



**JAVA programmers: your program name must be: Prob10.class**

**C programmers: your program name must be: prob10.exe**

### Task Description

A number system is a means of interpreting symbols used for Mathematic expression. The base of a number system is value raise to some power by which each place in the number symbol is multiplied in order to come up with the value represented by that place. For example, in base 10, the number 1234 represents the value  $(1 \times 10^3) + (2 \times 10^2) + (3 \times 10^1) + (4 \times 10^0)$ . The same number in base 19 represents the value  $(1 \times 19^3) + (2 \times 19^2) + (3 \times 19^1) + (4 \times 19^0)$ . If we let a, b, c... symbols represent the place values beyond 9 (i.e. 10, 11, 12...), then the number a1b in base 19 represents the value  $(10 \times 19^2) + (18 \times 19^1) + (11 \times 19^0)$ .

Your task is to interpret numbers from different number systems, execute mathematical operations on those numbers, and output the result in another number system. Each input number will be formatted as both a value and a base, with a carat (^) symbol separating them. So the number abc in base 17 will be expressed as abc^17. Applicable operations include addition, subtraction, and multiplication (no division). You must execute operations in the correct order, i.e. all multiplications are executed before any additions or subtractions can be executed. No parenthetical groupings will be present. The operators, +, -, and \* will be used to represent addition, subtraction, and multiplication, respectively. These operators will separate input numbers, and your program must interpret them correctly. No whitespace will be present in the inputs except for a newline character at the end of the input stream.

The last data input will be an equals sign (=), followed by a carat (^) and then the base in which you must output your result.

There will be no bases smaller than base 2; there will be no bases larger than base 20. All bases larger than base ten will use the lowercase alphabetic symbols a, b, c... to represent place values larger than 9.

### Sample Input/Output

Expression: 1b^13+j3a67^20-hhh^19+123^6\*123^7=^15  
408260^15

Expression: 1db7^14+egg^18-hi32^20+3876^9-321^4=^7  
-1051236^7

Expression: 1db7^14+egg^18+hi32^20\*3876^9\*2j^19-ia62^18+321^4=^20  
ia9j5bjc^20