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Exercise – *Radiation II*

A typical goal in radiation therapy is to destroy carcinogenic cells without damaging healthy tissue. Here we model both types of cells as a discrete distribution of points. A single source of radiation destroys all cells within a certain region. In order to optimize the therapy, you have to set up this source/region such that

1. no healthy tissue is destroyed while
2. as many carcinogenic cells as possible are destroyed.

Input The first line of the input contains the number of test cases $t \leq 200$. Each of the following t test cases is described as follows.

- It starts with a line that contains two integers m and n ($3 \leq m, n \leq 20'000$), separated by a space, where m denotes the number of points that correspond to healthy tissue (called *healthy points* from now on) and n denotes the number of points that correspond to carcinogenic cells (called *cancer points* from now on).
- The following $m + n$ lines describe the position of healthy points and cancer points. Each position is given by integer coordinates `x y`, separated by a space and so that $|x|, |y| < 2^{48}$. You may assume that all these positions are pairwise distinct in every test case.
- The first three lines describe the position of the so-called *outer* healthy points v_1, v_2 and v_3. They form a triangle $\triangle v_1, v_2, v_3$ of positive area that contains all healthy and cancer points. (It is possible that more points of either type are located on the boundary of the triangle.)
- The following $m - 3$ lines describe the position of the remaining healthy points.
- The following n lines describe the position of the cancer points.

Output The radiation source can be directed at any suitable point p and it can be setup with any suitable extension radius $r \geq 0$. It then destroys any point located within distance strictly less than r from p.

For every test case the corresponding output appears on a single line consisting of a single integer, denoting the maximum number of cancer points that can be destroyed using a single source of radiation while not destroying any healthy point.

Points There are five groups of test sets. Each group that is solved correctly is awarded with 20 points. So at most 100 points can be achieved in total.

1. For the first two groups of test sets (and for these only), you may assume that the radiation source is placed directly at one of the cancer points. You may also assume that both $n < 10^3$ and $m \cdot n < 10^6$. Corresponding example test sets are contained in the files `radio2-test1.in/out`.

2. For the third and for the fourth group of test sets, you may assume that $m \cdot n < 10^6$. Corresponding example test sets are contained in the files `radio2-test2.in/out`.
3. For the fifth group of test sets, there is no additional restriction regarding the input size. You may suppose, though, that the input points—both types of points—are distributed uniformly within the given triangle. Corresponding example test sets are contained in the files `radio2-test3.in/out`.

Sample Input

```
2
6 3
-2 -3
-2 4
4 0
-2 1
1 2
2 -1
-1 2
2 1
-1 -2
6 3
-7 -6
7 -6
0 6
0 -6
-3 0
3 0
-2 2
-1 -2
-1 1
```

Sample Output

```
1
3
```