Assignment #2 (An application of C++)

Goal：Use C++ to implement a set class, which provides insertion, deletion, union, intersection, difference, and inclusion as basic operations.

Guide：

The Pascal language provides the operation for set classes, while the C language does not. Therefore, you are asked to implement a set class with C, which facilitates the operations on sets. The operators of your set class are the same with those in Pascal.

Assume A and B are both sets. The following symbols are used to define each operation:

“x belongs to A” is represented as “x in A”
The union of A and B is represented as “A + B”
The intersection of A and B is represented as “A * B”
The difference of A and B is represented as “A – B”
”A contains B” is represented as “A >= B”

For simplicity, each element in this assignment is a single character. That is, you can use long bit string to store all elements in a set. Because the ASCII code has 256 different values, you are recommended to use an array of size 256 to represent a set.

Output: To test your implementation, your program should provide a console interface for users to input two sets A and B, and then output the results of all operations mentioned above.

Note: In this assignment you have to overload the operators (define what your operators are and what they can do). Suppose that you have implemented a set class named TSet, then programmers should be able to take advantage of your implementation. For example, he should be able to write the following codes.

```
TSet A, B, C, D;   //declaration for the class TSet
C = A+B;   //Store the union of A and B into C
D = A*B;   //Store the intersection of A and B into D
```

To facilitate our testing (and your testing), the input and output format are given as follows. (Note that you have to follow these formats, otherwise you do not finish the assignment)

Input:

2

abcdef

chfeechi

h

3abf4ec

43

g

In the above example, the number ‘2’ in the first row means there are two data sets for testing. Each dataset contains two strings and one character. These two strings represent two input sets (A and B), in which elements may be repeated. The correct output for the above example is as follows:

Output:

Test Case 1:

A: {abcdef}

B: {cefhi}

A+B: {abcdefhi}

A*B: {cef}

A–B: {abd}

B–A: {hi}

A does not contain B

B does not contain A

‘h’ is not in A

‘h’ is in B

Test Case 2:

A: {34abcef}

B: {34}

A+B: {34abcef}

A*B: {34}

A–B: {abcef}

B–A: {}

A contains B

B does not contain A

‘g’ is not in A

‘g’ is not in B

You can assume that TA will not input invalid inputs (you do not have to check if the inputs are valid or not). However, the number of testing data sets are not confined to 2. Therefore, please be ware of the first number in the input, which represents the total number of testing data sets. In addition, the input characters in each input string are not necessarily sorted by ASCII order (you can see the example above). Nonetheless, in your output you are asked to sort these characters by ASCII order. Please also remember to implement your set class by overriding operators, otherwise your program will not be accepted.