Can Rob Escape?

Rob, an adventurous robot, yearns for more than his life of servitude to his master. Determined to explore the vast unknown of the galaxy, Rob learns of a hidden passageway that leads to the planet's exit platform. This passageway is a maze filled with dazzling yet perilous vertical laser beams.

Rob's cylindrical body, equipped with advanced sensors, can only navigate through the passageway by zigzagging strategically between the deadly laser beams. Each beam poses a unique challenge, requiring Rob to calculate precise manoeuvres to escape unscathed.

Your mission is to find out if Rob can reach the end of the passageway and achieve his dream of exploring the wonders of the cosmos.

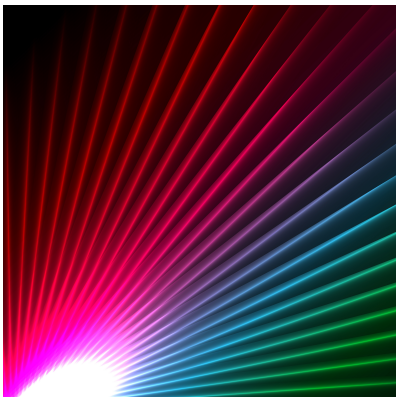
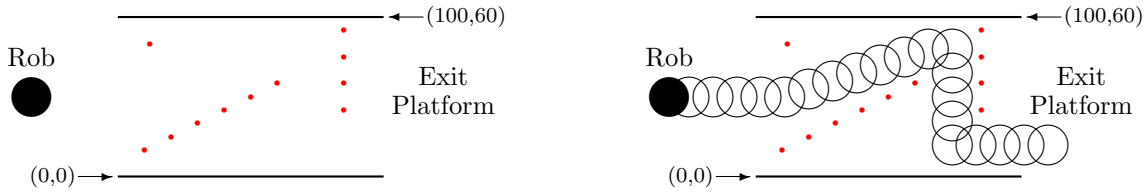


Image by kjpargeter on Freepik



Assume that the passageway is rectangular and flanked by walls, while Rob has a cylindrical shape. Rob needs to go through the entire passageway, without colliding with any laser beam, because he is before the passage start and the exit platform is immediately after the passage end. The laser beams have a diameter of 0, allowing Rob to pass between them or between a beam and a wall only if the distance between the beams or the distance between the beam and the wall, respectively, is greater than or equal to Rob's diameter.

To illustrate, consider the maze depicted in the figure, which is 100 metres long and 60 metres wide, and has 11 laser beams in the positions drawn in red. In this case, Rob would manage to escape, as it is shown graphically on the right side of the figure.

Task

Write a program that, given the length and width of the passageway, the diameter of Rob, and the positions of the laser beams, which are reasonably spread throughout the passage, determines if Rob can successfully manoeuvre through the passageway and reach the exit platform without colliding with the deadly beams.

Input

The input first line has two integers, L and W, which represent the length and width of the passageway (in metres), respectively. Beam positions are defined as if the passageway was a two-dimensional Cartesian coordinate system, where $(0, 0)$ and (L, W) are, respectively, the coordinates of the right wall start and the coordinates of the left wall end.

The second line contains an integer, D, which denotes Rob's diameter (in metres) and the third line has another integer, B, which is the number of laser beams.

Each of the following B lines has two integers, x and y, indicating that there is a vertical laser beam at coordinates (x, y). Different beams lie in different positions.

Constraints

$2 \leq L \leq 10\,000$	Length of the passageway
$2 \leq W \leq 10\,000$	Width of the passageway
$1 \leq D \leq \min(L, W)$	Diameter of Rob
$1 \leq B \leq 5\,000$	Number of laser beams
$0 < x < L$	Abscissa of a laser beam
$0 < y < W$	Ordinate of a laser beam

Output

The output consists of a single line with: "`Rob manages to escape!`", if Rob can reach the exit platform without colliding with any laser beam; "`Impossible to escape`", otherwise.

Sample Input 1

```
100 60
15
11
10 10
20 15
30 20
40 25
50 30
60 35
85 25
85 35
85 45
85 55
12 50
```

Sample Input 2

```
100 60
15
11
10 10
20 15
30 20
40 25
50 30
60 35
85 25
85 35
85 45
85 55
85 13
```

Sample Output 1

```
Rob manages to escape!
```

Sample Output 2

```
Impossible to escape
```