UCF "Practice" Local Contest — August 27, 2011

Lawn Maintenance (filename: lawn)

George has been having trouble with his lawn. Not only does it seem to need fertilizing, but lately, he has found weeds popping up all over the place! Fortunately, the local home improvement store stocks a new version of a product, the improved Weed 'n Feed, that will fertilize grass and kill weeds at the same time. The product is sold in terms of 1000-square-feet of coverage. George doesn't know how much grass he has, so he's having a difficult time trying to figure out how much Weed 'n Feed to buy.

George does know a few things, though. George has the measurements of his lot, his house, and all of his landscaping beds that don't have grass. In order to figure out the area of his lawn, he needs to calculate the area of his lot, and subtract out the area of his house and landscaping beds.

Since George hates spending too much time/money, he's asked you to write a program that will help him figure out the optimum amount of fertilizer to buy. You'll have to calculate the area of his lawn, and then figure out how many bags of fertilizer to buy (to cover the area).

To make things simpler, the lot, house, and landscaping beds can all be described by simple (non self-intersecting) polygons (note that each polygon may be convex or concave).

The Input:

There will be multiple lawns to fertilize (George wants to share his program with the neighbors, too). Input for each lawn begins with an integer L ($3 \le L \le 10$), indicating the number of corners (vertices) on the lot. This is followed (on the same input line) by L pairs of integers, each pair specifying the X and Y coordinates of the position of each corner of the lot. The next input line for a data set will contain an integer H ($3 \le H \le 10$), indicating the number of corners (vertices) on the house. This is followed (on the same input line) by H pairs of integers, each pair specifying the X and Y coordinates of the position of each corner of the house. Following this will be an integer N on a line by itself, indicating the number of landscaping beds. Each of the next N lines will contain an integer B ($3 \le B \le 10$), indicating the number of corners (vertices) on that bed, followed by B pairs of integers, specifying the X and Y coordinates of the position of each corner.

All corners (vertices) will be specified consecutively in counter-clockwise order. Although vertices and edges may be shared, the house will be completely contained within the lot, and the landscaping beds will be completely contained within the lot and completely outside the house. Furthermore, the landscaping beds will not overlap each other, i.e., they won't have common area. You may also assume that the area of any polygon is always less than 2^{31}.

All coordinates will be separated by at least one space, and there may be leading spaces on each line (no trailing spaces). No characters other than digits, spaces, and newlines will

appear in the input, i.e., no invalid input.

End of input is indicated by a value of zero for L (the number of vertices for a lot); this case should not be processed.

The Output:

For each lawn, print the number of fertilizer bags to buy. Use the following format:

```
Lawn #N: buy B bag(s)
```

where N is the number of the lawn (starting at 1), and B is the number of bags to buy. Note that the left-over fertilizer does not carry from one application (data set) to the next application. Leave a blank line after the output for each data set. Follow the format illustrated in Sample Output.

Sample Input:

```
4    0    0   100    0   100  100     0  100
4   20   20    80   20    80   80    20   80
1
4   20   10    30   10    30   20    20   20
4   50   50   250   50   250  200    50  200
6  100  100   150  100   150  150   200  150   200  200   100  200
2
5   50   50    70   50    70   60    60   70    50   70
4  150  100   250  100   250  120   150  120
0
```

Sample Output:

```
Lawn #1: buy 7 bag(s)

Lawn #2: buy 21 bag(s)
```