Announcements

- Reminder: hw0 due tonight!
  - Read html file for instructions
  - Use our .py templates for homework and projects
- Find answers to your questions on Piazza
  - Use search functionality
  - Don't post private question unless it is not of general interest
- In-class quiz next Friday
  - Bring a writing implement

Review: Expressions

Primitive expressions:

- 2
- add
- 'hello'

Call expressions:

\[
\max\left(\frac{2}{\text{Operand 0}}, \frac{3}{\text{Operand 1}}\right)
\]

One big nested call expression:

\[\max(\min(\text{pow}(3, 5), -4), \min(1, -2))\]

Infix operators represent implicit call expressions:

\[2 + 3 \rightarrow \text{add}(2, 3)\]

Types of Functions

Pure Functions

- abs(number):
  - Argument: 2
  - Return value: 2
  - Only produces return values

Non-Pure Functions

- pow(x, y):
  - Argument: 2, 100
  - Returns None!
  - Creates side effects, may return values

The interactive interpreter displays all return values except None.

Review: Evaluation Procedure

Expression tree:

\[
\max(\min(\text{pow}(3, 5), -4), \min(1, -2))
\]

Nested Print Expressions

Python displays the output "-2"
The Elements of Programming

- **Primitive Expressions and Statements**
  - The simplest building blocks of a language

- **Means of Combination**
  - Compound elements built from simpler ones

- **Means of Abstraction**
  - Elements can be named and manipulated as units