

Problem ID: fengshui

All the travelling has taken its toll on you and your friends, so as you arrive in China, you decide to take it easy for a while. You rent a cheap apartment for the next couple of months, planning to use it as a starting point for several short trips around the country. As you enter your new place for the first time, you immediately realize why it was so cheap: there is hardly any furniture! Now you have to start shopping...

You just had your new sofa delivered from the furniture store and it is now standing in your living room. You still haven't decided where to ultimately put it though, because you want to figure out the perfect spot first.

Your living room has rectangular shape, and the floor is made up of a regular grid of square tiles. The footprint of the sofa has the shape of a polygon, where each side length is a multiple of the side length of the floor tiles, and the sides always meet at a right angle.

In order to create perfect harmony in your living room, you want to furnish it according to the traditional Chinese system of *Feng Shui*. You have already consulted a Feng Shui expert, and after inspecting your home, she has assigned a *Qi* (life force) value to every floor tile in the room. She explained that the best harmony is attained if the sofa is placed in such a way that it is perfectly aligned with the floor tiles and the sum of the *Qi* values of tiles covered by the sofa is maximal.

The sofa can be freely moved in any direction, but it may not be rotated. Find the maximal possible sum of *Qi* values.

1	5	2	3
 8	2	9	5
7	 3	1	2

A solution for the first sample

Input

The input consists of:

- A description of the room, consisting of:
 - one line with two integers h, w ($1 \leq h, w \leq 1\,000$), the height and width of the grid of floor tiles;
 - h lines, each containing w integers q_1, \dots, q_w ($-1\,000 \leq q_i \leq 1\,000$), the *Qi* values of the floor tiles.

The upper left corner of the room has coordinates $(0, 0)$ and the lower right corner has coordinates (h, w) .

- A description of the sofa, consisting of:
 - one line with one integer n ($4 \leq n \leq 30$), the number of corners of the sofa;
 - n lines, each containing two integers x, y ($0 \leq x \leq h, 0 \leq y \leq w$), the corners of the sofa, given in counter-clockwise order.

It is guaranteed that the polygon defined in this way does not touch or self-intersect, every edge is either vertical or horizontal, and no three consecutive vertices are collinear.

Output

Output the maximal possible *Qi* value.

Sample Input 1

```
3 4
1 5 2 3
8 2 9 5
7 3 1 2
6
0 1
2 1
2 3
1 3
1 2
0 2
```

Sample Output 1

```
18
```

Sample Input 2

```
1 2
-5 -3
4
0 1
0 0
1 0
1 1
```

Sample Output 2

```
-3
```