

Problem C. Distinct Number

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

Given n intervals $[l_1, r_1], [l_2, r_2], \dots, [l_n, r_n]$ and an integer x , you should find the size of the set $S = \{y \mid y = i \text{ AND } x, i \in [l_1, r_1] \cup [l_2, r_2] \cup \dots \cup [l_n, r_n]\}$, where $i \text{ AND } x$ is the bitwise *and* of integers i and x .

Input

There are multiple test cases. The first line of input contains an integer T , indicating the number of test cases. For each test case:

The first line contains two integers n and x ($1 \leq n \leq 5 \cdot 10^3$, $0 \leq x \leq 10^{18}$).

Each of the next n lines contains two integers l_i and r_i ($0 \leq l_i \leq r_i \leq 10^{18}$).

It is guaranteed that the sum of n over all test cases does not exceed $5 \cdot 10^3$.

Output

For each test case, output an integer denoting the size of the set S .

Example

standard input	standard output
3	2
2 1	3
1 2	32768
343 34345	
1 3	
1 3	
1 123242343	
1 1000000000000000000	

Note

For the first sample test case, we have $S = \{0, 1\}$, so the answer is 2.

For the second sample test case, we have $S = \{1, 2, 3\}$, so the answer is 3.