CS150 - Programming & Objects

Note Title 1/18/2012

Announcements

- First HW will be up on Friday
- Quiz on Friday

A Sample Algorithm: the GCD

Ex: write $\frac{54}{42}$ in reduced form

How? $\frac{9}{7}$

greatest common divisor → 6

another is 3: $\frac{27}{21}$

How to find the gcd?

One idea: Given x, y with $x < y$.

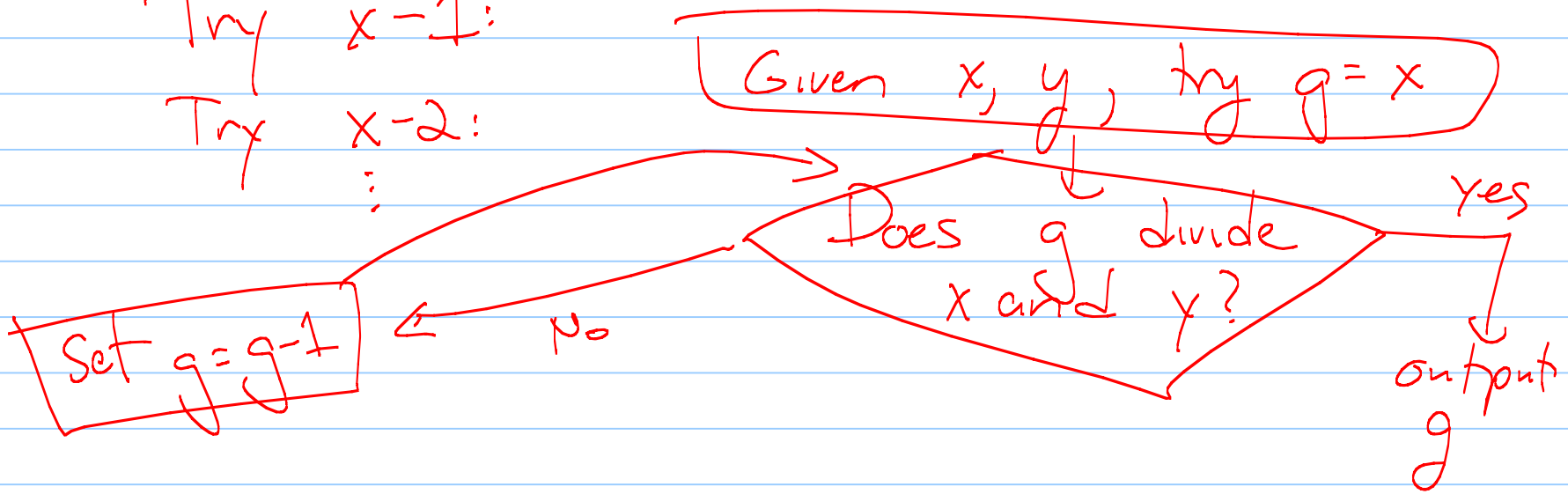
Try x.

Try $x-1$:

Try $x-2$:

⋮

Try 42: need 42 to divide $42 \cdot 54$.



Efficiency:

Does 42 divide 54 and 42?

