A. DSU with rollback

time limit per test: 2 seconds
memory limit per test: 256 megabytes

In this problem, you have to implement DSU with rollback. This data structure should support three operations:

- "`union` u v" — unite two sets that contain u and v, and output the current number of disjoint sets.
- "`persist`" — create a checkpoint to which the structure can rollback later.
- "`rollback`" — rollback to the latest checkpoint, get rid of the point, and output the current number of disjoint sets.

Input

The first line of the input contains two integers n and m ($1 \le n, m \le 2 \cdot 10^5$) — the initial number of one-size sets and the number of queries.

Next m lines contain the description of queries, one per line. For a union query the line looks like "`union` u v" ($1 \le u, v \le v$). For the creation of a checkpoint query the line looks like "`persist`". For a rollback query the like looks like "`rollback`". It is guaranteed that for each rollback query there exists the save point that is not yet removed.

Output

For each operation "`union`" and "`rollback`" output the current number of disjoint sets in a separate line.

Example

input Copy

```
5 10
persist
union 1 2
union 3 4
persist
union 1 4
union 2 3
rollback
union 4 5
rollback
union 1 5
```

output Copy

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