

Other Notations are Also Unambiguous

Our usual notation (“1 + 2”)

- is called **infix** because
- **operators appear in between operands.**

Postfix (and prefix) notation

- **is not ambiguous,**
- So it does not require parentheses!

For 20+ years, all HP engineering calculators used postfix (“reverse Polish”)...ask your parents.

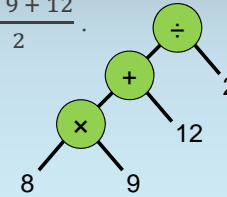
Postfix Notation is a Programming Language!

For example, we write $\frac{8 \times 9 + 12}{2}$.

As a tree, we draw...

In postfix, we write

8 9 × 12 + 2 ÷



This version (postfix) is a program!

Let's Run the Program...

Our program: **8 9 × 12 + 2 ÷**

Execute the “program” using a stack of paper:

- For a number,
 1. write number on a sheet of paper, and
 2. place it on top of the stack.
- For an operator,
 1. grab the top two sheets from the stack,
 2. perform the operation,
 3. write result on a sheet of paper, and
 4. place it on top of the stack.

R6 Points to the Top of Our Stack in LC-3 Memory

To compute our postfix program, we **used a stack of paper.**

Can we use computer memory instead?

Do you remember the idea of

- putting subroutine inputs/outputs
- into memory, then
- using a register
- to point to those memory locations?

For LC-3, use **R6** to point to the top of our stack.*

*A convention. Most ISAs have a register called the stack pointer.