CCO '12 P6 - The Winds Of War

Canadian Computing Competition: 2012 Day 2, Problem 3:

Colonel Trapp is trapped! For several days he has been fighting General Position on a plateau and his mobile command unit is now stuck at $(0, 0)$, on the edge of a cliff. But the winds are changing! The Colonel has a secret weapon up his sleeve: the "epsilon net". Your job, as the Colonel's chief optimization officer, is to determine the maximum advantage that a net can yield.

The epsilon net is a device that looks like a parachute, which you can launch to cover any convex shape. (A shape is convex when, for every pair p, q of points it contains, it also contains the entire line segment $\overline{pq}$.) The net shape must include the launch point $(0, 0)$.

The General has P enemy units stationed at fixed positions and the Colonel has T friendly units. The *advantage* of a particular net shape equals the number of enemy units it covers, minus the number of friendly units it covers. The General is not a unit.

You can assume that

- no three points (Trapp's position $(0, 0)$, enemy units, and friendly units) lie on a line,
- every two points have distinct x-coordinates and y-coordinates,
- all co-ordinates (x, y) of the units have $y > 0$,
- all co-ordinates are integers with absolute value at most $1\,000\,000\,000$, and
- the total number $P + T$ of units is between 1 and 100.

Input Specification

The first line contains P and then T, separated by spaces. Subsequently there are P lines of the form $x\ y$ giving the enemy units' co-ordinates, and then T lines giving the friendly units' co-ordinates.

Output Specification

Output a single line with the maximum possible advantage.

Sample Input

```
5 3
-8 4
-7 11
4 10
10 5
8 2
-5 7
-4 3
5 6
```

Output for Sample Input

```
3
```

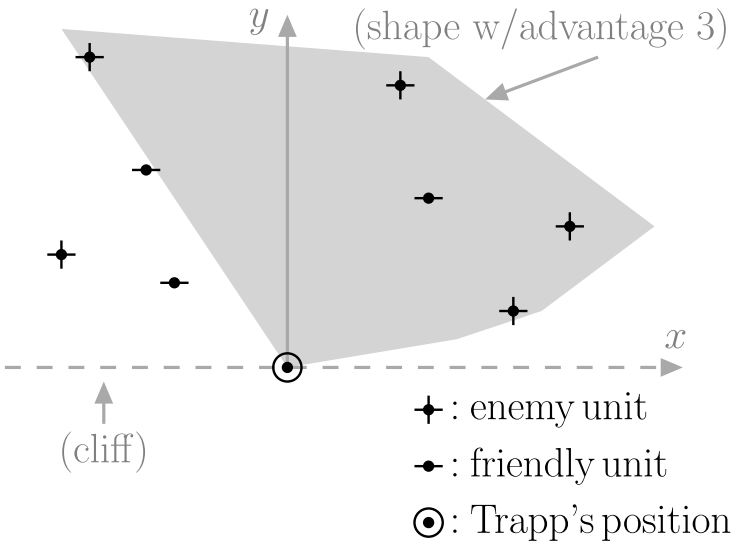

Figure 1: Sample input and an optimal net.