Problem D
Fallingwater

Most likely, you have heard of the famous architectural masterpiece, Fallingwater. Frank Lloyd Wright designed it in 1935 and beautifully integrated the natural flow of water into the house.

Figure D.1: Fallingwater (Kaufmann Residence) by Frank Lloyd Wright.

Lea has planned something much like this for her own house. She will use a waterfall and guide its flow by building stone ledges. She has just one problem: She is unsure where the water will end up. Can you help her?

For this problem, consider the waterfall as two-dimensional. The ledges are given by their start- and endpoint. Water falls down from a given source towards the ground and can never flow upwards. If it touches a ledge it will flow downwards or horizontally along the edge. On horizontal edges, the water splits and continues in both directions. If the point where the water hit the ledge is exactly an endpoint and furthermore the ledge does not go upwards, the water also splits, some of it continues to fall while the rest flows along the edge. See the sketch below.

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

Each test case starts with a line containing three integers n x y where n is the number of ledges, and (x, y) is the location of the water source which is considered to be a single point. n lines follow describing the ledges. The i-th line contains four integers $x_{i,1}$ $y_{i,1}$ $x_{i,2}$ $y_{i,2}$ meaning that the i-th ledge goes from $(x_{i,1}, y_{i,1})$ to $(x_{i,2}, y_{i,2})$ in a straight line.

Output

For each test case, print a line containing "Case #i: x" where i is its number, starting at 1, and x is a space-separated, naturally ordered list of the x-coordinates at which water will arrive at the ground ($y = 0$). Each line of the output should end with a line break.

Constraints

- $1 \leq t \leq 20$

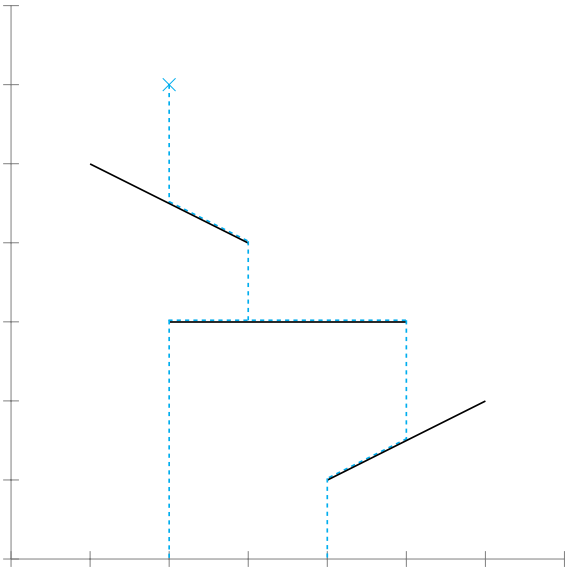

Figure D.2: Case #1

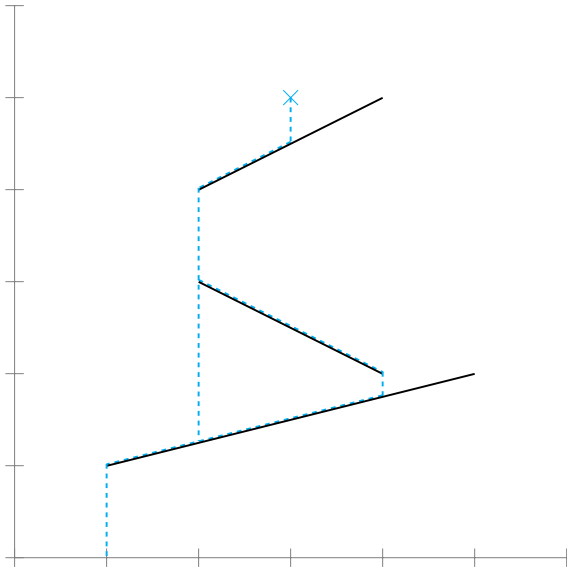

Figure D.3: Case #2

Figure D.4: Illustration of the sample inputs.

- $1 \leq n \leq 100$
- $1 \leq x, y, x_{i,j}, y_{i,j} \leq 100$ for all $1 \leq i \leq n$,$1 \leq j \leq 2$.
- $x_{i,1} \neq x_{i,2}$ for all $1 \leq i \leq n$.
- No two ledges will intersect. Every two points on different ledges are at least 10^{-4} apart.
- The water source is at least 10^{-4} away from each ledge.

Sample Input 1

```
2
3 2 6
1 5 3 4
2 3 5 3
4 1 6 2

3 3 5
2 4 4 5
2 3 4 2
1 1 5 2
```

Sample Output 1

```
Case #1: 2 4
Case #2: 1
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Sample Input 2	Sample Output 2
5 5 8 10 3 1 6 1 4 5 7 1 7 2 8 1 3 3 5 2 2 5 6 2 5 4 10 3 5 10 1 3 1 6 1 8 2 9 1 9 3 10 2 5 2 6 2 3 5 10 4 4 9 1 5 1 6 2 3 1 4 1 3 3 10 9 1 10 4 3 4 4 1 6 5 7 1 5 3 10 2 4 10 1 1 3 7 1 8 4 9 2 6 6 10 3 2 7 5 3	Case #1: 8 Case #2: 10 Case #3: 9 Case #4: 3 4 Case #5: 10