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Algorithms Lab

Exercise – *The Sultans Trail*

You are interested in hiking the Sultans Trail. With its length of more than 2000 kilometers, unfortunately, the trail is way too long for you to hike it in its entirety. You decide to only go for the most popular segment of the trail instead.

To that end, you ask n Sultans Trail finishers about their favorite segment, where the segment of finisher i is specified by an interval $I_i = [l_i, r_i]$ on $\mathbb{R}$ for two integers $l_i \leq r_i$, where we think about the whole trail as $\mathbb{R}$.

As a first step, you want to find a point on the trail that is part of as many finishers' favorite segments as possible. More concretely, you want to determine the maximum number of finishers' favorite segments that share a point, or, in other words, the maximum number of overlapping intervals I_i.

Input The first line of the input contains the number $t \leq 30$ of test cases. Each of the t test cases is described as follows.

- It starts with a line that contains an integer n, where n denotes the number of finishers, where $1 \leq n \leq 10^6$.

- Each of the following n lines defines one finisher's favorite segment. It contains two integers l r, separated by a space, where $0 \leq l \leq r \leq 10^9$.

Output For each test case output a single line that contains a single integer k, where k indicates the maximum number of overlapping intervals.

Points There are three groups of test sets, worth 100 points in total.

1. For the first group of test sets, worth 25 points, you may assume that $n \leq 1000$ and $r_i \leq 1000$ for all i.

2. For the second group of test sets, worth 25 points, you may assume that $n \leq 1000$.

3. For the third group of test sets, worth 50 points, there are no additional assumptions.

Corresponding sample test sets are contained in test$i$.in/out, for $i \in \{1, 2, 3\}$.

Sample Input

```
3
2
1 1
0 0
2
2 3
1 4
4
1 2
2 3
2 3
1 2
```

Sample Output

```
1
2
4
```