



fun4LeetCode

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So far, we have encountered the following series of calculator problems:



1. 224. Basic Calculator
2. 227. Basic Calculator II
3. 772. Basic Calculator III
4. 770. Basic Calculator IV

Though each of them may be solved using different methodologies, in this post I'd like to develop one "generic" solution to help us approach these problems.

Note that this post is **NOT** intended to deal with general calculator problems that involve parentheses/operands/operators. The analyses below are limited to the scope as specified by the four problems.

## I -- Definitions and terminology

In this section I will spell out some definitions to facilitate the explanation.

- **Expression** : An expression is a string whose value is to be calculated. Every expression consists of one or more operands and operators.
- **Operand** : An operand is a "generalized value" that can be the target of an operation. There are three types -- **number**, **variable**, **subexpression**.
- **Number** : A number consists of digits only. The value of an operand of this type is the number.
- **Variable** : A variable consists of lowercase letters only. It can be either a free variable whose value is mapped to some number (can be looked up). In the case of a free variable, the value of the operand of free variable type is given by the variable itself, while that of bound variable type is given by the number to which the variable is mapped.