Problem C. Sum of Log

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

Given two non-negative integers X and Y, determine the value of

$$\sum_{i=0}^{X} \sum_{j=[i=0]}^{Y} [i\&j = 0]\lfloor \log_2(i+j) + 1 \rfloor$$

modulo $10^9 + 7$ where

- & denotes bitwise AND;
- $[A]$ equals 1 if A is true, otherwise 0;
- $\lfloor x \rfloor$ equals the maximum integer whose value is no more than x.

Input

The first line contains one integer T ($1 \le T \le 10^5$) denoting the number of test cases.

Each of the following T lines contains two integers X, Y ($0 \le X, Y \le 10^9$) indicating a test case.

Output

For each test case, print one line containing one integer, the answer to the test case.

Example

standard input	standard output
3 3 3 19 26 8 17	14 814 278

Note

For the first test case:

- Two (i, j) pairs increase the sum by 1: $(0, 1), (1, 0)$
- Six (i, j) pairs increase the sum by 2: $(0, 2), (0, 3), (1, 2), (2, 0), (2, 1), (3, 0)$

So the answer is $1 \times 2 + 2 \times 6 = 14$.