

[Visible Sandwiches]

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Problem Statement

A famous restaurant, **Sefar**, is hosting a unique buffet where sandwiches are spread across a large open field. You are standing at a specific position on the field and observing the sandwiches scattered around. Each sandwich is represented as a point in a 2D plane with coordinates (sx, sy) .

A sandwich is considered **visible** if it satisfies one of the following conditions:

1. It lies along a unique direction relative to your position (x, y) .
2. It is the closest sandwich in that direction, meaning no other sandwich blocks your view.

Your task is to determine the positions of all the **visible sandwiches** for each observation.

Input

- The first line contains **T**, the number of test cases.
- For each test case:
 - The first line contains three integers **x**, **y** and **n**, where **(x,y)** is your observation point and **n** is the number of sandwiches scattered on the field.
 - The next **n** lines each contain **two integers** (sx, sy) , representing the coordinates of each sandwich.

Output

For each test case, extract the coordinates of all visible sandwiches in **ascending order**, first by the x-coordinate and then by the y-coordinate in case of ties.

Examples:

Example 1

Input:

```
1
0 0 5
1 1
2 2
3 3
4 4
5 6
```

Result:

```
1 1
5 6
```

Flag (*flag calc explained at the end of this file*):

```
3aa82834b765ea0421465a785c356dea163579e448ca30a0a2c8684dc5ae590a
```

Explanation:

From observation point (0,0) only the sandwiches at (1,1) and (5,6) are visible because all other sandwiches lying along the same line $y=x$ are blocked by the sandwich at (1,1).

Example 2

Input:

```
1
82 66 10
-410 450
-248 -210
-90 -95
-82 114
-82 162
-28 -72
0 114
41 90
68 -96
83 -78
```

Result:

```
-410 450
-248 -210
-90 -95
-82 114
-28 -72
41 90
68 -96
83 -78
```

Flag:

```
feed8e646e1ab27efc9309e3a4612a6d3ea83bfc70759d190cb5bf59b2ef3075
```

Explanation:

For observation point (82, 66), 2 of the sandwiches are not visible :
Sandwich at (-82, 162) is hidden by sandwich at (0, 114),
Sandwich at (0, 114) is hidden by sandwich at (41, 90),
After eliminating them we have only 8 out of 10 sandwiches to generate the flag from it

How to Calculate the Flag

After computing the visible sandwiches for each test case, you need to **generate the flag** as follows:

1. **Concatenate the coordinates of the visible sandwiches** for each test case, the concatenation should be done in the order of the coordinates on the output.

From the example 1: if the visible sandwiches are at coordinates (1,1),(5,6) concatenate them into a string: "1156".

2. **Sort the coordinates** by x-coordinate and then by y-coordinate in case of ties, and then concatenate them.
3. **Pass the concatenated string to a SHA256 hash function.** The final result will be a 64-character hexadecimal string, which is the **flag**.

For example 1, if the concatenated string is "1156", compute the SHA256 hash of this

`sha256("1156") =>`

`3aa82834b765ea0421465a785c356dea163579e448ca30a0a2c8684dc5ae590a`

For example 2

`sha256("-410450-248-210-90-95-82114-28-72419068-9683-78") =>`

`feed8e646e1ab27efc9309e3a4612a6d3ea83bfc70759d190cb5bf59b2ef3075`