output points A_1, B_1, C_1 in the same way as input. Lengths of sides shouldn't differ more than 10^{-6}. $\max(|AA_1|, |BB_1|, |CC_1|)$ shouldn't differ from correct answer more than 10^{-6}.

Examples

equilateral.in	equilateral.out
-4 -6	-4.0000000000000 -6.0000000000000
6 -6	6.0000000000000 -6.0000000000000
1 2.660254037844386	1.0000000000000 2.6602540378444

Problem F. Find a line

Input file:	`segments.in`
Output file:	`segments.out`
Time limit:	1 second
Memory limit:	256 megabytes

You have many segments on a plane. You need to find a line that intersects with maximal number of segments.

A line intersects a segment if it has at least one common point with it.

Input

First line contains N — number of segments ($1 \le N \le 1000$). Each of the next N lines contains numbers $X_{i_1}, Y_{i_1}, X_{i_2}, Y_{i_2}$ — coordinates of segment endpoints. All this numbers are integer and don't exceed 10^4 by its absolute value.

Output

Output coordinates of two different points which your line goes through. Coordinates should be integer and shouldn't exceed 10^7 by its absolute value.

Examples

segments.in	segments.out
3 0 0 1 0 0 1 1 1 0 2 1 2	0 0 1 2
5 -1 0 3 4 2 3 5 6 0 2 2 -2 8 5 9 2 8 5 9 2	-1 0 9 2

Problem G. Triathlon

Input file:	`triathlon.in`
Output file:	`triathlon.out`
Time limit:	0.5 seconds
Memory limit:	256 megabytes

Triathlon is an athletic contest consisting of three consecutive sections that should be completed as fast as possible as a whole. The first section is swimming, the second section is riding bicycle and the third one is running. The speed of each contestant in all three sections is known. The judge can choose the length of each section arbitrarily provided that no section has zero length. As a result sometimes she could choose their lengths in such a way that some particular contestant would win the competition.

Input

The first line of the input contains integer number N ($1 \leq N \leq 100$), denoting the number of contestants. Then N lines follow, each line contains three integers V_i, U_i and W_i ($1 \leq V_i, U_i, W_i \leq 10000$), separated by spaces, denoting the speed of ith contestant in each section.

Output

For every contestant write to the output one line, that contains word "Yes" if the judge could choose the lengths of the sections in such a way that this particular contestant would win (i.e. she is the only one who would come first), or word "No" if this is impossible.

Examples

triathlon.in	triathlon.out
9	Yes
10 2 6	Yes
10 7 3	Yes
5 6 7	No
3 2 7	No
6 2 6	No
3 5 7	Yes
8 4 6	No
10 4 2	Yes
1 8 7	