C. Dynamic Connectivity Offline

time limit per test: 4 seconds

memory limit per test: 256 megabytes

You are given an empty undirected graph with n vertices. You have to answer the queries of three types:

- "+ u v" — add an undirected edge u - v to the graph.
- "- u v" — remove an undirected edge u - v from the graph.
- "?" — calculate the number of connected components in the graph.

Input

The first line of the input contains two integers n and m ($1 \le n \le 3 \cdot 10^5$, $0 \le m \le 3 \cdot 10^5$) — the number of vertices and the number of queries, respectively. Next m lines contain the description of the queries, one per line. For a query "+" the line looks like "+ u v" ($1 \le u \ne v \le n$). It is guaranteed that the graph does not contains such an edge. For a query "-" the line looks like "- u v" ($1 \le u \ne v \le n$). It is guaranteed that the graph contains such an edge. For a query "?" the line looks like "?".

Output

For each "?" query, output the number of connected components in the graph at the time of the query on a separate line.

Example

input Copy

```
5 11
?
+ 1 2
+ 2 3
+ 3 4
+ 4 5
+ 5 1
?
- 2 3
?
- 4 5
?
```

output Copy

```
5
1
1
2
```