

University of Illinois at Urbana-Champaign
Dept. of Electrical and Computer Engineering

ECE 220: Computer Systems & Programming

The Stack Abstraction

Conventions Provide Implicit Information

What does this mean: $1 + 2 \times 3$?

It could mean $(1 + 2) \times 3 = 9$.

Or it could mean $1 + (2 \times 3) = 7$.

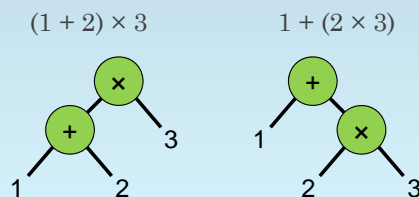
Most (all?) cultures on Earth

- choose this one
- by **convention**.

Arithmetic with Trees is Unambiguous

We can

- **eliminate ambiguity**
- **by using trees.**



Why Not Always Use Trees?

Since you're in ECE,

- I've asked your Math professors
- to let you use trees
- for all future homework.

Trees are painful for humans!

Sound good? Here's some practice...

Write $F(x,y)$ and the partial derivatives of $F(x,y)$ in x and y ...**using trees**:

$$F(x,y) = \frac{1}{2}e^{-a(x^2+y^2)} - \cos\left(20x + \frac{\pi}{4}\right)$$