

CALENDAR HELP HOME TOP CATALOG CONTESTS GYM PROBLEMSET GROUPS RATING EDU API

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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 "+ uv" ($1 \le u \ne v \le n$). 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	ру
5 11	
?	
+ 1 2	
+ 2 3	
+ 3 4	
+ 4 5	
+ 5 1	
?	
- 2 3	
?	
- 4 5	
?	
output	ру
5	
1	
1	
2	

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