Algorithms, pseudocode, and programming

Algorithms vs. Programs

- An **algorithm** is a sequence of precise instructions that leads to a solution
- A **program** is an algorithm expressed in a language the computer can understand
- In order to be a good programmer, one must be able to “think like a computer” when writing an algorithm.

Typically, the steps of an algorithm correspond to what a computer can do

- Store or assign a value to a location in memory
  - x ← 5
- Perform a calculation (e.g., 3 + 4, x * 5), and store the result in memory, or output the result
  - x ← num1 * 2
- Output text, a calculated value, or a value stored in memory, or any combination of the above
- Read in data from the keyboard or a file

What a computer can do (con't)?

- Do something if a condition is true

- Repeat something a fixed number of times
- Repeat something while a condition is true
- Repeat something for each element in a "list"

- Use existing or built-in behavior of the language
  - Get the length of the string
  - Determine if a sentence contains a word

Example

- Write an algorithm/pseudocode for finding the minimum number in a list of numbers