



Problem D. Div

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 512 mebibytes

How many integers $x > 0$ exist such that $c_0x^{a_0} + c_1x^{a_1} + \dots + c_{n-1}x^{a_{n-1}}$ is divisible by $x^0 + x^1 + \dots + x^{m-1}$?

Input

The first line contains a single integer t ($1 \leq t \leq 10^5$), denoting the number of test cases.

Each test case is described with two integers n and m ($1 \leq n \leq 10^5$; $1 \leq m \leq 10^9$), followed by n lines containing a pair of integers c_i and a_i each ($|c_i| = 1$; $0 \leq a_i \leq 10^9$).

The sum of n over all test cases does not exceed 10^5 .

Output

For each test case, display the required number, or -1 if it is infinite.

Example

standard input	standard output
3	1
5 2	-1
1 0	2
1 0	
1 0	
1 0	
1 0	
5 3	
-1 2	
-1 1	
-1 0	
1 1	
-1 1	
12 3	
-1 0	
-1 7	
1 8	
1 8	
-1 4	
-1 6	
1 8	
1 2	
1 5	
1 2	
-1 9	
1 5	

Note

In the first test case, $x = 4$ is the only solution.

In the second test case, the quotient is -1 for any $x > 0$.

In the third test case, the solutions are $x = 2$ and $x = 9$.