Honey Heist (Full)

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

Kim is playing a computer game on a grid of n by n cells. Her character is a bear, and the objective is to move the bear from its starting position to a pot of honey located elsewhere in the grid. Some cells are blocked by rocks, and it is not possible to move the bear through these rocks. There are rocks all around the perimeter of the grid.

Kim can control the bear by pressing the arrow keys ($\leftarrow$, $\uparrow$, $\rightarrow$, $\downarrow$). When she presses a key, the bear moves in that direction and cannot be stopped until it encounters a boulder. If the bear passes or stops at the honey pot, Kim wins the game.

Help Kim determine whether she can win the game, and if so, the smallest number of key presses required.

Input

The first line of input consists of two space-separated integers n and r ($0 \leq r \leq 100,000$), representing the side length of the grid and the number of rocks *inside* the grid respectively.

The second line of input consists of four space-separated integers i_b, j_b, i_h and j_h, representing the row and column of the bear's starting position and the honey pot respectively.

r lines follow, the kth of which consists of two space-separated integers i_k and j_k, representing the row and column of the kth rock.

All row and column indices are between 1 and n inclusive.

All rocks are at distinct positions. The bear's starting position and honey pot are distinct and neither of them coincide with a rock.

Subtask (50 points): $2 \leq n \leq 1,000$.

Full (50 points): $2 \leq n \leq 100,000$.

Output

If it is possible to win, print the smallest number of key presses required. Otherwise, print `0`.

Examples

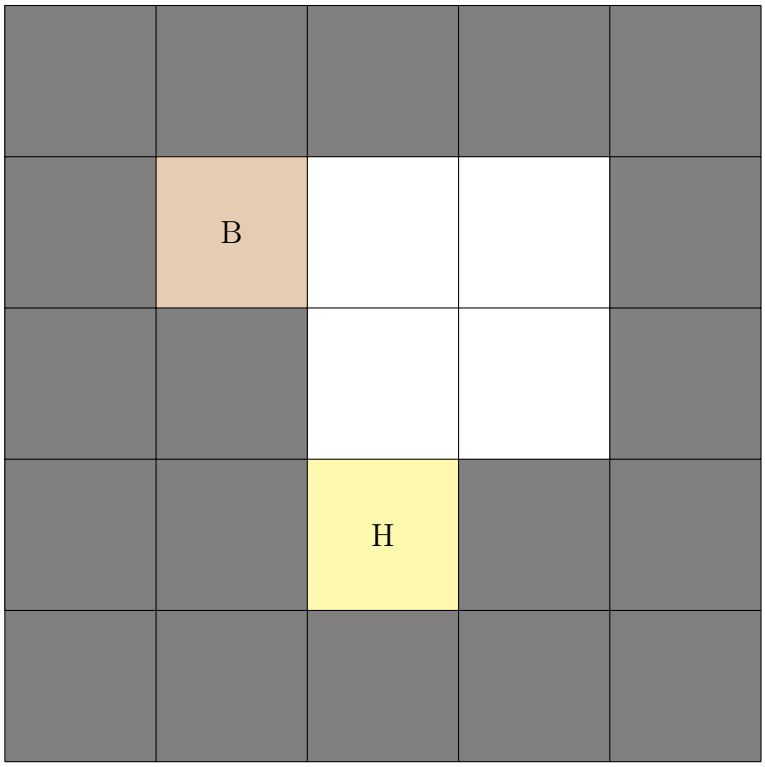
standard input	standard output
3 3 1 1 3 2 2 1 3 1 3 3	4
3 4 1 1 3 2 3 1 1 3 2 3 3 3	2
3 2 1 1 3 2 2 1 2 3	0
3 1 1 1 2 3 2 2	2
3 1 1 1 3 2 2 2	2

Note

In the first sample case, the grid has three rows and three columns, and three rocks.

