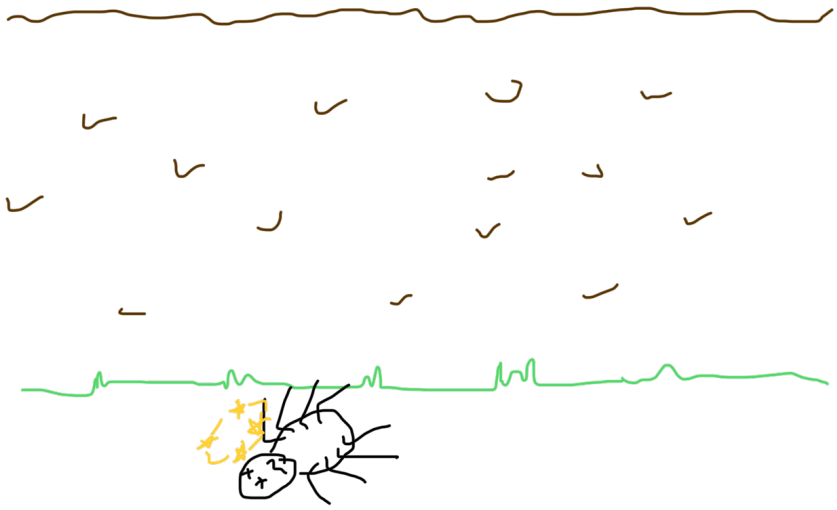
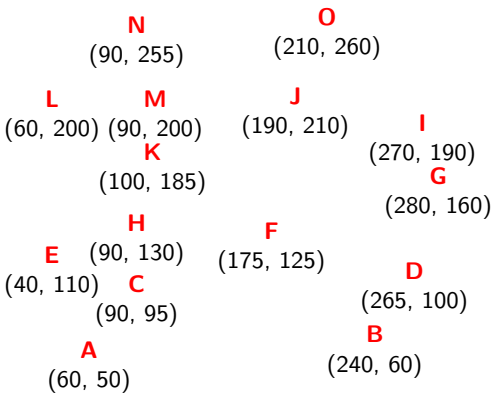
Problem I: Hill, the Climber



Hill, the Climber, likes to climb up everything. From chairs to buildings, from lamp posts to cliff walls, you name it, Hill climbs it. But Hill is a thoughtful and careful climber. Before starting to climb anything, Hill maps it and chooses the course to take up to the top. There is nothing worse than discovering that there is no route to the top when you are halfway up a mountain.

To plan a course for a climb, Hill precisely identifies and maps all the points which may be used as holds, during the ascent, sometimes with the aid of a drone. Afterwards, taking into account the distance between holds, Hill chooses a route to the summit. The best routes are those that pass through the least possible hold points.

The figure on the right depicts one such map (not completely to scale), of a 3.5 m high wall, where 14 hold points have been identified, whose coordinates are shown in centimetres.



The routes Hill may follow when climbing depend on Hill's *reach*, which is 90 cm. This means that Hill may only move from one hold point to another if they are 90 cm or less apart. For the same reason, the first hold point used must not be higher than 90 cm, and the last one must be located 90 cm or less from the top of the climb.

Given these constraints, Hill must start the climb up this wall at either hold point A or hold point B, and the final hold point must be O, which is the only one from which Hill is able to reach the top of the wall. In this case, Hill's sole best route starts at hold point A, and then passes through hold points H, F, J and O, before finally reaching the top, a total of 5 hold points.

Task

Your task is to help Hill compute the number of hold points on a best route for a climb to the top, given the height of the climb, the coordinates of all the hold points, and Hill's reach.

Input

The first line contains three integers, N, H and C, representing, respectively, the number of hold points, the height of the climb, in centimetres, and the number of test cases.

The following N lines contain a pair of integers standing for the (x, y) coordinates of the hold points, also in centimetres. The first coordinate of a hold point corresponds to its distance to some arbitrary reference line to the left of all hold points, and the second to its height, with respect to the base of the climb.

The final C lines contain one integer each, which represents the reach R of the climber, for each test case, in centimetres. You may assume that no more than around one hundred hold points are reachable from any hold point.

Constraints

$1 \leq N \leq 30\,000$	Number of hold points
$2 \leq H \leq 40\,000$	Height of the climb
$(0, 1) \leq (x, y) \leq (10\,000, H - 1)$	Coordinates of the hold points
$1 \leq C \leq 20$	Number of test cases
$1 \leq R \leq 200$	Climber's reach

Output

The output consists of one line for each of the test cases, containing either a single integer, denoting the number of hold points on a best route for the climb, or the word `unreachable`, if the given reach does not allow the climber to reach the top of the climb.

Sample Input

```
15 350 2
60 50
240 60
90 95
265 100
40 110
175 125
280 160
90 130
270 190
```

```
190 210
100 185
60 200
90 200
90 255
210 260
90
89
```

Sample Output

```
5
unreachable
```