

Problem C. Transform the Expression

Time limit	5000 ms
Mem limit	1572864 kB
Code length Limit	50000 B
OS	Linux

Transform the algebraic expression with brackets into RPN form (Reverse Polish Notation). Two-argument operators: +, -, *, /, ^ (priority from the lowest to the highest), brackets (). Operands: only letters: a,b,...,z. Assume that there is only one RPN form (no expressions like a*b*c).

Input

t [the number of expressions <= **100**]
expression [length <= **400**]
 [other expressions]

Text grouped in [] does not appear in the input file.

Output

The *expressions* in RPN form, one per line.

Example

Input:
 3
 (a+(b*c))
 ((a+b)*(z+x))
 ((a+t)*((b+(a+c))^(c+d)))

Output:
 abc*+
 ab+zx+*
 at+bac++cd+^*