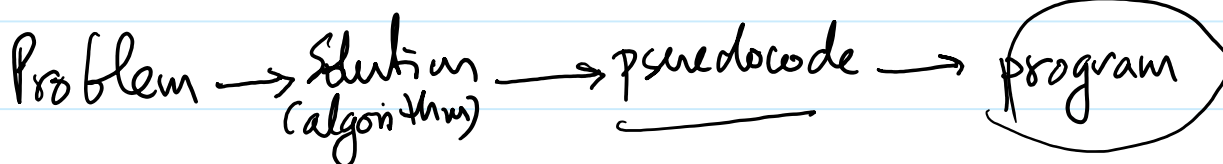Agenda: Course Introduction. The world of Programming Languages.

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 $\neq 0$

c is the largest number that divides both a+b

$$gcd(9, 15) = 3 \qquad 1, 3, 9$$
$$1, 3, 5, 15$$

$$gcd(54, 24) = 6 \qquad 1, 2, 3, 6, 9, 18, 27, 54$$
$$1, 2, 3, 6, 8, 12, 24$$

Algorithm: Euclid's Algorithm   c 300 BC

To compute the gcd(a, b) check to see if a + b are equal. IF they are then either a or b is the answer. If, replace the larger of a, b with their difference. Repeat!

$$gcd(9, 15) = gcd(9, 6)$$

$$(3, 6) → (3, 3)$$
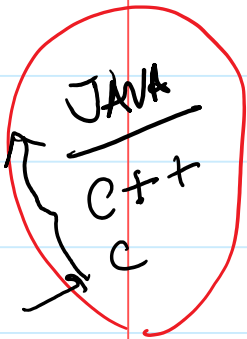
Pseudocode

```
function   gcd (a,b)

    while  a ≠ b do
        if  a > b then
            a ← a − b
        otherwise
            b ← b − a

    return a
```

JAVA
C++
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#   R   CSS

C++   Swift   Dart ?

Python   Sql

Go   Perl

Ruby   Paxal

                                        PLs ←——   ! PLs