

# ACM Pacific NW Region Programming Contest

## 15 November 2003

### PROBLEM I: COMPRESS

Reduce the number of digits.

#### DESCRIPTION

An experimental physicist generates a great deal of data from experiments that he performs. The data generated from these experiments has a special property, and he wants to take advantage of this property to reduce the amount of space needed to store the results.

The data is generated in pairs of numbers, where the first number is always less than or equal to the second number. The way that the physicist wants to store these numbers is similar to the way some people abbreviate a range of numbers in a book. For example, when they refer to pages 11 through 18 in a book, they will sometimes denote it as 11–8.

In particular, here are the rules for decoding the "compressed" second number:

Some notation definitions:

The first of a pair of numbers is denoted by  $F$ .

For example, in "18482–02",  $F = 18482$

The second of a pair of numbers (in compressed form) is denoted by  $C$ .

For example, in "18482–02",  $C = 02$

The second of a pair of numbers (in decoded form) is denoted by  $R$ .

For example, in "18482–02",  $R = 18502$

$MSD(x,y)$  refers to the ' $x$ ' most significant digits of ' $y$ ' when ' $y$ ' is denoted in base ten.

For example:  $MSD(3,19283) = 192$

$LSD(x,y)$  refers to the ' $x$ ' least significant digits of ' $y$ ' when ' $y$ ' is denoted in base ten.

For example:  $LSD(2, 48290) = 90$

The rules:

The number  $C$  is always written with the fewest possible digits. Consequently, if  $F$  and  $R$  are the *same* (which *can* happen), just that number is printed.

If the number  $C$  is larger than  $F$ , then  $R$  is the same as  $C$ .

For example, given: "123–283", then  $F=123$ ,  $C=283$ , and  $R$  would be 283

If  $C$  is less than or equal to  $F$ , then the following rules apply:

$LSD(\text{length}(C), R)$  will always be the same as  $C$ .

If  $LSD(\text{length}(C), F)$  is less than  $C$ , then  $R$  is equal to  $MSD(\text{length}(F) - \text{length}(C), F)$ , prepended to the digits of  $C$ .

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For example, given: "4137-223", then:

F=4137, C=223:

LSD(length(C),R) = 223

MSD(4 - 3, 4137) = 4

R would be 4223

If LSD(length(C), F) is greater than or equal to C, then R is equal to  $10^{\text{length}(C)}$  added to the following value: MSD(length(F) - length(C), F), prepended to the digits of C.

For example, given: "8543-13", then

F=8543, C=13:

LSD(length(C),R) = 13

MSD(4 - 2, 8543) = 85

$10^2 = 100$

R would be  $8513 + 100 = 8613$

Please note that leading zeros on the number C are significant. '7' is not the same as '07', and neither of them are the same as '007'.

For example:

given: "2839-06", then F=2839, C=06 so R would be 2906

given: "2839-006", then F=2839, C=006 so R would be  
3006

Your task is to compute the "compressed" second number format from it's uncompressed version.

### INPUT: [i.in](#)

In the input file, the first line of input specifies the number of problems in the file. Each subsequent line of input will consist of a pair of non-negative integers separated by a hyphen, where the second number is always larger than or equal to the first number. The second number will always be less than  $2^{31}-1$ . Note that the end-of-line character terminates every line in the input file, including the last one.

```
4
10-18
83294-84137
100-200
137-137
[EOF]
```

### OUTPUT:

Each line of output will consist of a single number (in cases where the first and second numbers are the same) *or* of the first number, followed by a hyphen, followed by the "compressed" version of the second number.

The output file has a format similar to the input file.

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- There is one line of output for each input problem.
- The first number is printed out verbatim.
  - If the first and second number are the same, nothing else is printed
  - Otherwise
    - § There is a hyphen between the first and second number.
    - § The second number is printed out in the compressed format.
- There are no spaces or tabs on any data line.

The correct output corresponding to the example input file would be

```
10-8  
83294-137  
100-00  
137  
[EOF]
```