Frequencies

On an $n \times n$ matrix, initially empty, you perform m operations. Each operation can be of the following two kinds:

- $\text{Horizontal}(l, r, x)$: All cells in rows $l, l+1, \ldots, r$ are set to value x;
- $\text{Vertical}(l, r, x)$: All cells in columns $l, l+1, \ldots, r$ are set to value x.

After executing all operations, report how many times do the least and most frequent elements occur in the matrix.

Input

The first line contains the size of the matrix n, and the number of operations m. Each of the next m lines describe one operation. The i^{th} operation is described by 4 values t_i, l_i, r_i, x_i, where t_i is a character that describes the kind of the i^{th} operation (either `H` for horizontal or `V` for vertical) and l_i, r_i, x_i describe the i^{th} operation.

Output

The output consists of a single line that contains the frequency of the element that appears least often fr_{min}, and the frequency of the element that appears most often in the matrix fr_{max} after carrying out the m operations.

Constraints

- $1 \leq n \leq 1\,000\,000$
- $t_i \in \{\texttt{H}, \texttt{V}\}$
- $1 \leq l_i \leq r_i \leq n$
- $1 \leq m \leq 200\,000$
- $1 \leq x_i \leq 100\,000$

Subtasks

- For 20 points: $1 \leq n \leq 1\,000, 1 \leq m \leq 100, 1 \leq x_i \leq 40$
- For another 20 points: $1 \leq n \leq 2\,000, 1 \leq n^2 \cdot m \leq 1\,000\,000\,000$
- For another 20 points: $1 \leq n \leq 6\,000, 1 \leq m \leq 100\,000$
- For another 20 points: $1 \leq n \leq 200\,000$

- For another 20 points: No further restrictions

Note: The tests for this task are scored individually!

Examples

Input Example #1

```
5 4
H 1 4 2
H 3 5 1
V 2 2 1
H 3 4 3
```

Output Example #1

```
7 10
```

Input Example #2

```
6 5
V 5 5 3
H 4 5 4
V 1 6 3
V 1 2 2
V 4 4 2
```

Output Example #2

```
18 18
```

Input Example #3

```
6 5
H 3 4 2
V 4 5 1
V 4 6 2
H 5 6 2
H 5 6 4
```

Output Example #3

```
12 18
```

Input Example #4

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

Output Example #4

```
6 34
```

Explanation

In the **first example**, after applying all the operations, the matrix looks as follows:

$2 \quad 1 \quad 2 \quad 2 \quad 2$

$2 \quad 1 \quad 2 \quad 2 \quad 2$

$3 \quad 3 \quad 3 \quad 3 \quad 3$

$3 \quad 3 \quad 3 \quad 3 \quad 3$

$1 \quad 1 \quad 1 \quad 1 \quad 1$

The least frequent element is 1 with a frequency of 7, and the most frequent element is 3 with a frequency of 10.

In the **third example**, after applying all the operations, the matrix looks as follows:

$\_ \quad \_ \quad \_ \quad 2 \quad 2 \quad 2$

$\_ \quad \_ \quad \_ \quad 2 \quad 2 \quad 2$

$2 \quad 2 \quad 2 \quad 2 \quad 2 \quad 2$

$2 \quad 2 \quad 2 \quad 2 \quad 2 \quad 2$

$4 \quad 4 \quad 4 \quad 4 \quad 4 \quad 4$

$4 \quad 4 \quad 4 \quad 4 \quad 4 \quad 4$

The least frequent element is 4 with a frequency of 12, and the most frequent element is 2 with a frequency of 18.