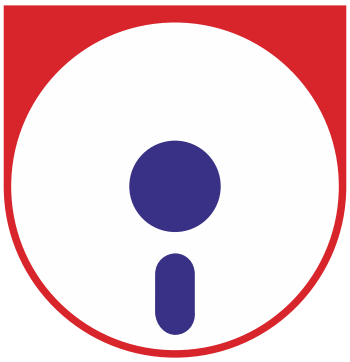


Croatian Open Competition in Informatics

Round 4, January 24th 2026

Tasks

Task	Time limit	Memory limit	Score
Zombie Apocalypse	3 second	512 MiB	50
Tomahawk	1 second	512 MiB	70
Magija	1 second	32 MiB	110
Sladoled	1 second	512 MiB	110
Tjelesni	1 second	512 MiB	110
Total			450

Task Zombie Apocalypse

Vito is obsessed with the new hit video game *Zombie Apocalypse*. He is currently facing the following challenge: m zombies are headed toward the city and will attack it if he doesn't stop them.

More specifically, the zombies are located in a secret cave n meters away from the city and leave the cave one by one. The zombies walk toward the city at a speed of 1 meter per second, and there is a one-second pause between two consecutive zombies leaving the cave.

Thus, after the first second there is one zombie 1 meter away from the cave; after the second second there are zombies 1 and 2 meters away; after the third second there are zombies 1, 2, and 3 meters away, and so on. Whenever a zombie passes the n-th meter, it reaches the city.

According to the rules of the game, Vito is allowed to drop k bombs on the path between the cave and the city in order to stop the attack. For each bomb, he has chosen:

- the position (distance from the cave) where the bomb is dropped,
- the radius of the bomb, and
- the time (in seconds) when the bomb is dropped.

A bomb with radius r dropped at position x at time t will destroy a zombie if it is located at position y at time t such that the distance between x and y is at most r meters, i.e., $|x - y| \leq r$. Zombies that have already reached the city are not affected by bombs. Once a zombie is destroyed, it can no longer continue its journey toward the city.

Vito can choose for the bombs to be dropped with any position, radius, and time, and multiple bombs can occur at the same time, even at the same position.

Given Vito's choices for the k bombs, determine how many zombies will reach the city.

Input

In the first line there are three natural numbers n, m, and k ($1 \leq n, m, k \leq 200$), the length of the path between the cave and the city, the number of zombies, and the number of bombs.

In each of the following k lines there are three natural numbers x, r, and t ($1 \leq x \leq n,\ 0 \leq r \leq n,\ 1 \leq t \leq 500$), the distance in meters from the cave at which one of the bombs is dropped, the radius of that bomb in meters, and the time at which the bomb is dropped in seconds.

Output

In the first and only one line, write one number, the number of zombies that managed to reach the city.

Scoring

Subtask	Points	Constraints
1	13	$m = 1$
2	27	$k = 1$
4	30	No additional constraints.

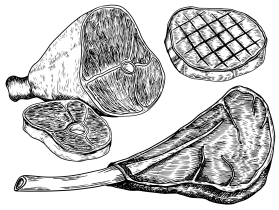
Examples

input	input	input
6 3 3 3 1 2 5 0 7 4 4 8	7 7 1 3 2 6	3 3 1 3 3 3
output	**output**	**output**
1	2	0

Clarification of the first example:

