7666 Subsets

Sets are important in mathematics. Almost any thing can be put into a set, as long as the universe of the elements is determined. For a universe Σ of n elements, there are totally 2^n different subsets of Σ. These subsets, again, can be collected as a set, which is often called a *family*. It is not difficult to see that there are 2^{2^n} different ways to collect them.

For example, let $\Sigma = \{1, 2, 3\}$. Then, $S = \{\{1\}, \{2, 3\}\}$ is a family of subsets of Σ having 2 subsets. Similarly, $T = \{\{\}, \{1\}, \{1, 2, 3\}\}$ is a family having 3 subsets.

In the following, we consider basic operations to manipulate families of subsets. Let A and B be any families of subsets of Σ and x be an element of Σ.

- `Make`(x_1, x_2, …, x_k). Build the family of subsets $\{\{x_1, x_2, \ldots, x_k\}\}$ where $x_i \in \Sigma$ for $1 \le i \le k$. For example, `Make`(1, 3) = {{1, 3}}, which is a family having the subset {1, 3} as its only element.
- `Union`(A, B). Build the family of subsets belonging to A or B.
- `Intersect`(A, B). Build the family of subsets belonging to both A and B.
- `Diff`(A, B). Build the family of subsets belonging to A but not to B.
- `Put`(A, x). Put x into all subsets in A. It x is already in this subset, leave it unchanged; otherwise add x into it.
- `Rem`(A, x). Remove x from all subsets in A. If x is in this subset, remove it; otherwise leave this subset unchanged.
- `Card`(A). Calculate the number of subsets in A.

For example, let $S = \{\{1\}, \{2, 3\}\}$ and $T = \{\{\}, \{1\}, \{1, 2, 3\}\}$. Then

- `Make`()={{}};
- `Union`(S, T)={{}, {1}, {2, 3}, {1, 2, 3}};
- `Intersect`(S, T)={{1}};
- `Diff`(S, T)={{2, 3}};
- `Put`(S, 2)={{1, 2}, {2, 3}};
- `Rem`(T ,1)={{}, {2, 3}}; and
- `Card`(T)=3.

Notice that in a set (or family) identical elements are combined as one element. Please write a program to perform a series of basic subset operations specified in the test data.

Technical Specification

1. There is only one test case and there are roughly 500 lines that you need to simulate.
2. The hardest family of subsets is built from about 260 commands.
3. The universe is fixed to be $\Sigma = \{1, 2, 3, \ldots, 50\}$.

Input

There is exactly one command per line. Each line in the test data is implicitily associated with a line number, which starts from 1. We use this line number as a reference to the family of subsets that is built after applying the corresponding operation. The syntax of each basic operation is as follows.

- `Make` x_1 x_2 ... x_k
- `Union #`i `#`j
- `Intersect #`i `#`j
- `Diff #`i `#`j
- `Put #`i x
- `Rem #`i x
- `Card #`i

Here, i and j are line numbers before the current execution line and '`#`' is a fixed leading symbol for identifying a line number. Integers $x, x_1, \ldots, x_k \in \Sigma$. When '`Card`' is encountered, output its value in a line. There is a single '`0`' in the last line of the test data, denoting the end of input.

Output

Please output the value after each execution of operation '`Card`' in a single line.

Sample Input

```
Make 1
Make 2 3
Union #1 #2
Make
Make 1
Make 1 2 3
Union #4 #5
Union #6 #7
Card #3
Card #8
Union #3 #8
Card #11
Rem #8 1
Card #13
0
```

Sample Output

```
2
3
4
2
```