

Mysterious Spacetime

C++/Rust/Pascal 4096x80

C++/Rust/Pascal 512 M1024 M

64bit IO Format: %lld

✖

The input data for this problem is large, please use a faster input method.

In a mysterious spacetime, there are  $x$  unknown energies, numbered from 1 to  $x$ . These energies appear at specific times and positions, following these rules:

1. Spacetime Appearance Rule:

- There are  $n$  different time points, numbered from 1 to  $n$ .
- At time point  $t$ , all energies in the interval  $[l, r]$  will appear and disappear at time point  $t + 1$ .

2. Generation Rule:

- There are  $m$  generators, numbered from 1 to  $m$ . Each generator  $i$  requires all energies in the interval  $[L_i, R_i]$ .
- If at some integer time point  $t$ , at least  $k_i$  energies in the interval  $[L_i, R_i]$  appear simultaneously, then generator  $i$  will be activated at time point  $t$ .
- Each generator is activated only once at the earliest moment when requirements are met.

You need to process  $q$  queries. Each query gives  $tl \ tr \ l \ r$ , asking:

- Within the time range  $[tl, tr]$ , what is the earliest time point  $t$  such that: there exists some generator  $i$  satisfying  $l \leq L_i \leq R_i \leq r$  that is activated at time point  $t$ .
- If no such  $t$  exists, output  $-1$ .

Input:

The first line contains a number  $1 \leq T \leq 10^5$ , indicating there are  $T$  test cases, each in the following format:

The first line contains four integers  $1 \leq n, m, x, q \leq 5 \times 10^5$ .

The next  $n$  lines, each containing three integers  $1 \leq t \leq 10^9, 1 \leq l \leq r \leq x$ , indicating that at time point  $t$ , all energies in interval  $[l, r]$  appear. (The problem guarantees all time points are different)

Output:

C++clang++18

1

ACM