time: 0, cave: {z, z, z}, path: (0, 0, 0, 0, 0, 0), city: {}
time: 1, cave: {z, z}, path: (z, 0, 0, 0, 0, 0), city: {}
time: 2, cave: {z}, path: (z, z, 0, 0, 0, 0), city: {}
time: 2, cave: {z}, path: (z, z, **0**, 0, 0, 0), city: {}
time: 2, cave: {z}, path: (z, 0, 0, 0, 0, 0), city: {}
time: 3, cave: {}, path: (z, z, 0, 0, 0, 0), city: {}
time: 4, cave: {}, path: (0, z, z, 0, 0, 0), city: {}
time: 5, cave: {}, path: (0, 0, z, z, 0, 0), city: {}
time: 6, cave: {}, path: (0, 0, 0, z, z, 0), city: {}
time: 7, cave: {}, path: (0, 0, 0, 0, z, z), city: {}
time: 7, cave: {}, path: (0, 0, 0, 0, **z**, z), city: {}
time: 7, cave: {}, path: (0, 0, 0, 0, 0, z), city: {}
time: 8, cave: {}, path: (0, 0, 0, 0, 0, 0), city: {z}
time: 8, cave: {}, path: (0, 0, 0, **0**, 0, 0), city: {z}
time: 8, cave: {}, path: (0, 0, 0, 0, 0, 0), city: {z}

Task Tomahawk



The chef at the most famous restaurant in Poland is preparing tomahawk steaks for a group of young and cheerful (and very hungry) programmers!

The steak can be represented as an $n \times n$ matrix. Initially, the temperature of the whole steak is 0 degrees. During the cooking process, the temperature in different parts of the steak (i.e., different cells in the matrix) will increase.

In order to prepare the perfect tomahawk steak, the chef lifts the steak and puts it back on the grill q times. Each time, the chef can place the steak on one of three sides: left, right, or down. He will then let the steak cook on that side for x seconds.

When the steak is being baked on its down side, it can be baked for at most n seconds. After this, the temperature of all the cells in the n-th row in the matrix will increase by x, the temperature of the cells in the $n-1$-st row will increase by $x-1$, the temperature of the $n-2$-nd row will increase by $x-2$, ..., the temperature of the cells in row number $n-x+1$ will increase by 1.

When the tomahawk steak is being baked on its right side, it can be baked for at most $\lfloor \frac{n+1}{2} \rfloor$ seconds. After this, the temperature of all the cells in the n-th column in the matrix will increase by x, the temperature of the cells in the $n-1$-st column will increase by $x-1$, the temperature of the $n-2$-nd column will increase by $x-2$, ..., the temperature of the cells in column number $n-x+1$ will increase by 1.

Similarly, when the tomahawk steak is being baked on its left side, it can be baked for at most $\lfloor \frac{n+1}{2} \rfloor$ seconds. After this, the temperature of all the cells in the first column in the matrix will increase by x, the temperature of the cells in the second column will increase by $x-1$, the temperature of the third column will increase by $x-2$, ..., the temperature of the cells in column number x will increase by 1.

We know that the tastiness of the tomahawk is closely related to the contrast of temperatures, that's why the chef wants to find out the difference between the coldest and the hottest part of the steak!

Input

In the first line, there are two natural numbers n and q ($1 \leq n \leq 10^9, 1 \leq q \leq 10^5$), the size of the steak and the number of times the chef lifts the steak.

In each of the following q lines, there is a single letter s and a natural number x. The letter s indicates the side of the tomahawk steak: "L" – left, "R" – right, or "D" – down. If $s =$ "D", then $1 \leq x \leq n$. Otherwise, $1 \leq x \leq \lfloor \frac{n+1}{2} \rfloor$.

Output

In the first and only line, print a single number - the difference in degrees between the coldest and hottest cell on the steak.

Scoring

Subtask	Points	Constraints
1	7	$n, q \leq 20$
2	22	$n, q \leq 1000$
3	31	$n \leq 1000$
4	6	n is even.
5	4	No additional constraints.

Examples

input

```
4 2
L 2
R 1
```

output

```
2
```

input

```
3 3
R 2
D 3
R 2
```

output

```
6
```

Clarification of the first example:

$$\begin{bmatrix}0&0&0&0\\0&0&0&0\\0&0&0&0\\0&0&0&0\end{bmatrix} \rightarrow \begin{bmatrix}2&1&0&0\\2&1&0&0\\2&1&0&0\\2&1&0&0\end{bmatrix} \rightarrow \begin{bmatrix}2&1&0&1\\2&1&0&1\\2&1&0&1\\2&1&0&1\end{bmatrix}$$

