CCC '08 J4 - From Prefix to Postfix

Time limit: 1.0s **Memory limit:** 256M

Canadian Computing Competition: 2008 Stage 1, Junior #4

Prefix notation is a non-conventional notation for writing arithmetic expressions. The standard way of writing arithmetic expressions, also known as infix notation, positions a binary operator between the operands, e.g., $3 + 4$, while in prefix notation the operator is positioned before the operands, e.g., $+\ 3\ 4$. Similarly, the prefix notation for $5 - 2$ is $-\ 5\ 2$. A nice property of prefix expressions with binary operators is that parentheses are not required since there is no ambiguity about the order of operations. For example, the prefix representation of $5 - (4 - 2)$ is $-\ 5\ -\ 4\ 2$, while the prefix representation of $(5 - 4) - 2$ is $-\ -\ 5\ 4\ 2$. The prefix notation is also known as Polish notation, due to Jan Łukasiewicz, a Polish logician, who invented it around 1920.

Similarly, in postfix notation, or reverse Polish notation, the operator is positioned after the operands. For example, postfix representation of the infix expression $(5 - 4) - 2$ is $5\ 4\ -\ 2\ -$.

Your task is to write a program that translates a prefix arithmetic expression into a postfix arithmetic expression.

Input Specification

Each line contains an arithmetic prefix expression. The operators are $+$ and $-$, and numbers are all single-digit decimal numbers. The operators and numbers are separated by exactly one space with no leading spaces on the line. The end of input is marked by 0 on a single line. You can assume that each input line contains a valid prefix expression with less than 20 operators.

Output Specification

Translate each expression into postfix notation and produce it on a separate line. The numbers and operators are separated by at least one space. The final 0 is not translated.

Sample Input

```
1
+ 1 2
- 2 2
+ 2 - 2 1
- - 3 + 2 1 9
0
```

Sample Output

```
1
1 2 +
2 2 -
2 2 1 - +
3 2 1 + - 9 -
```