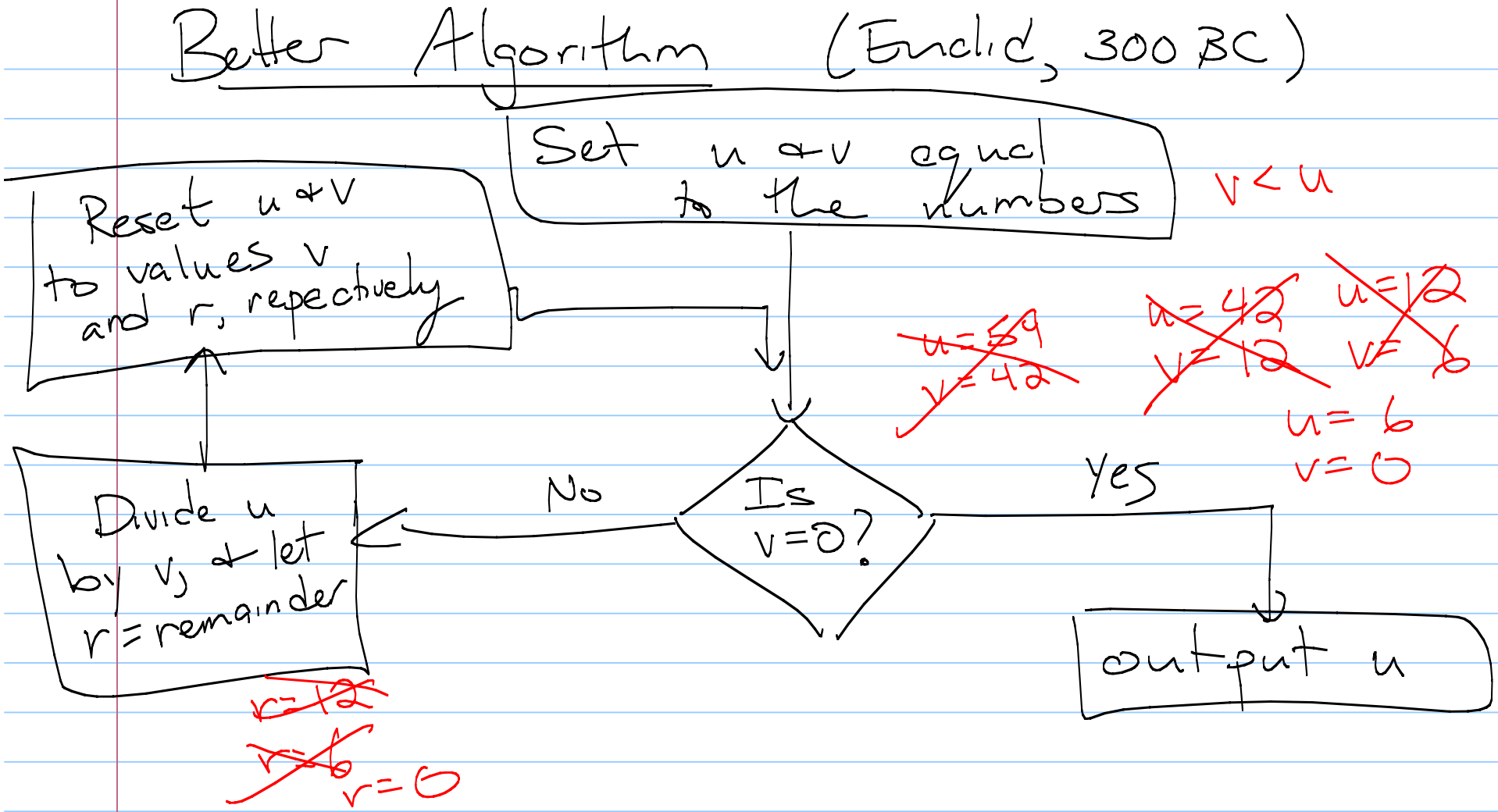
Does 41 divide 54 and 42?

⋮

Does 6 divide 54 and 42?

} SLOW

Better Algorithm (Euclid, 300 BC)



Euclid's algorithm

- Requires number theory to analyze, but much faster
- Even if #'s are near a billion, takes < 50 rounds.

Object orientation

Classes and objects:

We will write classes — these are essentially pieces of data that are similar.

An instance of a class is called an object.

Ex: Student record

Bank accounts

Television Class

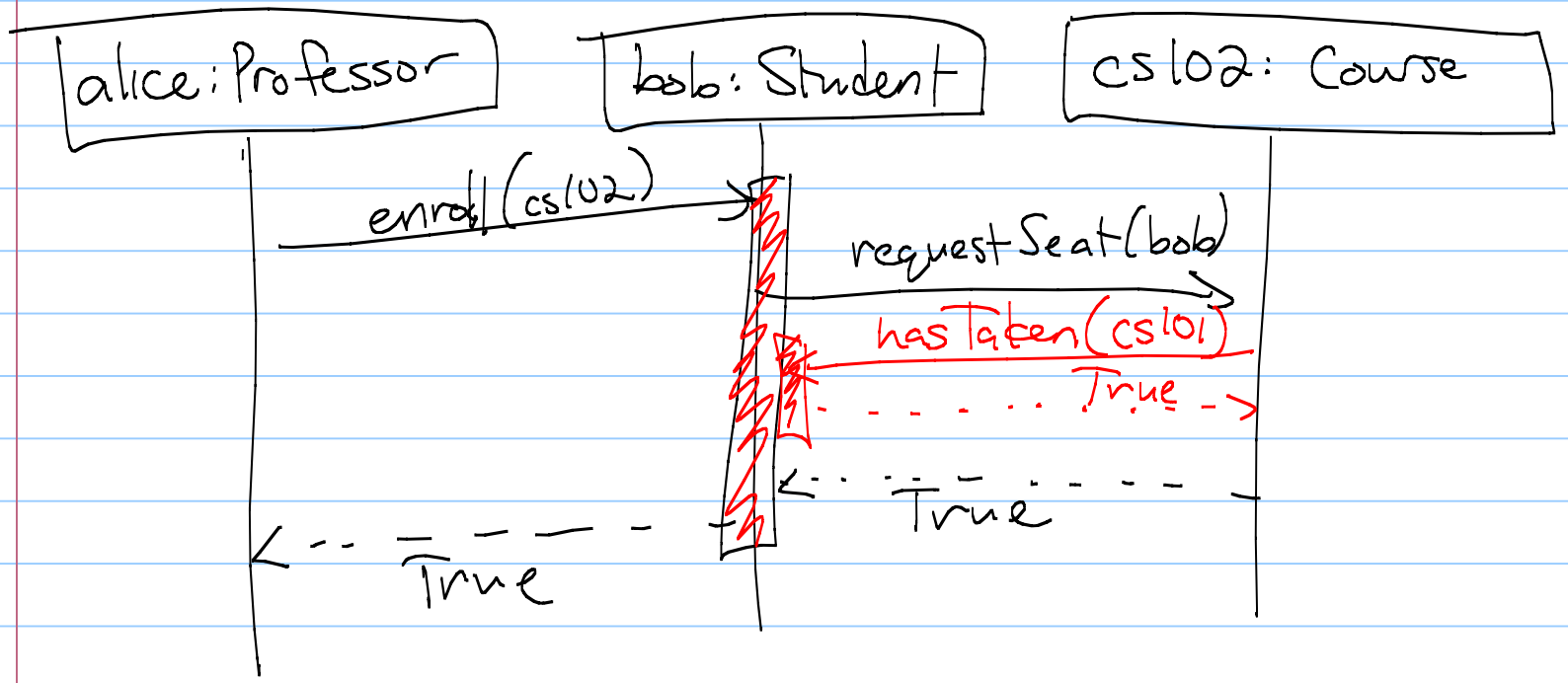
Objects:
- on/off
- volume
- channel (a #)
- inputs
- brightness settings
- parental blocks
- resolution
- brand

