Simply Sets

Problem #8
Novice / Advanced
8 points

C programmers: your program name must be: prob08.exe
JAVA programmers: your program name must be: Prob08.class

Task Description

A set is a collection of objects considered as a whole. The objects of a set are called elements or members. The elements of a set can be anything: numbers, people, letters of the alphabet, other sets, and so on. Sets are conventionally denoted with capital letters, A, B, C, etc

There are several ways to construct new sets from existing ones:

- Two sets (A and B) can be "added" together. The new set is said to be the **Union** of A and B.

    A = { 1, 2, 5, 7}
    B = { 1, 2, 3, 6}

    A + B = { 1, 2, 3, 5, 6, 7 }

- A new set can also be constructed by determining which members two sets (A and B) have "in common". The new set is said to be the **Intersection** of A and B. If no elements are contained in both sets, then A and B are said to be **Disjoint**.

    A = { 1, 2, 5, 7}
    B = { 1, 2, 3, 6}

    A ∩ B = { 1, 2 }

- Two sets (A and B) can also be "subtracted".   The **Relative Complement** of A in B (B-A) is the members of set B that are not in set A.

    A = { 1, 2, 5, 7}
    B = { 1, 2, 3, 6}

    B – A = { 3, 6 }

A set may have zero members. This set is referred to as an empty set of a **Null** set.

Your task will be to construct a new sets out of two given set and one of the set operations explained above.

Program Input

Sample data is contained in Prob08.in. Read this data using one of the methods described on your "Contest Instructions" sheet, under "Program Input/Output". Your program should read multiple sets of three-line instructions. The first line will represent the elements in Set A and the second, Set B. An element may be a number, letter, or any alpha-numeric string. Each element is separated by a comma. The third line will be one of the following three operations: **Union, Intersection,** or **Complement**. This series may repeat itself indefinitely, but will always contain two sets followed by an operation.

Program Output

You are to perform the operation given on the previous two sets and output the new set. Each new set should appear on a new line, and each element of the set should be separated by a common. No extra

whitespace is permitted. For empty sets, your program should output the word, **Null**. For the
Complement operation, you should output the relative complement of A in B (B – A). Your output set
should list all of the elements (in order presented) that come from set A followed by the elements (in order
presented) from set B.   In other words, there is exactly one way to order the elements in your output set.

Sample Program Input / Output
Sample Input:

```
1,Green,red,4,6
1,2,Red,8,3
Union
1,5,7,D,B
D,5,7,Green
Intersection
1,10,55
2,6,8,9
Intersetion
Blue,33,9,D
Blue,67,8,D
Complement
```

Sample Output:

```
1,Green,red,4,6,2,Red,8,3
5,7,D
Null
67,8
```