Joy of Handcraft

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

Little Horse always does some handcrafts, which is full of joy. This time, he builds a circuit that can turn on and off the bulbs periodically.

There are n bulbs in the circuit, the i-th of which has a period t_i and a luminance x_i. Formally, the i-th bulb will be turned on from the $(2kt_i + 1)$-th second to the $(2kt_i + t_i)$-th second, and it will be turned off from the $(2kt_i + t_i + 1)$-th second to the $(2kt_i + 2t_i)$-th second, $k = 0, 1, 2, \ldots$ When the i-th bulb is on, its luminance will be x_i, otherwise its luminance will be 0.

Now, Little Horse wants to know, for each second from the first second to the m-th second, what's the maximum luminance among all the bulbs.

Input

The first line of the input contains an integer T ($1 \le T \le 100$) — the number of test cases.

The first line of each test case contains two integers n, m ($1 \le n, m \le 10^5$) — the number of bulbs, and the number of integers you need to output. The sum of n and the sum of m will not exceed 2×10^5.

Then in the next n lines, the i-th line contains two integers t_i, x_i ($1 \le t_i, x_i \le 10^5$) — the period and the luminance of the i-th bulb.

Output

The x-th test case begins with *Case #x:*, and there follow m integers. The i-th integer indicates the maximum luminance among all the bulbs in the i-th second. If no bulb is on in the i-th second, output 0.

Example

standard input	standard output
3 2 3 1 1 2 2 2 5 1 2 2 3 3 3 1 1 1 2 1 3	Case #1: 2 2 1 Case #2: 3 3 2 0 3 Case #3: 3 0 3