

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 $l_j, l_j + 1, \dots, r_j$.

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 $c_{l_j}, c_{l_j+1}, \dots, c_{r_j}$ for their distance learning courses. Then their final grade will be equal to $c_{l_j} \mid c_{l_j+1} \mid \dots \mid c_{r_j}$, 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 ($1 \leq t \leq 2 \cdot 10^4$) — the number of test cases. The description of the test cases follows.

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

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

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

Each of the following q lines contains two integers l_j and r_j ($1 \leq l_j \leq r_j \leq n$) — 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

input

Copy

```
3
2
0 1
3 4
3
1 1
1 2
2 2
4
1 7
1 7
3 10
2 2
5
1 3
3 4
```

Codeforces Round 932 (Div. 2)

Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Problem tags

bitmasksbruteforcedata structuresgreedy*2400math

No tag edit access

→ Contest materials

Announcement (en)

Tutorial (en)

```

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

```

output

Copy

```

1 5 4
15 11 15 15 7
1 3 3 3

```

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:

- 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.
- On the second distance learning course, he will receive a grade of 4.
- 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:

- 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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