Geometry

Description

Given n points on the x-y plane, A-Long wants to remove minimum points so that the origin, i.e., $(0, 0)$, is not included in the convex hull formed by the remaining points.

You are required to find out the minimum number of points to be removed.

Input

The input contains multiple test cases. The first line contains an integer T, indicating the number of the test cases.

For each test case:

- The first line contains an integer n, indicating the number of total points.
- Each of the following n lines contains two integers x_i, y_i, indicating a point at (x_i, y_i).

Output

For each test case, print one integer in a line, indicating the minimum number of points to be removed.

Sample Input/Output

Input

```
3
2
1 0
2 0
3
1 0
0 1
-1 -1
5
2 -1
1 2
-1 2
-2 -1
0 -2
```

Output

```
0
1
2
```

Explanation

For the third test case, we can remove $(-2, 1)$ and $(-1, 2)$, and the remaining points form a triangle, which excludes the origin.

Constraint

- $1 \leq T \leq 10, 1 \leq n \leq 10^5, 0 \leq |x_i| \leq 10^9, 0 \leq |y_i| \leq 10^9$.
- No two points coincide, and no point or line formed by two points touches $(0, 0)$.