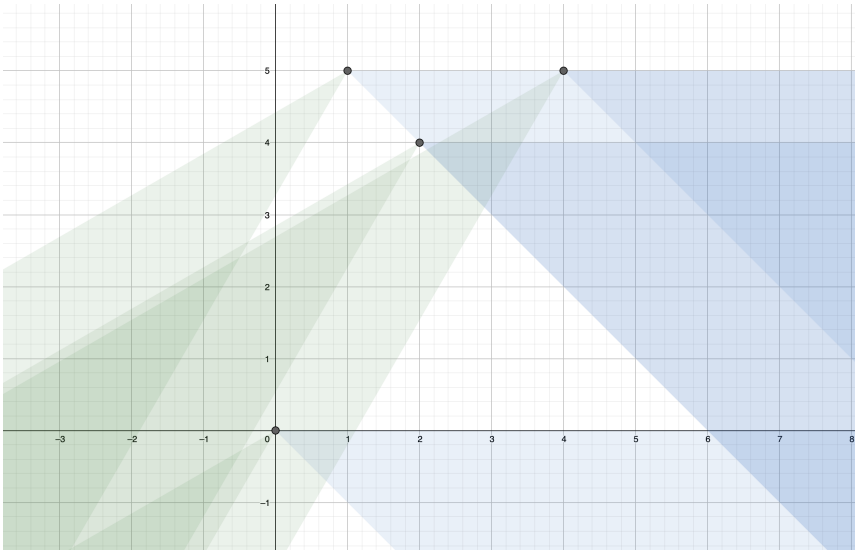
Light of Stars

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

There are n shining stars on an infinite two-dimensional plane. The i-th star can be seen as a point located at (x_i, y_i). It's guaranteed no two stars occupy the same place.

Each star emits the **same** regions of light that don't intersect. Every region of light is given in the form of an angle. Now you want to know, for every star, the number of times it is lightened by other stars. Note that stars will not block the light.



Input

The first line contains two integers n, k ($1 \le n \le 10^5, 1 \le k \le 10$) – the number of stars and the number of light regions.

The following n lines describe all the stars on the plane. The i-th of these lines contains two integers x_i, y_i ($0 \le x_i, y_i \le 50000$), describing the coordinates.

The following k lines describe all light regions. The i-th of these lines contains two integers l_i, r_i ($0 \le l_i \le r_i < 180$), describing an illuminated region. The evaluation of degree starts from the positive x-axis and rotates clockwise.

It is guaranteed that any two different angle intervals do not intersect.

Output

One line contains n integers, denoting the number of times each star is lightened.

Example

standard input	standard output
4 2 0 0 4 5 2 4 1 5 0 45 120 150	1 1 1 0