

4360 Junk-Mail Filter

Recognizing junk mails is a tough task. The method used here consists of two steps:

- 1) Extract the common characteristics from the incoming email.
- 2) Use a filter matching the set of common characteristics extracted to determine whether the email is a spam.

We want to extract the set of common characteristics from the N sample junk emails available at the moment, and thus having a handy data-analyzing tool would be helpful. The tool should support the following kinds of operations:

- a) 'M X Y ', meaning that we think that the characteristics of spam X and Y are the same. Note that the relationship defined here is *transitive*, so relationships (other than the one between X and Y) need to be created if they are not present at the moment.
- b) 'S X ', meaning that we think spam X had been misidentified. Your tool should remove all relationships that spam X has when this command is received; after that, spam X will become an isolated node in the relationship graph.

Initially no relationships exist between any pair of the junk emails, so the number of distinct characteristics at that time is N .

Please help us keep track of any necessary information to solve our problem.

Input

There are multiple test cases in the input file.

Each test case starts with two integers, N and M ($1 \leq N \leq 10^5$, $0 \leq M \leq 10^6$), the number of email samples and the number of operations. M lines follow, each line is one of the two formats described above.

Two successive test cases are separated by a blank line. A case with $N = 0$ and $M = 0$ indicates the end of the input file, and should not be processed by your program.

Output

For each test case, please print a single integer, the number of distinct common characteristics, to the console. Follow the format as indicated in the sample below.

Sample Input

```
5 6
M 0 1
M 1 2
M 1 3
S 1
M 1 2
S 3
```

3 1
M 1 2

0 0

Sample Output

Case #1: 3
Case #2: 2