# Problem C
## Can You See Me in the Dark

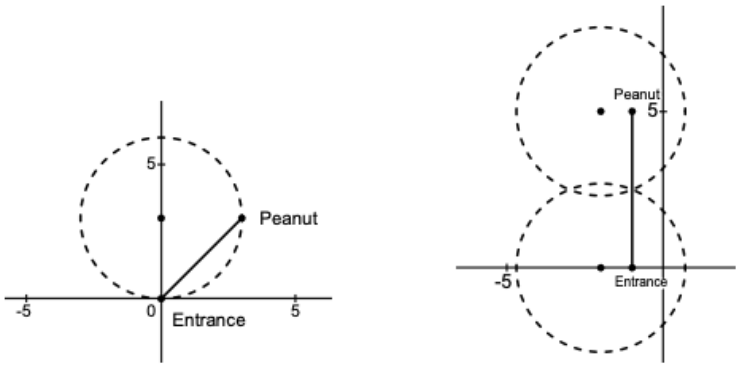
*timelimit: 10 seconds*

After the Elephant Espionage Brigade's successful deployment of the Hyper Soft-Pitch Transmitters, they have finally gathered some highly confidential intel: the location of the Golden Peanut!

To capture the Golden Peanut, the elephants have once again deployed their most elite spies: Ellie, Elliot, and Ellanah. While traversing the many obstacles that blocked their path, the three spies prepared to enter the Hidden Stronghold of Peanut Treasures. Despite the lack of traps in this room, there was still one major barrier to their success: security cameras.

To circumvent the security cameras, Ellanah, the brigade's technology guru, has added dark zones into the room. Each dark zone prevents all points within a certain distance from its center from being seen by any cameras. Since these dark zones can be quite unstable, the elephants want to minimize the amount of time they spend in the room. Therefore, they will take a straight line path to the Golden Peanut and back to the door. Luckily, the elephants can hide within or on the border of the zones!

Ellanah can control the size of the dark zones as long as they all maintain the same radius, but she notices that the larger she makes them, the more unstable they become. She has asked you to help her determine the smallest radius the zones can have such that Ellie's and Elliot's path is fully covered by the dark zones.




The images above show the solutions to the two sample cases provided.

**The Problem:** Given the center location of each dark zone, along with the locations of the entrance and the Golden Peanut, determine the minimum radius needed such that Ellie's and Elliot's straight line path between the entrance and the Golden Peanut is fully covered by dark zones.

## Input

The first line of input will contain a single integer, $n$ ($1 \leq n \leq 10^5$), representing the number of dark zones Ellanah has created. The following $n$ lines will each contain two integers, $x_i$ and $y_i$ ($-10^5 \leq x_i \leq 10^5$; $-10^5 \leq y_i \leq 10^5$), representing the location of the center of the $i^th$ dark zone. The final line of input will contain four integers, $x_e$, $y_e$, $x_p$ and $y_p$ ($-10^5 \leq x_e \leq 10^5$; $-10^5 \leq y_e \leq -10^5$; $-10^5 \leq x_p \leq 10^5$; $-10^5 \leq y_p \leq 10^5$), representing the locations of the entrance and the Golden Peanut, respectively. The entrance and the Golden Peanut are guaranteed to not be at the same location.

## Output

Output a single real number: the minimum radius needed to fully cover the straight line path between the entrance and the Golden Peanut. Your answer will be considered correct if its absolute or relative error does not exceed $10^{-4}$.

| Sample Input 1 | Sample Output 1 |
|---|---|
| 1<br>0 3<br>0 0 3 3 | 3.000000000000 |

| Sample Input 2 | Sample Output 2 |
|---|---|
| 2<br>-2 0<br>-2 5<br>-1 0 -1 5 | 2.692582403567 |