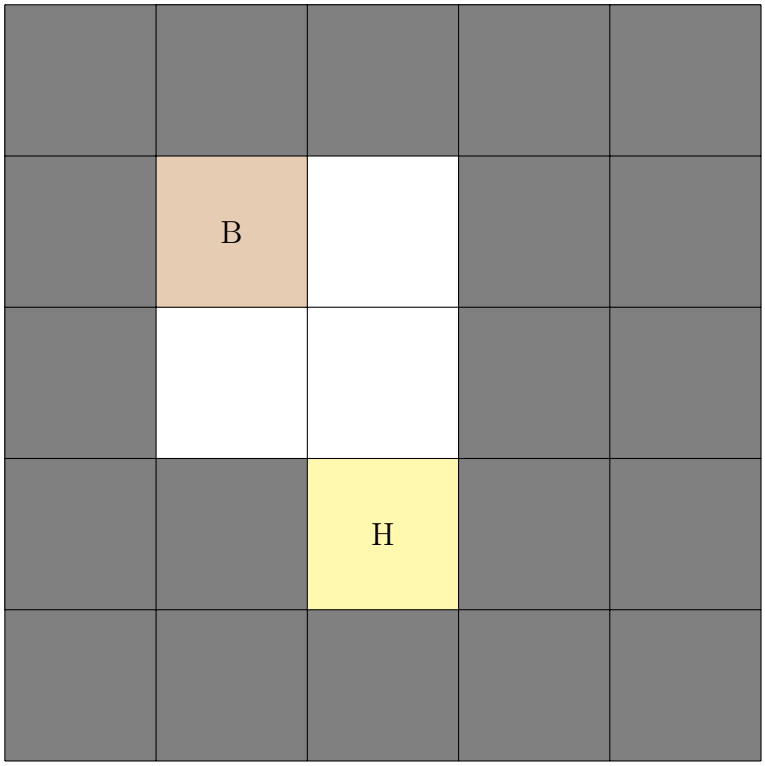
In the diagrams below,

- the bear's starting position is marked in brown,
- the honey pot is marked in yellow, and
- the rocks are marked in gray.



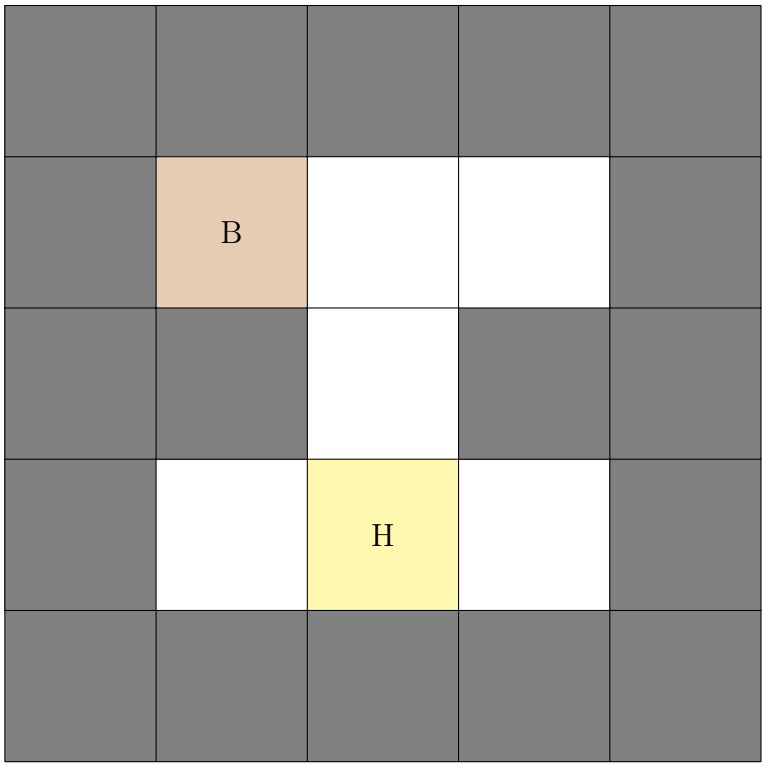
The bear can only reach the honey pot by the following sequence of four key presses: →↓←↓.

In the second sample case, the grid has three rows and three columns, and four rocks.



