2 - All Your Base

Premise: Given a specification for a "base" (well, actually a mixed radix number system), take in pairs of numbers written in our "base", perform a specified operation on them and output the result in our base.

The Base: A number system where the right-most digit (digit 1) can be a counting number between 0 and 1, the second right-most digit (digit 2) can be a counting number between 0 and 2 and, more generally, each digit *n* (as labeled from the right) can have values between 0 and *n*. After 9, upper case letters are used, starting with A and going through Z. After the highest digit (which can be 0-Z), no further digits are possible; any numbers which go past that digit are invalid. Negative numbers are prefixed with a single "-" sign. Numbers never have leading zeros, with the exception of zero itself, which is represented by a single "0" character.

Operations: Addition (+) and subtraction (-): The numbers are added or subtracted as normal (including carrying, borrowing, etc).

Input:

- The first line of input is the number (base 10) of operations that need to be performed.
- Each following line will be at most 1000 bytes and will consist of a variable-radix number, a space, a single character indicating the operation (+, or -), a space, another variable-radix number, and a newline (LF).
- Either number for any operation (and also the result) may be negative.

Output:

- For each operation in the input, a single line of output should be produced containing either the result (a variable-radix number) or the string "Invalid") (without quotes) followed by a newline (LF).
- If either of the input numbers or the resulting number is not valid in the number system, or an error is encountered while performing the operation, the result is invalid.

Input	Output	Notes
3		Number of operations; no output for this line
3 + 5	Invalid	Neither number is valid
9987654321 + 1	A000000000	
-A000000000 - 1	-A000000001	