

Watering System

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 1024 mebibytes

There are n flower pots in a row, numbered from 1 to n . Along the row, you can place watering machines. Each watering machine is characterized by its position x (an integer between 1 and n) and its direction: left or right.

All watering machines share the same watering range L (a non-negative integer).

- A watering machine at position x pointing to the right waters all pots with indices in the segment $[x, x + L]$.
- A watering machine at position x pointing to the left waters all pots with indices in the segment $[x - L, x]$.

Only pots with indices between 1 and n exist.

Initially, there are no watering machines. You need to process q operations of two types:

- **Insert a watering machine.** An operation of the form “1 d x ” inserts a new watering machine at position x .
If $d = 0$, the watering machine points to the left.
If $d = 1$, the watering machine points to the right.
Multiple watering machines may be placed at the same position. Operations are given in chronological order, and there are no deletions.
- **Range query.** An operation of the form “2 ℓ r ” asks the following question:
Consider the current set of watering machines. Suppose all watering machines have the same range L . Find the smallest integer $L \geq 0$ such that every pot with index in the segment $[\ell, r]$ is watered by at least one watering machine. Note that watering machines outside the interval $[\ell, r]$ may help water pots inside $[\ell, r]$. If there is no integer L that makes all pots in $[\ell, r]$ watered (no matter how large L is), you must output -1 for this query.

Input

The first line contains two integers, n and q ($1 \leq n, q \leq 3 \cdot 10^5$), representing the number of pots and the number of operations.

Each of the next q lines describes one operation in the order they must be processed:

- “1 d x ”: insert a watering machine at position x with direction d , ($d \in \{0, 1\}$, $1 \leq x \leq n$). Here, $d = 0$ means the watering machine points to the left, and $d = 1$ means it points to the right.
- “2 ℓ r ”: query the minimal range L for the segment $[\ell, r]$ ($1 \leq \ell \leq r \leq n$).

Output

For each query of the form “2 ℓ r ”, output a single line with one integer:

- the minimal integer $L \geq 0$ such that every pot in $[\ell, r]$ is watered, or
- -1 if it is impossible.

Example

<i>standard input</i>	<i>standard output</i>
10 11	-1
1 0 6	7
2 5 8	6
1 1 3	5
2 9 10	5
2 3 9	4
1 1 8	4
2 1 9	
2 1 8	
1 0 4	
2 3 7	
2 2 9	