Welcome to recitation!

15-213: Introduction to Computer Systems
1st Recitation, Sept. 12, 2011

Instructor: Adrian Trejo (atrejo)
Section H, 3:30p – 4:30p PH125C
Outline

• General
• UNIX
• Integers
• Floating point
• Bits
• Datalab
• Style
• Cheating
• Summary
General Stuff

- [www.cs.cmu.edu/~213](http://www.cs.cmu.edu/~213)
- [www.autolab.cs.cmu.edu](http://www.autolab.cs.cmu.edu)

- Everything related to the course can be found on these two sites.
UNIX Basics

- Use the shark machines!
- ssh/scp (on Mac/UNIX)
- PuTTY/Filezilla (on Windows)
- tar
- Learn to use an editor well (e.g. vim, emacs) and stick with it.
Integers

- Signed vs. Unsigned
- Two’s complement representation
- Implicit casting between signed and unsigned
Floating Point

• Sign (one bit)
• Exponent (single precision: 8 bits; double precision: 11 bits)
• Fraction (Mantissa)

• $\text{Bias } (2^{(k-1)} - 1, \text{ where } k \text{ is the number of exponent bit})$
• Normalized ($E = \text{Exp} - \text{Bias}$) vs. Denormalized ($E = 1 - \text{Bias}$)

• Special Values ($\text{Exp is all ones}$)
Bit Operations

- \&, |, ^, ~
- <<, >> (arithmetic vs. logical)
- ! (logical not)
Datalab Tips

• Signed negation
  • \(-x == \sim x + 1\)
  • Always works except for \(x = \text{Tmin}\)

• Properties of Zero
  • \(0 \& x = 0\) for all \(x\)
  • \((0-1) \& x = x\) for all \(x\)

• int \(x = 0\)
  • int \(y = -x\)

• \(x\) and \(y\) are both positive since their MSBs is 0
Parity Example

• Let’s write a function that takes an integer and returns 1 if it has an odd number of ‘1’ bits, and 0 otherwise.

• How can we get the answer?
  • If we XOR all the bits together, then we’ll get the answer!

• 10011010 (function should return 0)
  • $1 \oplus 0 \oplus 0 \oplus 1 \oplus 1 \oplus 0 \oplus 1 \oplus 0 = 0$

• 1001 $\oplus$ 1010 = 0011

• 00 $\oplus$ 11 = 11
• 1 $\oplus$ 1 = 0
Style

• [http://www.cs.cmu.edu/~213/codeStyle.html](http://www.cs.cmu.edu/~213/codeStyle.html)
  • Make sure you read through it since we’ll use it as a rubric when we grade your labs.

• Look out for:
  • Comments
  • Magic numbers (without #define)
  • Line length
  • Consistency
  • etc.
Cheating policy

• Don’t do it!
• MOSS checker built into Autolab
Need help?

• Email: 15-213-staff@cs.cmu.edu

• Office hours: UMTWH 5:30p – 8:30p WeH 5207

• Recitation: bring us questions