

Problem D

2-Barrier Coverage

Input file: *testdata.in*

Time limit: 5 second

Problem Description

Given a rectangular region and a subset Q of points in the given region. Each point in Q denotes the location a sensor. The disc of radius r centered at a sensor (i.e., a point in Q) is its sensing range, see Figure 1. Define a crossing path to be a path passing through both the top edge and the bottom edge of the rectangular region, see Figure 2 and Figure 3. **Determine whether every crossing path intersects at least two distinct sensors' sensing ranges.** In Figure 3, both of paths p_4 , p_6 intersect two sensors' sensing ranges. In Figure 4, every crossing path intersects at least two distinct sensors' sensing ranges.

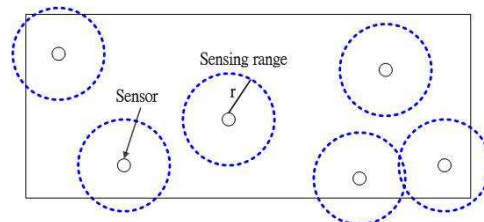


Figure 1: Graph description.

Input

1. radius r .
2. a rectangular region.

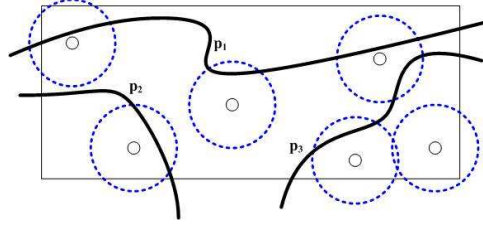


Figure 2: Paths p_1 , p_2 , p_3 are not crossing paths.

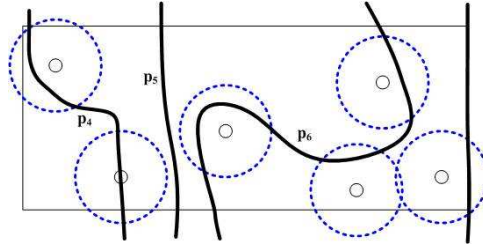


Figure 3: Crossing paths.

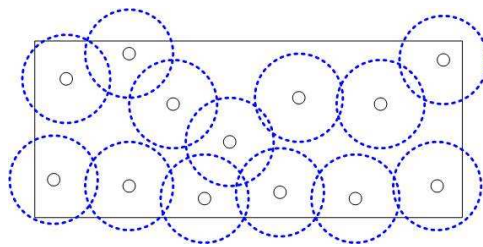


Figure 4: Each crossing path intersects at least two distinct sensors sensing ranges.

3. a subset Q of points in the given rectangular region.

Output

For each test case, Output “Yes” if every crossing path intersects at least two distinct sensors sensing ranges, and “No” otherwise.

Input Format

For each test case, the first line will show the order of this case and “END” presents the end of it, in the second line of the input file will always be the format of “ $r=[\text{number}]$ ”, which represents the sensing radius, and there will be no white spaces. The third line to the sixth line are used to represent the rectangular region. They contain the x-coordinate of the westernmost point, the x-coordinate of the easternmost point, the y-coordinate of the southernmost point, and the y-coordinate of the northernmost point, of the rectangular region, respectively. The rest lines of each test case contain the coordinates of points in Q . Coordinates of the points in Q is always represented in the format of “ $([\text{number}], [\text{number}])$ ”, and there will be no white spaces. There will be at most five test cases, and each test case contains at most 50 points in Q .

Note that all the factors mentioned-above should be varied and non-negative integer.

Output Format

For each test case, output “Yes” or “No”

Sample Input

Test Case 1:

$r=2$

0

22

0

25

(1,6)

(2,18)

(5,16)
(4,4)
(7,5)
(8,16)
(6,10)
(6,7)
(13,4)
(10,3)
(9,12)
(11,15)
(13,17)
(15,16)
(17,14)
(15,6)
(17,8)
(20,7)
(20,12)
(17,2)

END

Test Case 2:

r=2

0

12

0

20

(1,2)

(1,10)

(2,6)

(2,18)

(4,16)

(4,12)

(4,3)

(5,6)

(6,15)

(7,8)

(9,19)

(9,16)

(10,7)

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(10,4)
(11,15)
(12,9)
(12,2)
END
Test Case 3:
r=2
0
14
0
15
(1,1)
(2,6)
(2,11)
(4,9)
(5,6)
(6,3)
(7,8)
(9,11)
(10,7)
(11,2)
(12,9)
(14,11)
(14,5)
(14,2)
End
Test Case 4:
r=2
0
22
0
22
(2,0)
(10,0)
(14,0)
(18,0)
(22,0)
(2,5)
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```
(4,5)
(6,5)
(10,5)
(14,5)
(18,5)
(22,5)
END
Test Case 5:
r=2
0
22
0
22
(2,0)
(4,0)
(6,0)
(10,0)
(14,0)
(18,0)
(22,0)
(2,5)
(4,5)
(6,5)
(10,5)
(14,5)
(18,5)
(22,5)
END
```

Sample Output

```
Yes
Yes
No
No
Yes
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