CODEFORCES β
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PROBLEMS   SUBMIT CODE   MY SUBMISSIONS   STATUS   HACKS   ROOM   STANDINGS   CUSTOM INVOCATION

D. Gears

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

There are two polygons on the plane, A and B. Polygon A rotates around point P, and polygon B rotates around point Q. Each polygon rotates with the constant rotational speed in the clockwise direction around its point, the rotational speed values of the polygons' rotation are equal.

Your task is to determine if there will be a *collision* between polygons. A *collision* is a situation when the polygons have at least one common point.

It is guaranteed that at the moment 0 the polygons A and B do not intersect and no polygon is fully contained inside another one.

Note that:

- the polygons are not necessarily convex;
- points P and Q can be located on the border of or outside their polygons.

Input

The first line contains space-separated coordinates of point P.

The second line contains a single integer n ($3 \le n \le 1000$) — the number of vertices of polygon A.

Each of the next n lines contains two space-separated integers — the coordinates of the corresponding vertex of polygon A.

The next line is empty.

Then follow space-separated coordinates of point Q.

The next line contains a single integer m ($3 \le m \le 1000$) — the number of vertices of polygon B. Next m lines contain the coordinates of the vertices of the polygon B.

The vertices of both polygons are listed in the counterclockwise order. Coordinates of all points are integers, their absolute values don't exceed 10^4.

Output

Print "YES", if the collision takes place and "NO" otherwise (don't print the quotes).

Examples

input

```
1 0
4
0 0
1 0
1 5
0 5

9 0
4
9 0
9 -5
10 -5
10 0
```

output

```
YES
```

input

Finished

Practice

⭐

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest]

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Submit?

Language: [GNU G++ 5.1.0   ▼]

Choose file: [选择文件] 未选择任何文件

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

[Submit]

→ Problem tags

brute force   geometry   math

No tag edit access

→ Contest materials

- Announcement   ✕
- Tutorial   ✕
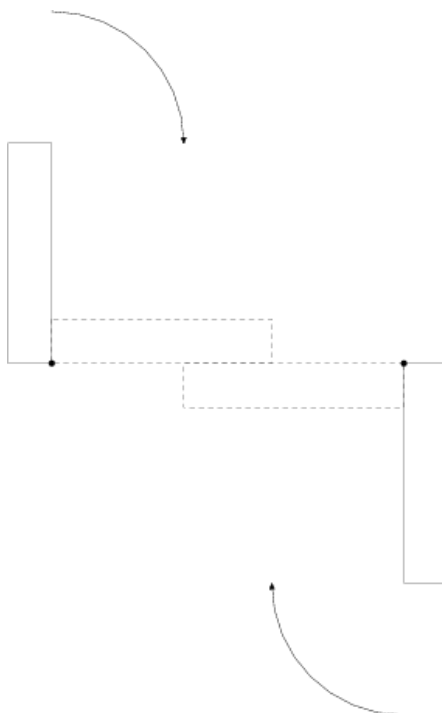
```
0 0
3
1 0
2 -1
2 1

0 0
3
-1 0
-2 1
-2 -1
```

output

```
NO
```

Note

A *polygon* is a closed polyline that doesn't intersect itself and doesn't touch itself.

Picture to the first sample: