Bulgarian OI '09 P1 - Minesweeper

Time limit: 0.6s   **Memory limit:** 32M

2009 Bulgarian Olympiad in Informatics

There is a dangerous minefield somewhere in Bulgaria. You have been assigned to enclose them all with a "warning band" so that future travellers are aware of the danger.

After searching around with a metal detector, you have located all of the mines. Each mine is a perfectly round shape with radius R at location x, y. Can you write a program to determine the length of the shortest band that will enclose all of the mines?

Input Specification

On the first line of the standard input, two integers N and R will be given - the number of the mines and their radius. On the next N lines, the coordinates x and y of the center of a mine will be given. The mines will overlap (in order to create a more powerful blast, for example).

N will be between 1 and 10 000, inclusive, and x, y will be between $-20\,000$ and $20\,000$.

Output Specification

Output a single line, containing the minimal length of a band.
Your answer will be considered correct if it is within 0.001 of the answer.

Sample Input

```
8 1
1 4
3 2
7 9
5 4
9 5
6 7
9 1
11 8
```

Sample Output

```
34.408
```

Diagram