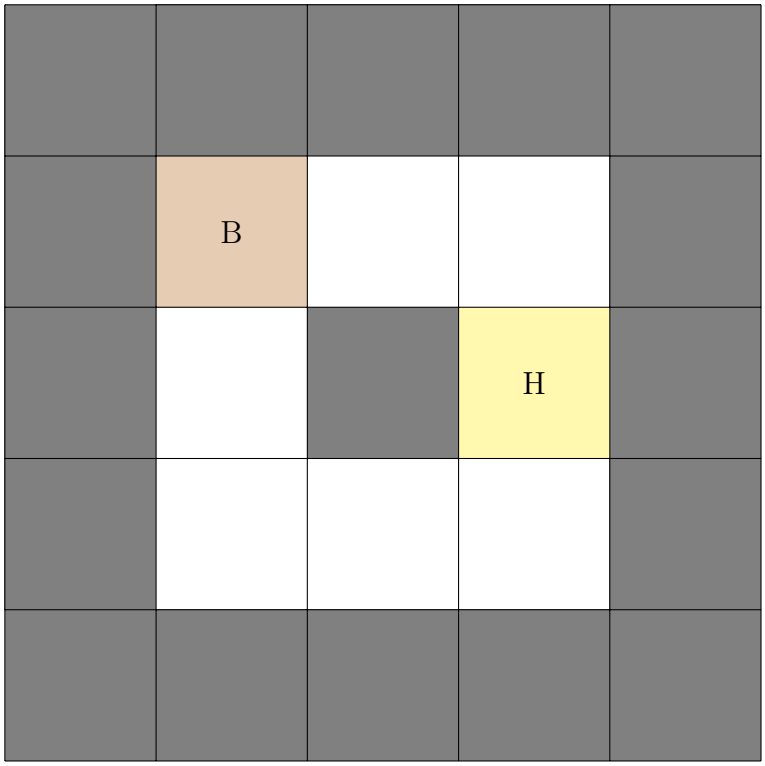
There are two paths to the honey pot: ↓→↓ and →↓. The second of these is preferred as it uses only two key presses.

In the third sample case, the grid has three rows and three columns, and two rocks.



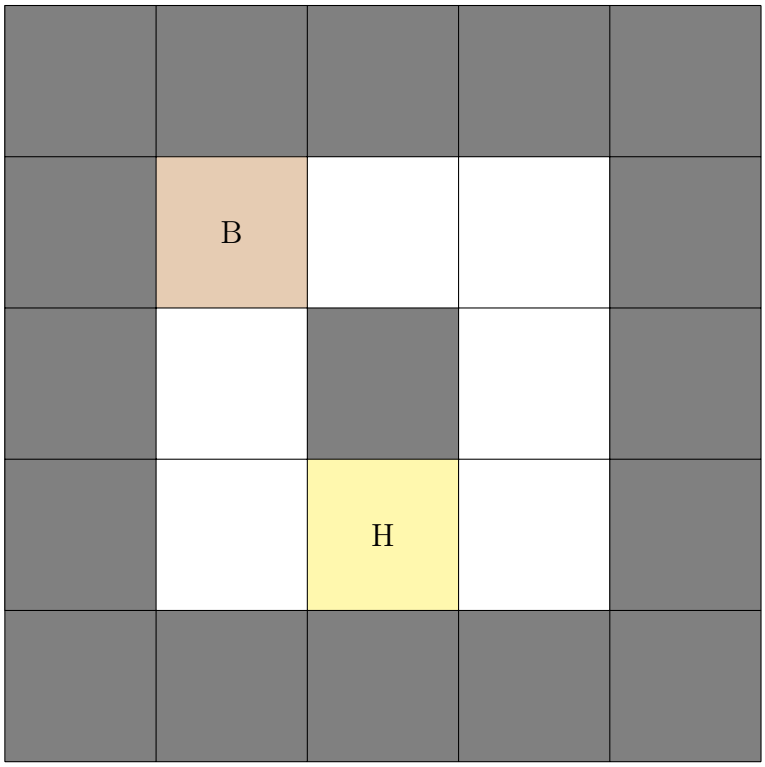
The bear cannot reach the honey pot, as the rocks prevent Kim from moving the bear off the top row.

In the fourth sample case, the grid has three rows and three columns, and one rock.



There are two paths to the honey pot: ↓→↑ and →↓. The second of these is preferred as it uses only two key presses.

The fifth sample case is a reflection of the fourth.



The answer is unchanged.