CS 161
Intro to CS I

What is CS all about?

Computers Are Everywhere

- Examples:
  - homes, offices, rooms/servers, phones, pacemakers, cars, etc.

- What is the difference b/w these?
  - Complexity
  - Size

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What is a computer?

- A Computational Device
  - It computes (input-> processing -> output)
  - Modern: device that can be programmed to carry out an algorithm.

- What is Computer Science?

What is an algorithm?

- Step-by-step description of how to accomplish a task, i.e. recipe

- Algorithmic thinking

- Expressed in any language
  - Natural
  - Programming

What is programming?

- Problem Statement

- Solve the Problem

- Specify Algorithm

- Algorithm -> Computer Language

- Why do we teach programming 1st?

Hardware vs. Software

- Computer: **machine** that manipulates data and carries out **set of instructions**
- Hardware
  - CPU
  - RAM
  - Hard Disk
- Software
  - Programs

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Software/Programs

- Primary piece of software on computer?

- What is its purpose?

- What are applications?

Digital Realm

- Based on discrete #s
  - Specifically: Circuits
- Binary, i.e. base 2
  - 0 or 1
- What base do most people use?
  - What is the range for each digit?
- What is Hexadecimal?, i.e. base 16
  - What is the range for each digit?

Decimal, Binary, & Hex

- Decimal
  - Powers of 10
- Binary
  - Powers of 2
- Base X to Base 10 conversion
  - 32 (base 10): $3*10^1 + 2*10^0 = 32$ (base 10)
  - 100000 (base 2): $1*2^5 + 0*2^4 + 0*2^3 + 0*2^2 + 0*2^1 + 0*2^0 = 32$ (base 10)
  - How do we express 35 (base 10)
    - base 2
    - base 16

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Quick Demo...

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More Binary

- What is each digit called?

- What is a Byte?

- How many numbers can be expressed in a Byte?
  - Signed/Unsigned

- What is the smallest number?

- What is the largest number?

What does this mean for us?

- Class Discussion…