Q.1)

N roses

M lotuses

Coordinates – x, y

C

for each lotus & rose.

Task – Separate lotus & roses.

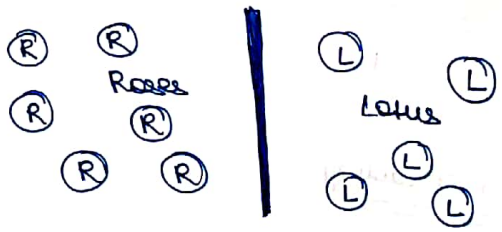
↓

by drawing a line of certain thickness in btw.

C

+ve thickness.

Diagramatically :



Goal – draw line with max possible thickness.

Input

T – no of test cases

ex: Say T = 2.

description of 2 test cases is as follows :

Example input

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

-1 2

1 2

0 4

3

-1 0

1 0

0 2

3

-1 3

1 3

0 5

Output for this will be

-1

1

My Methodology

↳ we have n cases

& n points

in a 2D space

Let us first find the convex hull for each of these points.

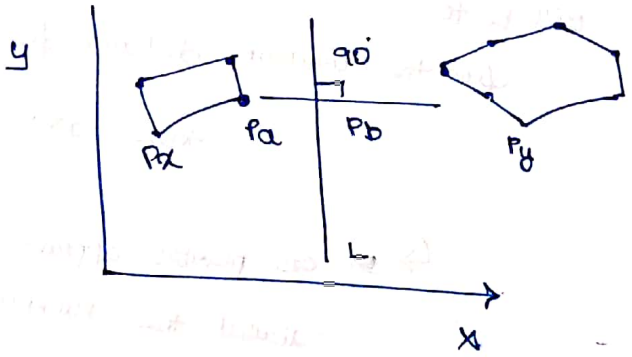
So we have convex hull A & convex hull B.

Now if A has non-zero area of intersection with B

⇓

we cannot draw any line

Diff cases we can consider:



Now Pa & Pb are the 2 closest points

∴ the thickness of the line will be

$P_b - P_a$.

Now if we consider Px & Py

the

thickness of the line will be

Px-Py or Py-Px

then any pt

like Pa, Pb

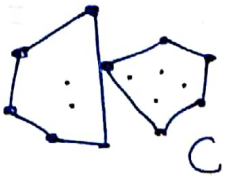
C will be inside our thick line

⇓

not possible.

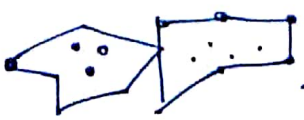
Other cases :

closest value to the convex hull of vertices & vice versa.



C edge & a point

or



C vice versa.

The approach

will be to

find the minimum distance for each of

those cases

↳ one possible approach will be to

calculate the Minkowski Sum

of A⊖B.

Algo for Minkowski sums

Ip: convex polygon

1. $i=1, j=1$
2. $V_{n+1} = V_1$; $\text{cont}+1 = w_1$
3. Repeat
   1. Add $V_i + w_j$ as vertex to P⊕R
   2. if angle $(V_i V_{i+1}) <$ angle $(w_j w_{j+1})$ then $i = i+1$

   else $i = i+1, j = j+1$
4. Until $i = n+1$ & $j = m+1$

⇓

finds the angular interval for each edge of each polygon.