

# Representing mathematical expressions in plain text

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## Abstract

*Standard math notation often relies on spacing and/or 2D layout for legibility, this translates poorly to 1D (often monospace or nearly monospace) text used in programming and text files. Moreover the standard math notation is hard to explain in a few sentences and leads to confusion about operator precedence when you start adding domain-specific operators (&&, ||, <<, >>, &, |, ^, @).*

## I. STANDARD NOTATION (SN)

Brackets are a good fallback, they let you express any expression you want although very verbosely.

$$\begin{aligned} &(a + b) * c \\ &a + (b * c) \\ &a + (((b * c) * d) * e) \end{aligned}$$

You probably don't want to write brackets all day, so SN has many alternative representations.

E(MD)(AS) says that exponentiation  $a^b$  takes precedence over multiplication  $a * b$  and division  $\frac{a}{b}$ , both of which have the same precedence, and all of them take precedence over addition  $a + b$  and subtraction  $a - b$ .

You may notice how inconsistent the presentation of these operators is.

You can also choose to write  $a * b$  as  $ab$ , however this now has higher precedence than  $a/b$ , which is our best hope for writing  $\frac{a}{b}$  in plain text.

Not to mention that exponentiation is right-associative, meaning  $a^{b^c} = a^{(b^c)}$ , unlike the rest of the operators, since the left-associative version can be represented differently  $(a^b)^c = a^{b*c}$ , however in practice nobody uses the right-

associative version because a) it is unintuitive and b) nobody wants to or has to deal with numbers of this magnitude anyway.  
... and we'd have to write  $a^b$  as  $a^{\wedge}b$ .

II.   WOW

Column Number 2