Competitive Programming SS24

Submit until end of contest

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Problem: brutus (1.0 second timelimit)

Note: This is a problem that is harder to solve than usual. Solve the other problems first before spending too much time on this one.

Your friends pass the time between competitive programming contests with action-packed snail challenges. The most recent trend is *obstacle crawling*. All you need is a trained snail and a bunch of obstacles lying around. First the host draws a line on the ground, where each participant places her trained snail. Then the host draws the left and right borders of the field, which mark a corridor perpendicular to the starting line. A snail that gets past all obstacles wins. Snails are disqualified if they touch an obstacle or cross a border.

Unfortunately, your professionally trained combat snail *Brutus* crawls straight away from you every time you let her out of the cage. As each participant must stand exactly behind her competing snail, Brutus, who is oblivious to obstacles or boundaries, always crawls away from the starting line in a 90 degree angle. To make things worse, you always arrive late to challenges due to the time consuming fostering Brutus demands. As penalty, your friends assign you a (uniform) random position on the starting line.

What are your chances of winning anyway?

Input The first line contains 4 integers representing the start- and end point of the starting line. The next line contains the number of obstacles $0 \leq n \leq 10^5$. Each obstacle is given as a polygon with the number of corners $3 \leq c \leq 10$ in the first line and c lines containing a corner each.

All points are given as two integers $x, y \in [-1e6, 1e6]$. The corners of a polygon are given in counterclockwise order and polygons can be concave. All obstacles are on the same side of the starting line (left side) and no obstacle intersects or touches the starting line; not even the infinite geometrical line defined by the line segment we call starting line. Obstacles can intersect each other.

Output Print the probability that Brutus finishes the challenge successfully. The answer should be a rounded integral number between 0 and 100.

Sample input

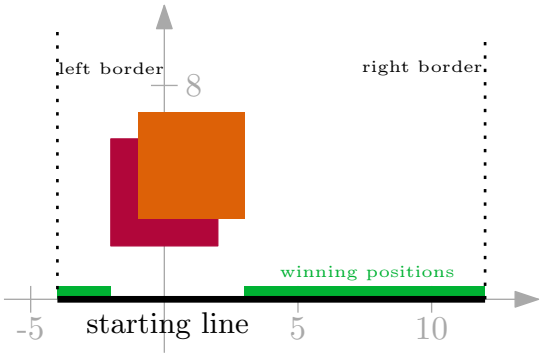
```
-4 0 12 0
2
4
-2 6
-2 2
2 2
2 6
4
-1 7
-1 3
3 3
3 7
```

Sample output

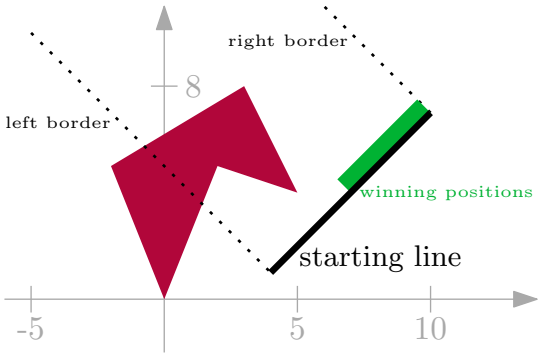
```
69
```

```
4 1 10 7
1
5
3 8
-2 5
0 0
2 5
5 4
```

```
50
```



Sample 1



Sample 2