CS101: Intro to Computing Fall 2015

Lecture 1

WHY ARE WE HERE?

I’ve seen things you people wouldn’t believe…

Everyone should program!!!

- This is my ***mission***

Why learn to program?

a. Pervasive
b. Lucrative
c. Transferrable
d. Creative
e. Control

Everyone can program

- Our goal is a safe, friendly, inclusive atmosphere for everyone to learn.
- You should feel ***welcome***, regardless of gender, gender identity, ethnicity, nationality, religion, disability, sexual orientation, class, political views, or educational background.
- We are ***peers*** and ***allies.*** Let’s all treat one another with respect and kindness.

Programming is a ***skill!***

- Learn by ***doing!***
- Learn by ***interacting!***
- You need to ***constantly*** practice.
- ***Get help*** when you need it!
- **WARNING**: If you are not committed to this class, you’re not going to make it!

Please excuse our mess…

- This course is being upgraded as we go.
- There will probably be some SNAFUs.

HOW WILL THIS CLASS WORK?

Grading

- 20% homework
- 25% labs
- 10% lecture attendance (i>clicker)
- 20% midterms (2)
- 25% final exam

Official grade book will be on Compass

Required Supplies

- ***No*** textbook!
- i>clicker
- CodeLab account

Course website

https://courses.engr.illinois.edu/cs101/

- Homework assignments
- Course calendar
- Course policies

Labs

- ***YES***, there is lab this week!
- ***NO*** labs the week of Labor Day!
- You ***must*** attend your lab section.

Policies

- No late homework submissions
- Use Piazza for questions
- ***Never*** copy code
- Always cite your source

Getting help

- Piazza
- Office hours in the lab (TBA)

Course Overview

- ≈ 6-7 weeks: programming (Python)
- ≈ 5-6 weeks: engineering programming
- 2 weeks: Matlab

WHAT IS PROGRAMMING?

Program

- A set of instructions a computer executes to achieve a goal
- Can be *very* long (millions of instructions)
- Also called “code” or “source code”
- Our programs will be called “scripts”

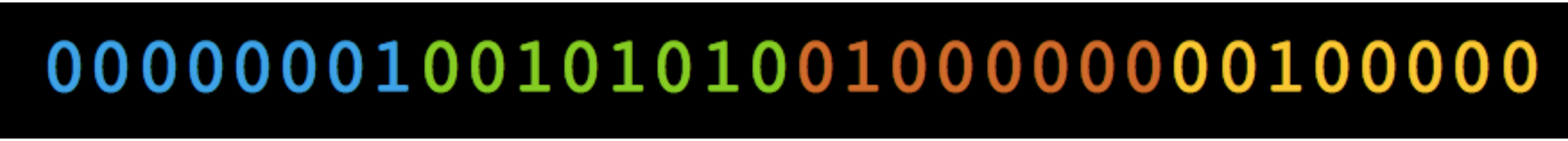
Data

- Information stored in a computer is called *data*.
- All data is represented in *binary.*
  - – A series of 0’s and 1’s
- Each 0 or 1 is called a *bit.*
- Bits are stored in groups of 8 called *bytes.*

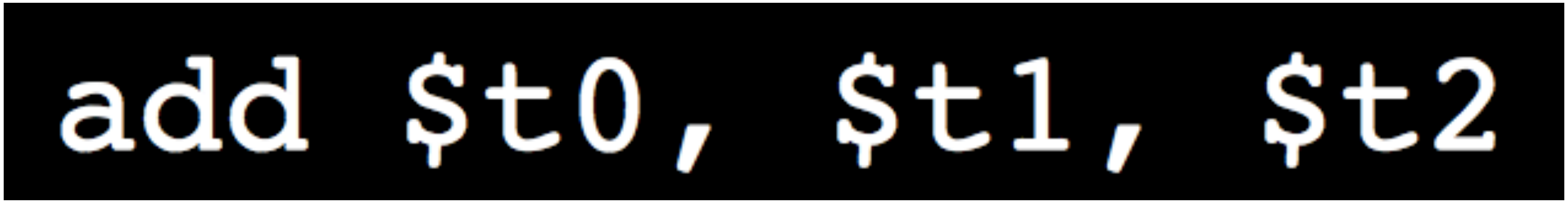
00000001001010100100000000100000

Instructions

- Programs are data.
- Instructions are encoded in binary.
- Each instruction is typically 4 or 8 bytes.



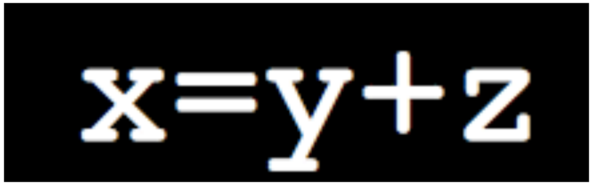
```
00000001001010100100000000100000
```



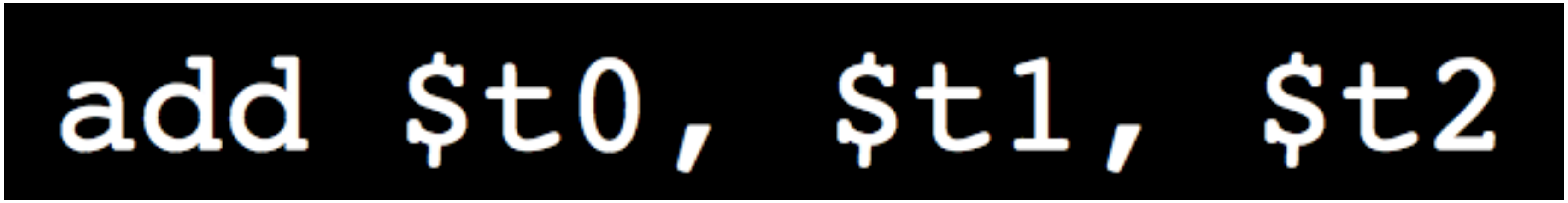
```
add $t0, $t1, $t2
```

Programming Language

- An artificial language used to communicate instructions to a computer
- Rigorous and unambiguous
- Grammar is mathematically formal
- Has *syntax* and *semantics* like a natural language



```
x=y+z
```



```
add $t0, $t1, $t2
```

Programming Languages

- Low-level: `add $t0, $t1, $t2`
  - Define individual, machine readable instructions
- High-level: `x=y+z`
  - Human readable instructions *translated* into machine readable instructions

High-level languages

- Compiled languages
  - Compiler translates ***entire*** program into machine language
- Interpreted (scripting)
  - Interpreter translates program into machine language ***line by line***
  - Translation happens “on the fly”

Python

- High-level language
- Interpreted language
- Weakly typed
- **WARNING**: Split between versions 2 and 3. We will use version 2!

Why Python?

- Freely available
- Cross platform
- Widely adopted
- Well documented
- Designed for teaching
- Beautiful

LET’S GET STARTED!