IOI '14 P2 - Wall (Standard I/O)

Time limit: 1.0s **Memory limit:** 256M

Jian-Jia is building a wall by stacking bricks of the same size together. This wall consists of n columns of bricks, which are numbered 0 to $n-1$ from left to right. The columns may have different heights. The height of a column is the number of bricks in it.

Jian-Jia builds the wall as follows. Initially there are no bricks in any column. Then, Jian-Jia goes through k phases of *adding* or *removing* bricks. The building process completes when all k phases are finished. In each phase Jian-Jia is given a range of consecutive brick columns and a height h, and he does the following procedure:

- In an *adding* phase, Jian-Jia adds bricks to those columns in the given range that have less than h bricks, so that they have exactly h bricks. He does nothing on the columns having h or more bricks.
- In a *removing* phase, Jian-Jia removes bricks from those columns in the given range that have more than h bricks, so that they have exactly h bricks. He does nothing on the columns having h bricks or less.

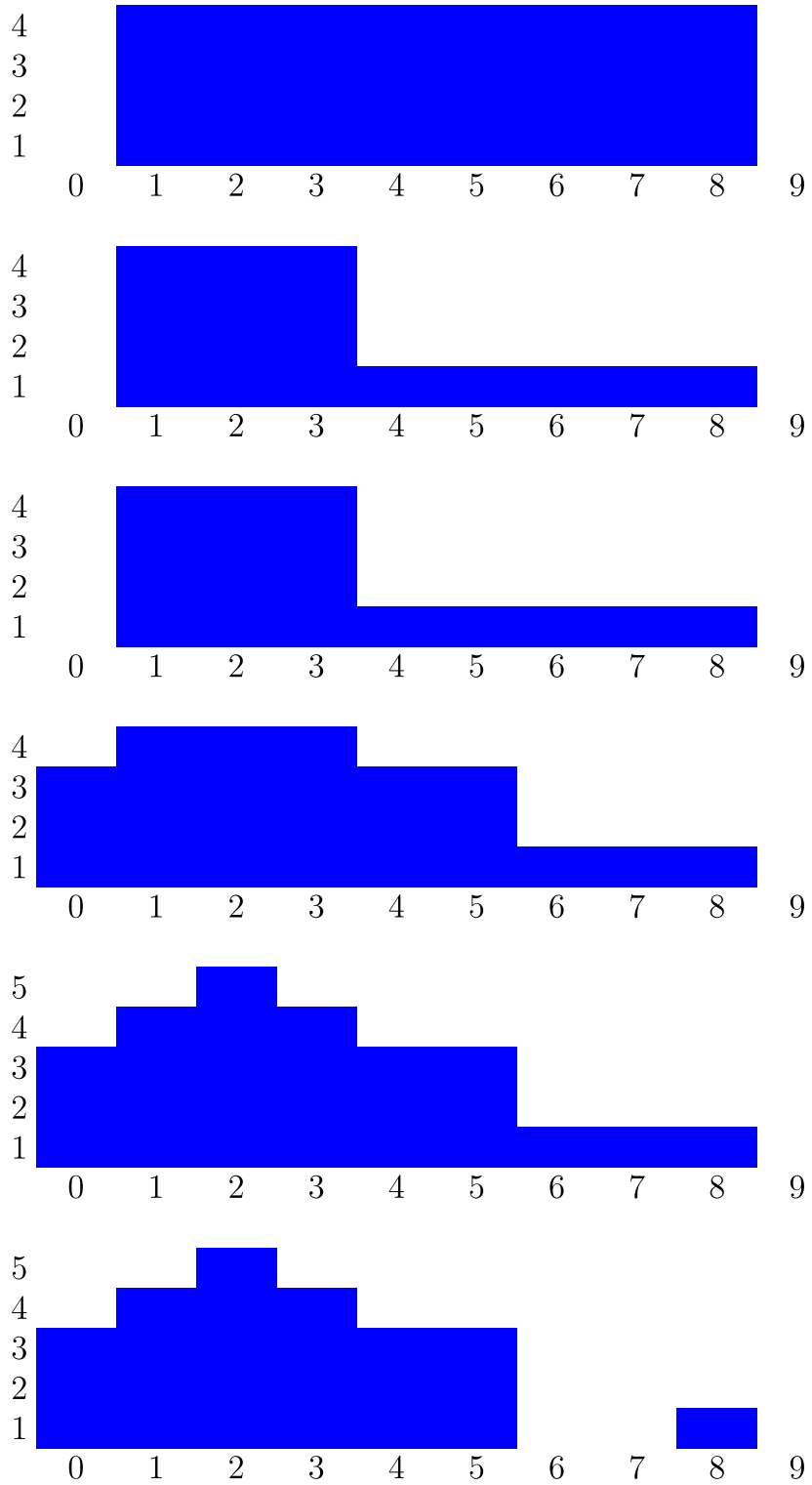
Your task is to determine the final shape of the wall.