Clarification of the second example:

$$\begin{bmatrix}0&0&0\\0&0&0\\0&0&0\end{bmatrix} \rightarrow \begin{bmatrix}0&1&2\\0&1&2\\0&1&2\end{bmatrix} \rightarrow \begin{bmatrix}1&2&3\\2&3&4\\3&4&5\end{bmatrix} \rightarrow \begin{bmatrix}1&3&5\\2&4&6\\3&5&7\end{bmatrix}$$

Task Magija

"Welcome to the SHOW! You are about to witness a spectacular magic performance by Magic Ivor." This is how Ivor imagines the announcement of his first magic performance, but first he needs to prepare.

Ivor will request n volunteers for his tricks and arrange them on the stage. At the left end of the line is person 1, to the right of person 1 is person 2, to the right of person 2 is person 3, and so on.

The tricks that Ivor learns during his preparation can be described in the form l r len. In such a trick, Ivor learns to swap the positions of people, specifically to swap two **disjoint** intervals of equal length: the interval $[l, l + len - 1]$ and the interval $[r, r + len - 1]$. Two intervals are disjoint if they do not have any common volunteers.

Often, Ivor wonders, for a given person x, what are the minimum and maximum positions that this person can occupy if he can use his learned tricks in any order and any ammount of times. He also does not have to use all the tricks he has learned so far.

There are Q events describing Ivor's preparation, and we distinguish between two types of events.

- An event of the form 1 x asks you to answer Ivor's question considering the tricks he has learned so far. He may use the tricks in any order and does not have to use all of them.
- An event of the form 2 l r len indicates a trick that Ivor has just learned.

Your task is to help Ivor and answer all events of the first type.

Input

The first line contains the natural numbers n and q ($1 \leq n, q \leq 2 \cdot 10^5$), as described in the problem text.

Each of the following Q lines describes one event of one of the following forms:

- 1 x – Ivor wants to know the minimum and maximum positions that person x can occupy ($1 \leq x \leq n$).
- 2 l r len – Ivor has learned to swap the intervals $[l, l + len - 1]$ and $[r, r + len - 1]$. It holds that $1 \leq len \leq n$, $l + len - 1 < r$, and $r + len - 1 \leq n$.

Output

After each event of type 1, print two numbers: the minimum and maximum positions that the given person can occupy, separated by a space.

Scoring

Subtask	Points	Constraints
1	9	$N, Q \leq 5$
2	14	$N, Q \leq 15$
3	22	$N, Q \leq 1000$
4	11	$N \leq 4000$
5	17	$N \leq 10000$
6	37	No additional constraints.

Sample Input / Output

input

```
5 3
2 3 4 1
1 5
1 3
```

output

```
5 5
3 4
```

input

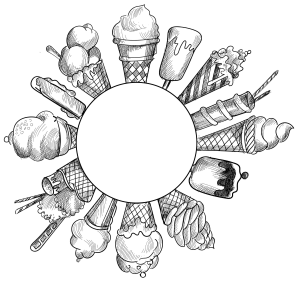
```
9 2
2 1 7 2
1 2
```

output

```
2 8
```

Explanation of the second sample: Ivor has learned to swap the intervals $[1, 2]$ and $[7, 8]$. The minimum position that person 2 can occupy is 2. The maximum position that person 2 can occupy is 8 because Ivor can swap the intervals $[1, 2]$ and $[7, 8]$.

Task Sladoled



In the ice cream city, n ice cream stands have opened, but at the opening, none of the stands had any ice cream scoops for sale.

In the next q days, shipments of ice cream scoops will arrive at some stands. On each of the q days, two integers a and b are given, meaning that stand a received a shipment of ice cream scoops of flavor b on that day.

At each stand, it is also possible to make ice cream combinations. A combination can use the scoops that are **available at that** stand, where each scoop can be used an arbitrary number of times, and a combination consists of at least 1 ice cream scoop.

The value of a combination is equal to the sum of the flavors of the scoops in that combination, and flavors can repeat. We are interested in combinations whose value is less than or equal to 50000 (combinations with higher values are too sweet).