Methods:
- toggleOnOff()
- volumeUp()
- volumeDown()
- setChannel(value)
- channelUp()
- channelDown()

no method to alter this

Multiple Classes: Student Registration System

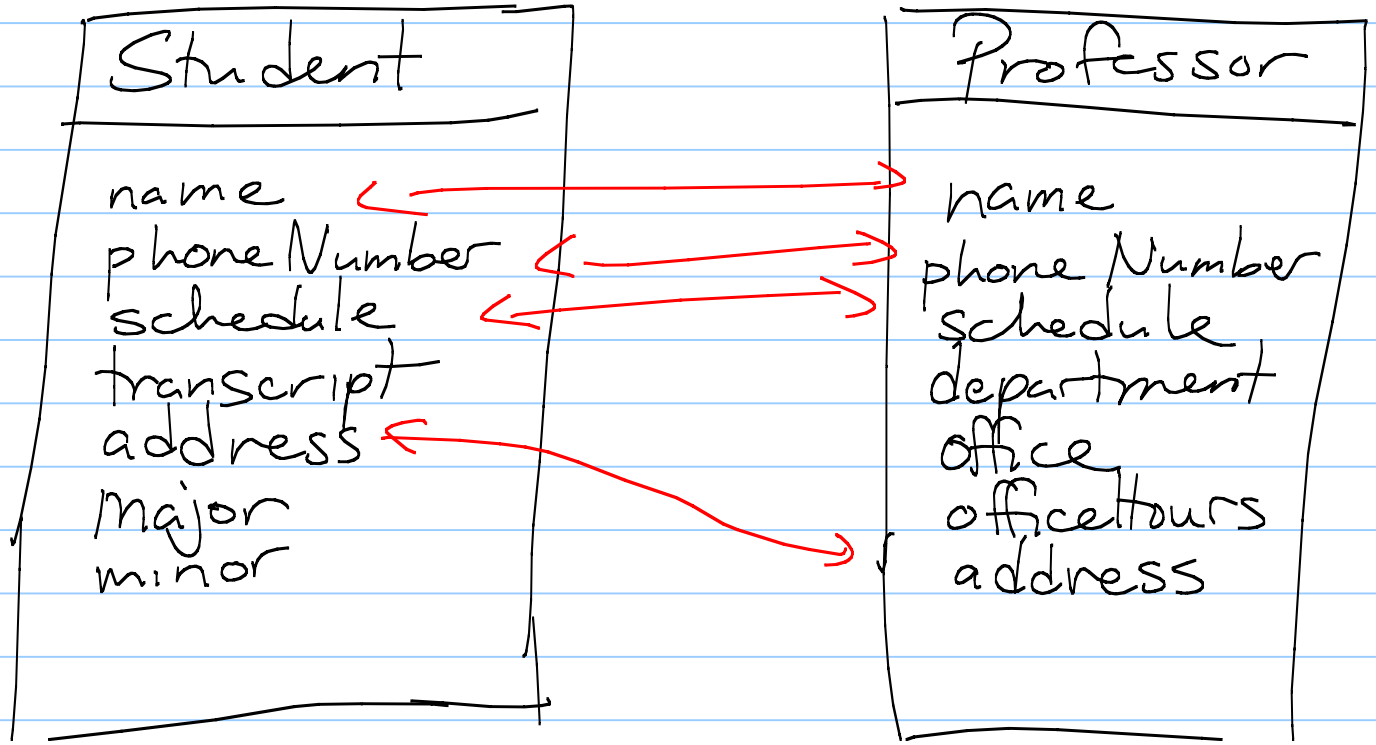
Sometimes, classes will interact.