Example

We assume that there are 10 brick columns and 6 wall building phases. All ranges in the following table are inclusive. Diagrams of the wall after each phase are shown below.

phase	type	range	height
0	add	columns 1 to 8	4
1	remove	columns 4 to 9	1
2	remove	columns 3 to 6	5
3	add	columns 0 to 5	3
4	add	columns 2	5
5	remove	columns 6 to 7	0

Since all columns are initially empty, after phase 0 each of the columns 1 to 8 will have 4 bricks. Columns 0 and 9 remain empty. In phase 1, the bricks are removed from columns 4 to 8 until each of them has 1 brick, and column 9 remains empty. Columns 0 to 3, which are out of the given range, remain unchanged. Phase 2 makes no change since columns 3 to 6 do not have more than 5 bricks. After phase 3 the numbers of bricks in columns 0, 4, and 5 increase to 3. There are 5 bricks in column 2 after phase 4. Phase 5 removes all bricks from columns 6 and 7.



Given the description of the k phases, please calculate the number of bricks in each column after all phases are finished.

Input Specification

- Line 1 of input consists of the two integers n, and k. n is the number of columns of the wall, and k is the number of phases.
- Line $2+i$ of input each consists of the format: $op[i], left[i], right[i], \text{ and } height[i]$.
  - $op[i]$ is the type of phase i: 1 for an adding phase and 2 for a removing phase, for $0 \leq i \leq k-1$.
  - the range of columns in phase i starts with column $left[i]$ and ends with column $right[i]$ (including both endpoints $left[i]$ and $right[i]$), for $0 \leq i \leq k-1$. You will always have $left[i] \leq right[i]$.

- $height[i]$ is the height parameter of phase i, for $0 \leq i \leq k-1$.

Output Specification

The output should consist of n integers, one per line, describing the result. Line i should describe the final number of bricks in column i, for $0 \leq i \leq n-1$.

Sample Input 1

```
10 3
1 3 4 91220
1 5 9 48623
2 3 5 39412
```

Sample Output 1

```
0
0
0
39412
39412
39412
48623
48623
48623
48623
```

Sample Input 2

```
10 6
1 1 8 4
2 4 9 1
2 3 6 5
1 0 5 3
1 2 2 5
2 6 7 0
```

Sample Output 2

```
3
4
5
4
3
3
0
0
1
0
```

Subtasks

For all subtasks the height parameters of all phases are nonnegative integers less or equal to $100\,000$.

subtask	points	n	k	note
1	8	$1 \leq n \leq 10\,000$	$1 \leq k \leq 5\,000$	no additional limits
2	24	$1 \leq n \leq 100\,000$	$1 \leq k \leq 500\,000$	all adding phases are before all removing phases
3	29	$1 \leq n \leq 100\,000$	$1 \leq k \leq 500\,000$	no additional limits
4	39	$1 \leq n \leq 2\,000\,000$	$1 \leq k \leq 500\,000$	no additional limits