After each day, it is necessary to print how many different **values** of ice cream combinations can be made at the stand that received ice cream scoops **on that** day.

Input

The first line contains the natural numbers n and q ($1 \leq n \leq 100, 1 \leq q \leq 10^5$), as described in the problem statement.

Each of the next q lines contains two numbers a and b ($1 \leq a \leq n, 1 \leq b \leq 50000$), as described in the problem statement.

Output

Print q lines with the answers to the queries described in the problem statement.

Scoring

Subtask	Points	Constraints
1	16	$n = 1, q \leq 20$
2	33	$q \leq 100$
5	61	No additional constraints.

Sample Tests

input

```
1 2
1 3
1 5
```

output

```
16666
49996
```

input

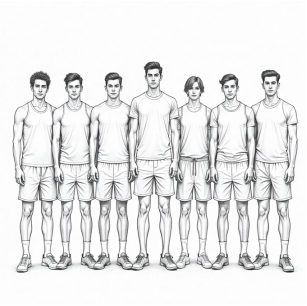
```
2 4
2 35625
1 25139
1 37795
2 17791
```

output

```
1
1
2
3
```

Explanation of the first sample test: After the first day, the values of ice cream combinations at the first stand that can be made are all multiples of 3 less than or equal to 50000. There are 16666 such combinations. After the second day, the only combination values that **cannot** be made are: 1, 2, 4, 7. All other combination values can be made, totaling 49996.

Task Tjelesni



The first semester at the university is coming to an end. Marin decided to attend a PE class in order to collect his 12th attendance and thus pass the course. He was surprised by the number of students waiting in front of the gym.

He counted n students (including himself) and noticed an interesting property: no two students have the same height, and for every integer from 1 to n there is exactly one student of that height.

Before the class started, the students lined up in a row. The heights of the students in the row, observed from left to right, form a permutation p of size n. The professor has some unusual requirements for the order of students in the row, so he decided to issue q commands that must be executed in the given order.

Each command is of the form l_i r_i and means that the students at positions from l_i to r_i (inclusive) need to step out of the row, and then fill the empty positions in the following way: position l_i is filled by the shortest student among those taken out. Position $l_i + 1$ is filled by the tallest of the remaining students. Position $l_i + 2$ is again filled by the shortest of the remaining students, position $l_i + 3$ by the tallest, and so on, alternating between the shortest and the tallest until position r_i is filled.

After executing all the commands, Marin is no longer sure whether he is standing in the correct position or if at some point he moved to the wrong place. However, he remembers the initial permutation p, all q commands in the order they were given, and he has told you his height m. He asks you to determine the position where he should be standing.

Input

The first line contains three natural numbers n, q i m ($1 \leq n, q \leq 10^5, 1 \leq m \leq n$), the numbers from the problem statement.

The second line contains a sequence of n numbers $1 \leq p_i \leq n$, the permutation p.

Each of the next q lines contain two numbers $1 \leq l_i \leq r_i \leq n$, the i-th command.

Output

In the first and only line output one number - the position Marin should occupy.

Scoring

Subtask	Points	Constraints
1	7	$n, q \leq 1000$
2	11	$l_i = 1$, for each $1 \leq i \leq q$
3	17	$m = 1$ or $m = n$
4	24	$n, q \leq 5000$
5	51	No additional constraints.

Sample tests

input

```
7 3 3
4 2 3 7 1 6 5
4 7
3 5
1 4
```

output

```
5
```

input

```
6 4 1
5 3 6 2 1 4
2 4
3 5
2 6
5 6
```

output

```
2
```

input

```
8 2 5
8 7 6 5 4 3 1 2
2 8
1 7
```

output

```
7
```

Explanation of the first sample test: After executing the first command, the heights of the students in the row are: 4 2 3 1 7 5 6. After executing the second command the heights are: 4 2 1 7 3 5 6. In the end, after executing the third command, the row should look like this: 1 7 2 4 3 5 6. Marin should occupy the 5^{th} position from the left.