

# Moniphant Sleep

Input file:           standard input  
Output file:         standard output  
Time limit:          3 seconds  
Memory limit:       1024 megabytes

Hello, here is Moniphant! He has a problem for you to solve.



Moniphant discovered that he can traverse multiple levels of sleep, encountering a Mofunfun in each one. Formally, there are 4 types of operations.

1. **Sleep:** Moniphant descends to the next level of sleep.
2. **Wake up:** Moniphant ascends from the current level of sleep, i.e., he goes to the previous level.
3. **Say “You are a pig!” to Mofunfun:** This insults the Mofunfun at the current level, making it angry.
4. **Mofunfun’s retaliation:** Mofunfuns at every level attempt to retaliate against Moniphant, but only the angry ones succeed. Successful retaliation sends Moniphant back to the level of the least infuriated Mofunfun, i.e., the smallest level where a Mofunfun is angry. After retaliating, the Mofunfun is no longer angry. Note that if there are no angry Mofunfuns, this operation is omitted.



The four operations correspond to the pictures above.

**Note that Mofunfun of the current level disappears when Moniphant goes back to smaller levels.**

Now consider a sequence of  $n$  Moniphants, indexed from 1 to  $n$ . Your task is to perform one of the 4 operations on all Moniphants indexed between  $l$  and  $r$ , or determine the sleeping level of a specific Moniphant.

Each Moniphant undergoes the “Sleep” operation (the 1st operation)  $5 \times 10^5$  times before the problem commences.

Input

The first line of the input contains two integers  $n$  and  $q$  ( $1 \leq n, q \leq 5 \times 10^5$ ), indicating the number of Moniphant and the number of operations.

In the following  $q$  lines, there are three integers  $op, l, r$  ( $op \in \{1, 2, 3, 4, 5\}, 1 \leq l \leq r \leq n$ ), if  $op \leq 4$ , it means you should do that type of operation for Moniphants in range  $[l, r]$ . And if  $op = 5$ , then  $l = r$  holds, and you should print the sleeping level of the  $l$ -th Moniphant.

Output

For every operation 5, output a single line contains a single integer, indicating the ansewr.

Examples

standard input	standard output
1 9 1 1 1 1 1 1 1 1 1 3 1 1 2 1 1 1 1 1 1 1 1 4 1 1 5 1 1	500004
3 7 2 1 3 3 1 3 1 1 3 1 1 3 5 1 1 4 1 3 5 1 1	500001 499999

Note

At last, Moniphant hopes you enjoy the contest!

