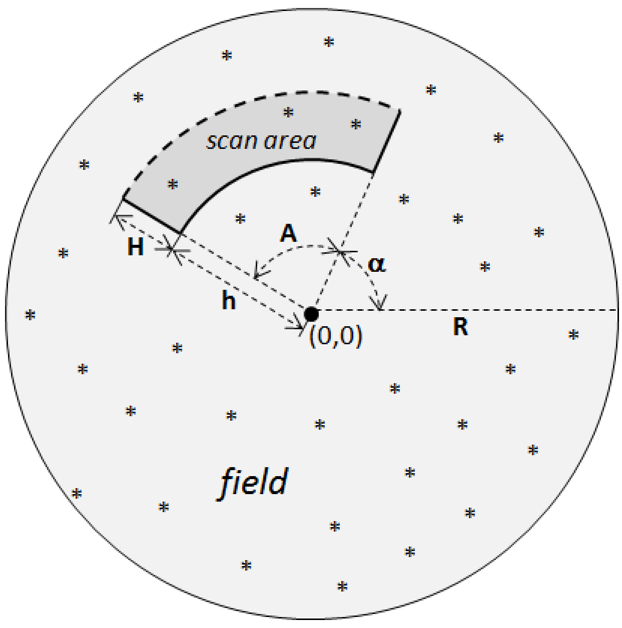
Radars Inc. is a worldwide renowned radar maker, whose excellent reputation lies on strict quality assurance procedures and a large variety of radar models that fit all budgets. The company hired you to develop a detailed *inspection* that consists of a sequence of E *experiments* on a specific *surveillance model*.

There is a *field* represented with a polar coordinate plane that contains N objects placed at positions with integer polar coordinates. The inspected model is located at the origin $(0, 0)$ of the field and can detect objects at a distance less than its *detection range* R through a *scan area* defined by four adjustment parameters α, A, h, and H, whose meaning is illustrated with the following figure:



Formally, the *scan area* of the model is the region described by the set of polar points

$$\{(r, \theta) \mid h \leq r < h + H,\ \alpha \leq \theta \leq \alpha + A\}$$

α, A, h and H are four integer values where:

- α specifies the *start angle* of the radar's scan area ($0 \leq \alpha < 360$);
- A specifies the *opening angle* of the radar's scan area ($0 \leq A < 360$);
- h gives the *internal radius* of the radar's scan area ($0 \leq h < R$); and
- H gives the *height* of the radar's scan area ($1 \leq H \leq R$).

An object placed at (r, θ) will be displayed by the model if $h \leq r < h + H$ and $\alpha \leq \theta \leq \alpha + A$, where the last inequality should be understood modulo 360^o (i.e., adding and comparing angles in a circle).

Given N objects placed on the field, you must develop an inspection of the surveillance model through the implementation of E experiments with specific parameterizations. For each experiment you have to find the maximal number of objects on the field that the radar should display if the parameters α ($0 \leq \alpha < 360$) and h ($0 \leq h < R$) are free to set (as integer numbers), and the parameters H ($1 \leq H \leq R$) and A ($0 \leq A < 360$) are given.

Input

The input consists of several test cases. Each test case is described as follows:

- A line with two integer numbers N and R separated by blanks, representing (respectively) the number of objects located on the field and the detection range of the model ($1 \leq N \leq 10^4$, $2 \leq R \leq 10^2$).
- Each one of the following N lines contains two integer numbers r_i and θ_i separated by blanks, specifying the integer polar coordinates (r_i, θ_i) of the i-th object ($1 \leq r_i < R$, $0 \leq \theta_i < 360$, $1 \leq i \leq N$).
- The next line has an integer number E indicating the number of experiments of the inspection ($1 \leq E \leq 10^2$).
- Each one of the following E lines contains two integer numbers H_j and A_j separated by blanks, representing (respectively) the fixed height and the fixed opening angle that parameterize the j-th experiment ($1 \leq H_j \leq R$, $0 \leq A_j < 360$, $1 \leq j \leq E$).

For each test case you can suppose that there are not two different objects placed at the same integer polar coordinate. The last test case is followed by a line containing two zeros.

Output

For each test case of the input, print E lines where the j-th line contains the maximal number of objects on the field that the radar should display according to the parameterization given for the j-th experiment ($1 \leq j \leq E$).

Sample Input

```
6 100
15 7
15 60
40 15
50 15
45 30
45 90
2
2 1
100 359
9 100
15 7
15 60
40 15
50 15
45 30
45 90
40 45
50 45
78 100
6
100 359
11 30
10 30
11 29
5 30
11 10
0 0
```

Sample Output

```
1
6
9
5
3
3
2
2
```