Problem I: Ice Igloos

Time limit: 10 s
Memory limit: 512 MiB

A fishing village built on the surface of a frozen lake far north in the arctic is endangered by global warming – fractures are starting to form on the lake surface. The village consists of n igloos of spherical shape, each occupying a circular area of the surface.

An igloo can be represented as a circle in the coordinate plane: the center of the circle is a point with integer coordinates, while the radius is a positive floating-point number less than 1 with exactly one fractional digit.

Given the locations of possible ice fractures, the villagers would like to know how many igloos are affected by each. Formally, given q queries where each query is a straight line segment defined by the two endpoints, find the number of igloos each segment intersects. A segment intersects an igloo if it has at least one point in common with the interior of the circle.

Input

The first line contains an integer n ($1 \leq n \leq 100\,000$) - the number of igloos. Each of the following n lines contains three numbers x, y and r – the coordinates of the center and the radius of one igloo. The coordinates x and y are integers such that $1 \leq x, y \leq 500$, while r is a floating-point number with exactly one fractional digit such that $0 < r < 1$. No two igloos will intersect or touch.

The following line contains an integer q ($1 \leq q \leq 100\,000$) - the number of queries. Each of the following q lines contains four integers x_1, y_1, x_2, y_2 ($1 \leq x_1, y_1, x_2, y_2 \leq 500$) - the coordinates of the two endpoints of the segment. The two endpoints will be different. Endpoints may be inside igloos.

You may assume that, for every igloo i and the segment s, the square of the distance between s and the center of i is either less than $r^2 - 10^{-5}$ or greater than $r^2 + 10^{-5}$ where r is the radius of the igloo i.

Output

Output should consist of q lines. The k-th line should contain a single integer – the number of igloos that are intersected by the k-th segment.

Example

input

```
5
4 2 0.6
7 3 0.7
8 5 0.8
1 3 0.7
3 4 0.4
2
3 1 9 6
3 4 7 2
```

output

```
2
1
```