A2 – Crypto-Math

A common puzzle is to present a math problem where each digit is replaced by a letter. So, for example the sum:

$$\begin{array}{r} 112 \\ +\ 234 \\ \hline 346 \end{array}$$

could be represented as:

$$\begin{array}{r} AAB \\ +\ BCD \\ \hline CDE \end{array}$$

where A=1, B=2, C=3, D=4, and E=6. Notice that the same digit always replaces all instances of the same letter. It will also be the case that each distinct letter will be replaced by a different digit. Your task is to take a problem written as letters, and display the equivalent version using numbers.

Input:

A input instance begins with a number, N, indicating the number of different letters used in the math problem. On the next line will be the problem, in the form (for example): AAB + BCD = CDE. All letters will be capital, and only the first N letters (starting from A) will be used. Each operand (and the sum) will be at most 5 letters long.

Output:

Output the equivalent mathematical statement, after replacing letters with numbers. If there is more than one possible answer for a given input, display the one with the lowest digit for 'A', then the lowest digit for 'B', and so on. If there is no possible way to assign digits legally to solve the problem, then output "No solution possible".

Input and output samples:

Input:
5 AAB + BCD = CDE

Output:
112 + 234 = 346

Input:
9 EFGH + ABCD = BIEF

Output:
2769 + 0358 = 3127

Input:
3 AAA + B = BDDD

Output:
999 + 1 = 1000

Input:
4 AAA + B = CDDD

Output:
No solution possible.