## Transform the Expression

Transform the algebraic expression with brackets into RPN form (Reverse Polish Notation). Twoargument operators: $+,-,{ }^{*}, /, \wedge^{\wedge}$ (priority from the lowest to the highest), brackets ( ). Operands: only letters: $\mathrm{a}, \mathrm{b}, \ldots, \mathrm{z}$. Assume that there is only one RPN form (no expressions like $\mathrm{a}^{*} \mathrm{~b}^{*} \mathrm{c}$ ).

## 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))
$\left((a+b)^{*}(z+x)\right)$
$\left((a+t)^{\star}\left((b+(a+c))^{\wedge}(c+d)\right)\right)$
Output:
$a b c^{*}+$
ab+zx+*
at+bac++cd+^*

