Random Fact 15.2

Reverse Polish Notation

In the 1920s, the Polish mathematician Jan Łukasiewicz realized that it is possible to dispense with parentheses in arithmetic expressions, provided that you write the operators *before* their arguments, for example, + 3 4 instead of 3 + 4. Thirty years later, Australian computer scientist Charles Hamblin noted that an even better scheme would be to have the operators *follow* the operands. This was termed **reverse Polish notation** or RPN.

Reverse Polish notation might look strange to you, but that is just an accident of history. Had earlier mathematicians realized its advantages, today's schoolchildren might be using it and not worry about precedence rules and parentheses.

Standard Notation	Reverse Polish Notation
3 + 4	3 4 +
3 + 4 × 5	3 4 5 × +
3 × (4 + 5)	3 4 5 + ×
(3 + 4) × (5 + 6)	3 4 + 5 6 + ×
3 + 4 + 5	3 4 + 5 +

In 1972, Hewlett-Packard introduced the HP 35 calculator that used reverse Polish notation. The calculator had no keys labeled with parentheses or an equals symbol. There is just a key labeled ENTER to push a number onto a stack. For that reason, Hewlett-Packard's marketing department used to refer to their product as "the calculators that have no equal".

Figure 14
The Calculator with No Equal

Over time, calculator vendors have adapted to the standard algebraic notation rather than forcing its users to learn a new notation. However, those users who have made the effort to learn reverse Polish notation tend to be fanatic proponents, and to this day, some Hewlett-Packard calculator models still support it.