

CS 160

CS Orientation

Intro to CS & Number Conversions

Odds and Ends...

- Get Assignment #1 demoed this week!!!
- Assignment #2 posted!

Computers Are Everywhere

- Examples:
 - homes, offices, rooms/servers, phones, pacemakers, cars, etc.
- What is the difference b/w these?
 - Complexity
 - Size

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

Hardware vs. Software

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

Software/Programs

- Primary piece of software on computer?
- What is its purpose?
- What are applications?

Programming

- Writing **code** that a computer can **execute**
 - Does that mean we have to write in binary?
- High-level language
 - **Translated Continuously during runtime**
 - Interpreted
 - Just in time compilation/caching
 - Translated Prior/Ahead of time to runtime
 - High-level -> machine language
 - High-level -> intermediate language

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) in base 2 vs. base 16?

Get into groups 4-5

- Convert 11110010 (base 2) to base 10.
- Convert 130 (base 10) to base 2.

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?
- Help:

<http://classes.engr.oregonstate.edu/eecs/fall2015/cs160-001/Exam1Review1.txt>

Get into groups 4-5

- What is the smallest/largest unsigned number in 16 bits?
- What is the smallest/largest signed number in 16 bits?
- What is the smallest/largest unsigned number in x bits?