15-213 Recitation: Data Lab

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Agenda

- Introduction
- Course Details
- Data Lab
  - Getting started
  - Running your code
  - ANSI C
- Floating Point

Introduction

- Welcome to 15-213/18-213/15-513!
- Recitations are for…
  - Reviewing lectures
  - Discussing homework problems
  - Interactively exploring concepts
  - Previewing future lecture material
- Please, **please** ask questions!

Course Details

- How do I get help?
  - Course website: http://cs.cmu.edu/~213
  - Office hours: **5-9PM** from Sun-Thu in Wean 5207
  - Piazza
  - *Definitely* consult the course textbook
  - **Carefully read the assignment writeups!**
- All labs are submitted on Autolab.
- All labs should be worked on using the **shark machines.**

Data Lab: Getting Started

- Download lab file (`datalab-handout.tar`)
  - Upload tar file to **shark** machine
  - `cd <my course directory>`
  - `tar xpvf datalab-handout.tar`
- Upload `bits.c` file to Autolab for submission

Data Lab: Running your code

- `dlc`: a modified C compiler that interprets *ANSI C* **only**
- `btest`: runs your solutions on random values
- `bddcheck`: exhaustively tests your solutions
  - Checks all values, formally verifying the solution
- `driver.pl`: Runs both dlc and bddcheck
  - Exactly matches Autolab's grading script
  - You will likely only need to submit once
- For more information, **read the writeup**
  - Available under assignment page as "**View writeup**"
  - **Read it. Read the writeup... please.**

Data Lab: What is ANSI C?

Within two braces, all *declarations* must go before any *expressions*.

This is *not* ANSI C.

```
unsigned int foo(unsigned int x)
{
    x = x * 2;
    int y = 5;

    if (x > 5) {
        x = x * 3;
        int z = 4;
        x = x * z;
    }

    return x * y;
}
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Form Groups of 3 - 4

- Series of exercises
  - Operators
  - Floating point
  - Puzzle

Floating Point: Rounding

1.BBGRXXX

In the below examples, imagine the underlined part as a fraction.

- Guard Bit: the least significant bit of the resulting number
- Round Bit: the first bit removed from rounding
- Sticky Bits: all bits after the round bit, OR'd together

Examples of rounding cases, including rounding to nearest even number

- 1.10 11: More than ½, round up: 1.11
- 1.10 10: Equal to ½, round down *to even*: 1.10
- 1.01 01: Less than ½, round down: 1.01
- 1.01 10: Equal to ½, round up *to even:* 1.10
- 1.01 00: Equal to 0, do nothing: 1.01
- 1.00 00: Equal to 0, do nothing: 1.00

All other cases involve either rounding up or down - *try them*!

Questions?

- Remember, data lab is due this Thursday!
  - You really should have started already!
- Read the lab writeup.
  - **Read the lab writeup.**
    - ***Read the lab writeup.***
      - ***Read the lab writeup.***
        - **Please. :)**