

Nemo is a naughty boy. One day he went into the deep sea all by himself. Unfortunately, he became lost and couldn't find his way home. Therefore, he sent a signal to his father, Marlin, to ask for help.

After checking the map, Marlin found that the sea is like a labyrinth with walls and doors. All the walls are parallel to the X-axis or to the Y-axis. The thickness of the walls are assumed to be zero. All the doors are opened on the walls and have a length of 1. Marlin cannot go through a wall unless there is a door on the wall. Because going through a door is dangerous (there may be some virulent medusas near the doors), Marlin wants to go through as few doors as he could to find Nemo.

Figure-1 shows an example of the labyrinth and the path Marlin went through to find Nemo.

We assume Marlin's initial position is at $(0, 0)$. Given the position of Nemo and the configuration of walls and doors, please write a program to calculate the minimum number of doors Marlin has to go through in order to reach Nemo.

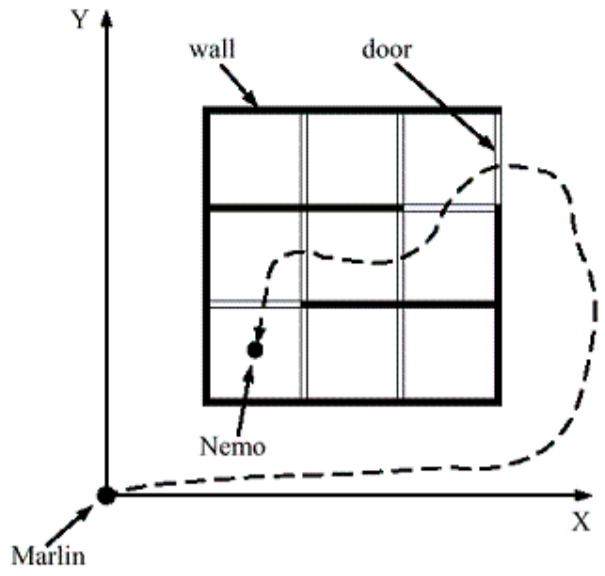


Figure-1. Labyrinth and Path

Input

The input consists of several test cases. Each test case is started by two non-negative integers M and N . M represents the number of walls in the labyrinth and N represents the number of doors. Then follow M lines, each containing four integers that describe a wall in the following format:

$x y d t$

(x, y) indicates the lower-left point of the wall, d is the direction of the wall — '0' means it's parallel to the X-axis and '1' means that it's parallel to the Y-axis, and t gives the length of the wall. The coordinates of two ends of any wall will be in the range of $[1, 199]$.

Then there are N lines that give the description of the doors:

$x y d$

x, y, d have the same meaning as the walls. As the doors have fixed length of 1, t is omitted.

The last line of each case contains two positive float numbers:

$f_1 f_2$

(f_1, f_2) gives the position of Nemo. And it will not lie within any wall or door.

A test case of $M = -1$ and $N = -1$ indicates the end of input, and should not be processed.

Output

For each test case, in a separate line, please output the minimum number of doors Marlin has to go through in order to rescue his son. If he can't reach Nemo, output '-1'.

Sample Input

```
8 9
1 1 1 3
2 1 1 3
3 1 1 3
4 1 1 3
1 1 0 3
1 2 0 3
1 3 0 3
1 4 0 3
2 1 1
2 2 1
2 3 1
3 1 1
3 2 1
3 3 1
1 2 0
3 3 0
4 3 1
1.5 1.5
4 0
1 1 0 1
1 1 1 1
2 1 1 1
1 2 0 1
1.5 1.7
-1 -1
```

Sample Output

```
5
-1
```