10/04/2024, 19:41 Problem - E - Codeforces





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E. Distance Learning Courses in MAC

time limit per test: 2 seconds memory limit per test: 256 megabytes input: standard input output: standard output

The New Year has arrived in the Master's Assistance Center, which means it's time to introduce a new feature!

Now students are given distance learning courses, with a total of n courses available. For the i-th distance learning course, a student can receive a grade ranging from x_i to y_i .

However, not all courses may be available to each student. Specifically, the j-th student is only given courses with numbers from l_j to r_j , meaning the distance learning courses with numbers $l_i, l_i + 1, \ldots, r_i$.

The creators of the distance learning courses have decided to determine the final grade in a special way. Let the j-th student receive grades $c_{l_j}, c_{l_j+1}, \ldots, c_{r_j}$ for their distance learning courses. Then their final grade will be equal to $c_{l_j} \mid c_{l_j+1} \mid \ldots \mid c_{r_j}$, where \mid denotes the bitwise OR operation.

Since the chatbot for solving distance learning courses is broken, the students have asked for your help. For each of the q students, tell them the maximum final grade they can achieve.

Input

Each test consists of multiple test cases. The first line contains a single integer t ($1 \le t \le 2 \cdot 10^4$) — the number of test cases. The description of the test cases follows.

The first line of each test case contains a single integer n ($1 \le n \le 2 \cdot 10^5$) — the number of distance learning courses.

Each of the following n lines contains two integers x_i and y_i $(0 \le x_i \le y_i < 2^{30})$ — the minimum and maximum grade that can be received for the i-th course.

The next line contains a single integer q ($1 \le q \le 2 \cdot 10^5$) — the number of students.

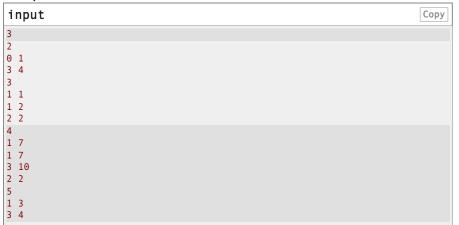
Each of the following q lines contains two integers l_j and r_j $(1 \le l_j \le r_j \le n)$ — the minimum and maximum course numbers accessible to the j-th student.

It is guaranteed that the sum of n over all test cases and the sum of q over all test cases do not exceed $2 \cdot 10^5$.

Output

For each test case, output q integers, where the j-th integer is the maximum final grade that the j-th student can achieve.

Example



Codeforces Round 932 (Div. 2)

Finished

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Register for practice

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Start virtual contest

→ Problem tags



→ Contest materials

- Announcement (en)
- Tutorial (en)

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Note

In the first test case:

- 1. The maximum grade for the first student is 1:
 - On the first distance learning course, he will receive a grade of 1.

Therefore, the final grade is 1.

- 2. The maximum grade for the second student is 5:
 - \circ On the first distance learning course, he will receive a grade of 1.
 - On the second distance learning course, he will receive a grade of 4.

Therefore, the final grade is $1 \mid 4 = 5$.

- 3. The maximum grade for the third student is 4:
 - On the second distance learning course, he will receive a grade of 4.

Therefore, the final grade is 4.

In the second test case:

- 1. The maximum grade for the first student is 15:
 - On the first distance learning course, he will receive a grade of 7.
 - $\circ~$ On the second distance learning course, he will receive a grade of $4. \ \,$
 - $\circ~$ On the third distance learning course, he will receive a grade of $8. \,$

Therefore, the final grade is $7 \mid 4 \mid 8 = 15$.

- 2. The maximum grade for the second student is 11:
 - $\circ~$ On the third distance learning course, he will receive a grade of 9.
 - On the fourth distance learning course, he will receive a grade of 2.

Therefore, the final grade is $9 \mid 2 = 11$.

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