Fairy Chimneys

Fairy chimneys of Cappadocia is so fascinating that many people have dreaming of climbing on top and jumping from one to another. Dreams are coming true…

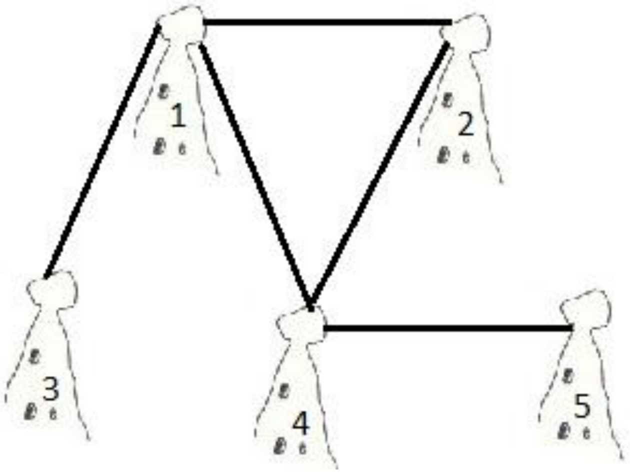
Regional tourism administration decided to build bidirectional bridges connecting some fairy chimneys. However, material used in the bridges is so weak that they fall right after the first use. From time to time the administration adds new bridges. Each fairy chimney is assigned a scenery value which is calculated as *the number of distinct fairy chimneys the visitor can go and come back*.

There are **N** fairy chimneys (numbered 1,2,…,**N**) and initially there is no bridge. The administration has **Q** operations each of which is either:

- Add `(a x y)`: builds a bidirectional bridge between chimneys x and y.
- Query `(q x)`: queries the scenery value of chimney x at the time of the query.

Given the number of fairy chimneys **N** and operations **Q**, your task is to find answers to the query type of operations.

Example



Let **N**=5. Assume that after some add operations we obtained the bridge network shown on the left. Then consider the operation sequence,

```
q 1
q 3
a 3 2
q 3
```

The answer to the first query (`q 1`) is 3. From chimney 1 it is possible to go and come back to chimney 1 (without using any bridges). It is also possible to go chimneys 2 and 4 and come back to chimney 1. But it is impossible to go 3 or 5 to go and come back. The answer to the second query is 1. The third operation adds a bridge between chimneys 3 and 2, so the number of bridges is now 6. The answer to the last query is 4,as from chimney 3 we can go chimneys 3(itself), 1(passing through 3->1->2->3), 2(passing through 3->1->2->3) and 4(passing through 3->1->4->2->3) and come back to 3.

Task

Please write a program that finds answers to the "q" (query) type of operations. The input/output format is explained below with a sample.

input file (Standard Input)	output file (Standard Output)
5 9 a 1 2 a 1 3 a 1 4 a 2 4 a 4 5 q 1 q 3 a 3 2 q 3	3 1 4

Input format: The first line has two space-separated integers (**N** and **Q,** in this order). Next **Q** lines contain the mixed add and query operations. Entries in the same lines are space-separated.

Output format: Answers to the queries in respective order.

Subtasks

Subtask 1 (14 points)

1≤N≤1 000, 1≤Q≤5 000

Subtask 2 (18 points)

1≤N≤5 000, 1≤Q≤500 000

Subtask 3 (23 points)

1≤N≤50 000, 1≤Q≤500 000

Subtask 4 (10 points)

1≤N≤1 000 000, 1≤Q≤5 000 000
Query type of operations begins after all the add type of operations finishes.

Subtask 5 (35 points)

1≤N≤1 000 000, 1≤Q≤5 000 000

Implementation details

You have to submit only one file, called `chimneys.c`, `chimneys.cpp` or `chimneys.pas`. The file implements your full program.