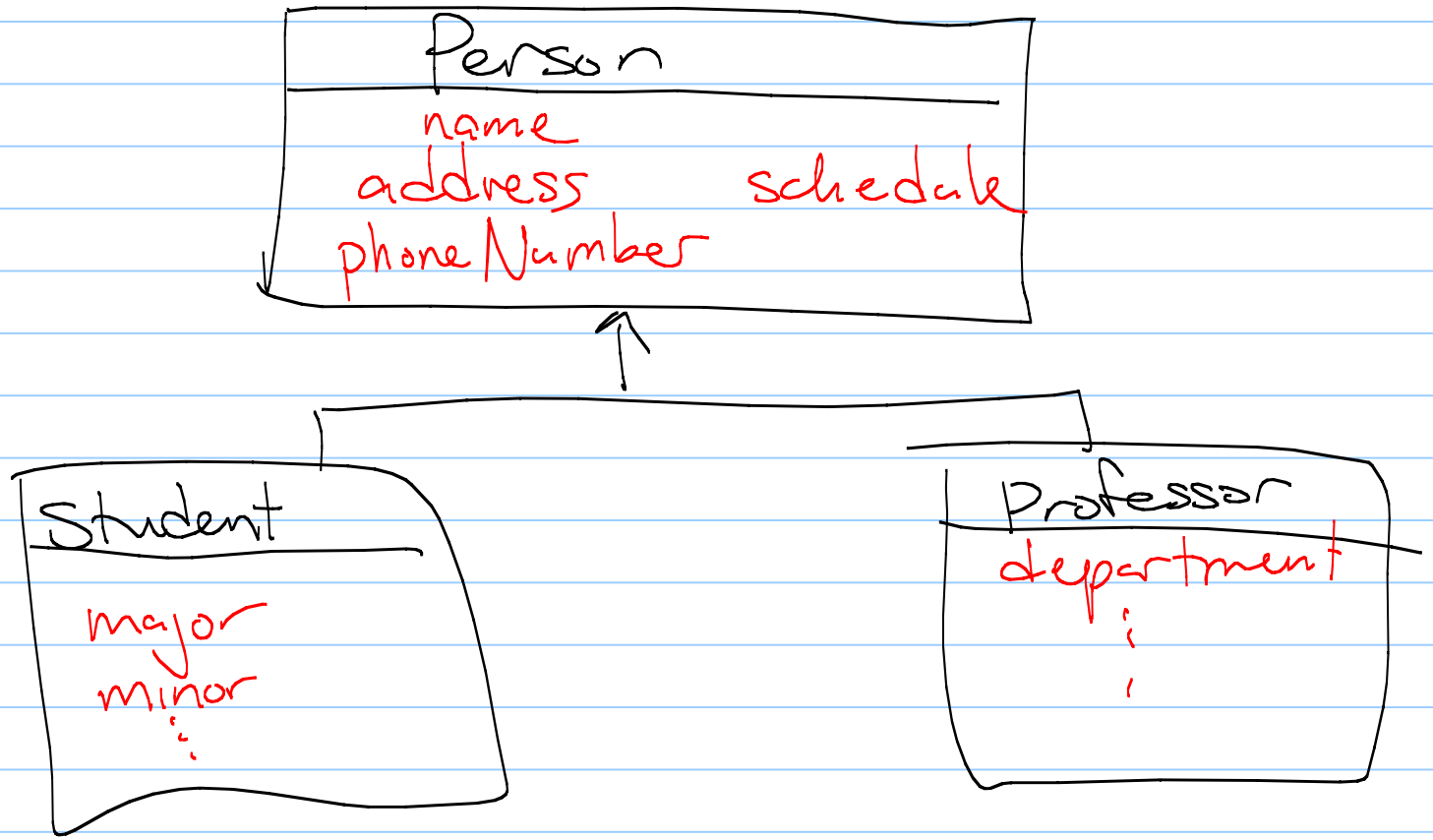
Inheritance:

Sometimes, different classes will share similar data.

Ex:



Parent & child classes:



This room: ISLUstudent

Turing

We will do our work on the lab computers in 121 Ritter.
(door code: 72444)

Remote connections:

- SSH

- NX client