# Problem FIFA: Fifa World Cup

I am an ambitious footballer and as you know - every young football player has a dream: participating in the world cup and leading your team to the championship. This year, the FIFA world cup will take place in Germany and I am eager to become a member of our national team.

The coach has not yet chosen the players for the national team. My performance during the practice this week will determine his decision. Therefore I have to give my best - and you can help me to realize my dream.

The last test I have to pass is a free kick practice. My coach puts up some figures made of paperboard which represent the opponents. Then he marks some positions on the football ground. We have to try to score from three of these positions, but it is left to me which three different positions I choose to kick from. Of course, I want to optimize my chances of scoring.

Look at the picture below to clarify any questions:
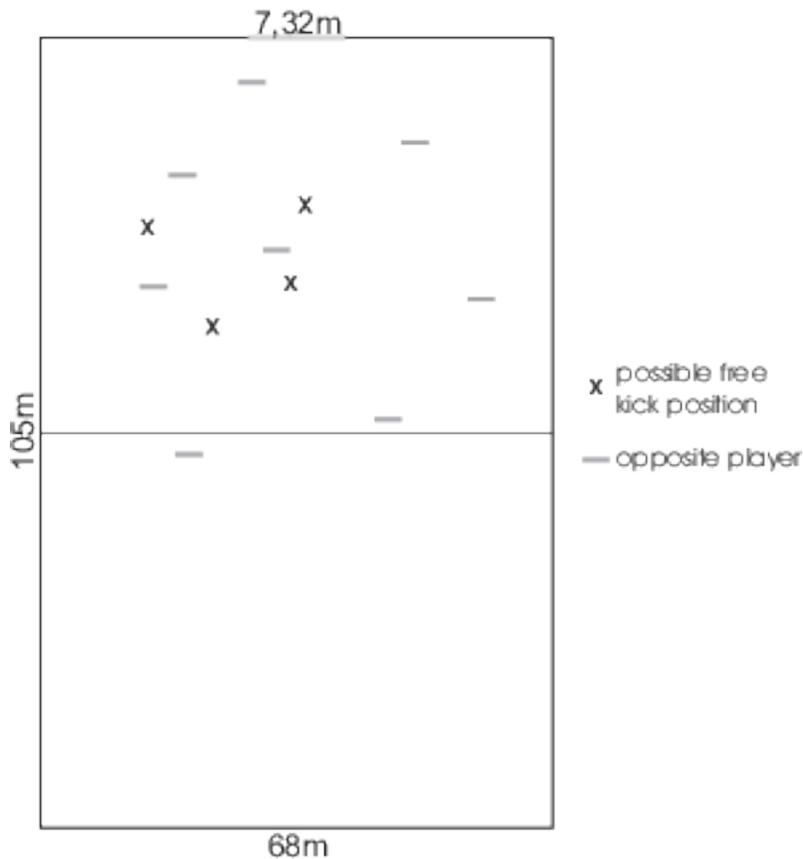
The picture shows that our football ground is a rectangle of 105 × 68 meters. The goal is placed at the center of the top side of the rectangle and is 7.32 meters wide. This example displays eight opponents and four possible free kick positions. You can safely assume that a free kick position is never inside any paperboard figure.

Here is some additional information you cannot find in the picture: the goal is 2.44 meters high and the opponents are of different heights and widths. The opposite players are always in a parallel orientation to the goal line. The bottom left corner of the rectangle of the football ground is the origin of the coordinate system used to specify the positions.

I trained very hard during the last weeks, to get my shot follow a straight line into the desired direction independent of the actual free kick position. But be aware that the ball (which is of negligible size) must not hit or even touch any of the paperboard figures.
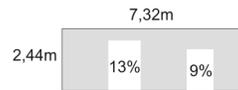
Input

The input contains several testcases, each of them described below.

The first line of a testcase contains two integer numbers p and o, the number of free kick positions and the number of opponents. The following p lines contain the x- and y-coordinates for the possible free kick positions. The next o lines contain the opponent description with four numbers: the height, the width and the x- and y-position of the center of any paperboard figure. Note that each coordinate could be a double number, but is inside the football ground. Every height is less than 2.44 meters and every width is less than 1.0 meter. The testcases are ended by **EOF**.

Output

The first line of every testcase should be `Case #` followed by its number. Then you have to print three lines with the best three free kick positions. If two free kick positions have the same probability then sort them by id. Otherwise sort them by the area of the goal which can be hit from this position. Print the percentage of this goal area rounded to the nearest integer. Have a look at the following situation:

In this example you can hit the gray shaded area of the goal and the white area is blocked by any paperback figure. So the percentage would be 78%.

Print a blank line between two consecutive testcases.

Sample Input 1

```
3 1
34 83
34 75
34 79
1.86 0.7 34 95
3 0
34 75
34 79
34 83
3 1
34 75
34 83
34 79
1.96 0.9 34 85
```

Sample Output 1

```
Case #1
86% with id 2
84% with id 3
82% with id 1

Case #2
100% with id 1
100% with id 2
100% with id 3

Case #3
63% with id 1
47% with id 3
0% with id 2
```