Statement Submissions Questions

Ranged Alfa Pool

Time limit: *2000 ms*
Memory limit: *462 MB*

In Alfa Pool, players play against each other in pairs, in the order dictated by the system. For each game, the winner earns a given number of points and the loser earns no points.

To make the tournament more interesting, the organizers decided on the following set of rules:

- The points awarded are doubled for every successive win. The first win earns 1 point, the second successive win earns 2 points, the third successive win earns 4 points, and so on.
- In case of a loss, the successive win streak resets. A subsequent win earns again 1 point.
- If a player loses twice in a row, they are eliminated from the tournament.

Find out in how many different ways a player can earn between A and B points, before being eliminated. For example, let $A = 2$ and $B = 4$. A player can earn between 2 and 4 points in 12 different ways, where a number K denotes a win earning K points and **X** denotes a loss.

```
1  1 X 1 X X
2  X 1 X 1 X X
3  1 X 1 X 1 X X
4  X 1 X 1 X 1 X X
5  1 X 1 X 1 X 1 X X
6  X 1 X 1 X 1 X 1 X X
7  1 X 1 2 X X
8  X 1 X 1 2 X X
9  1 2 X X
10 X 1 2 X X
11 1 2 X 1 X X
12 X 1 2 X 1 X X
13
```

In all the 12 scenarios above, the player exited the tournament with a total of either 2, 3, or 4 points.

Standard input

Your program must read from the standard input. The first line contains the number of queries N that you have to answer. Each of the following N lines contains one query, consisting of two space-separated non-negative integers A_i and B_i.

Standard output

Your program must print to the standard output exactly N lines, each containing exactly one integer number: the number of different ways in which a player can earn between A_i and B_i points before exiting the tournament. For each query, you have to print the result modulo $10^9 + 7$.

Constraints and notes

- $1 \leq N \leq 10^4$
- $0 \leq A_i \leq B_i \leq 10^6$

Input	Output	Explanation

WORKSPACE / SUBMIT