Agenda: Course Introduction, The world of programming languages.

Read: §1.1 from Scott & two short articles posted on class website.

First assignment is posted (due on Monday, Sep. 14)

Problem → Solution (algorithm) → Pseudocode → Program

Problem: Greatest Common Divisor (GCD)

\[ \gcd(a, b) = c \]

where \( a \) or \( b \neq 0 \)

\[ \begin{array}{c}
\gcd(9, 15) = 3 \\
\gcd(54, 24) = 6
\end{array} \]

Algorithm: Euclid's Algorithm c 300 BC
To compute the \( \gcd(a, b) \), check to see if \( a \) or \( b \) are equal. If they are then either \( a \) or \( b \) is the answer. If not, replace the larger of \( a, b \) with their difference. Repeat!

\[ \gcd(9, 15) = \gcd(9, 6) \]

\[ (3, 6) \Rightarrow (3, 3) \]
Pseudocode

Function gcd (a, b)

while a ≠ b do
  if a > b then
    a = a - b
  else
    b = b - a

return a

Java
C++

int gcd (int a, int b) {
  while (a != b) {
    if (a > b)
      a = a - b;
    else
      b = b - a;
  }
  return a;

Python

def gcd (a, b):
  while a != b:
    if a > b:
      a = a - b
    else:
      b = b - a
  return a
Java  Javascript  Haskell  HTML
C  C#  Swift  R  CSS
C++

Python  SQL
Go  Perl  Haskell
Ruby