Electric Car

University of Melbourne Competitive Programming Club

Problem Statement

To escape the COVID situation in Melbourne you decide to flee to a country town in rural Australia. The only car available to you is your parents electric car, which fortunately is very environmentally friendly. However, the downside is that the car only has a range of $100km$ before you need to stop and charge it at a charging station. To try and keep a low profile and not be caught for breaching public health orders you must plan your trip to make the **smallest number of stops** at charging stations to charge your car before reaching your destination.

You are given the starting and ending points as two-dimensional coordinates as well as n additional two-dimensional coordinates for each of the charging stations' locations. Assuming there is a straight path between any two coordinates (i.e. the distance between two points is their Euclidean distance) and that your car can only travel between towns at most $100km$ apart, find the **minimum number of charging stations** you are required to stop at to reach your destination.

The start position and end position do not count as stops. If there is no solution possible print -1.

NOTE: UMCPC does not condone breaching public health orders.

Input

The first line will contain a single positive integer n, the total number of charging stations.
The following lines will be in the format of two space separated integers each representing two-dimensional coordinates (in signed km from the origin):
The next line will contain the starting coordinates of the car s_x, s_y.
The next line will contain the ending coordinates of the car e_x, e_y.
The next n lines represent the coordinates of the charging stations, the i^{th} line containing coordinates x_i, y_i.

Output

A single integer representing the minimum number of stops at charging stations in order to reach your destination.
If there is no way to reach your destination print -1.

Constraints

$1 \leq n \leq 10^3$
$-10^9 \leq s_x, s_y, e_x, e_y, x_i, y_i \leq 10^9$

Sample Cases

Input 1

```
1
0 0
10 110
50 50
```

Output 1

```
1
```

Input 2

```
1
0 0
10 110
-80 -90
```

Output 2

```
-1
```

Input 3

```
4
0 0
102 0
1 0
0 100
51 100
102 100
```

Output 3

```
3
```