CS – 220
Computer Systems II

Instructor: Tom Bartenstein

Course Web Page:
http://www.cs.binghamton.edu/~tbartens/CS220_Spring_2016/

Teaching Staff

- Prof: Tom Bartenstein (tbartens@binghamton.edu)
  - Office Hours:
    - Mondays 4:30 – 5:30 PM, EB P-14
    - Wednesdays 1:00 – 2:00 PM, EB P-14
    - Or by appointment
- Teaching Assistants
  - Section A: Matthew Reigata
    - Office Hours: TBD
  - Section A: Matthew Williamson (Lab only)
  - Section B: Kailas Nair (knair1@binghamton.edu)
    - Office Hours: TBD

CS-220 Course Goals

- Goal: Learn how to write application software
  - What is “application software?”
  - Why would I want to write [good] application software?
  - How do we learn to write good software?
- Goal: Teach yourself a new(?) computer language
  - What programming languages do you know? Python? Java? C? x86 Assembly? Perl? Ruby? Others?
- Goal: Motivate other CS topics
  - Languages, Operating Systems, Algorithms, Data Structures, Architecture, etc.

CS-220 Outline

- A number is just a number… or is it?
- An operator is just an operator… or is it?
- A platform is just a platform… or is it?
- An algorithm is just an algorithm… or is it?
- A variable is just a variable… or is it?
- A peripheral is just a peripheral… or is it?

Abstraction

- "The act of considering something as a general quality or characteristic, apart from concrete realities, specific objects, or actual instances."
- Concrete – This soccer ball  Abstract – "ball"

- Abstraction is at the heart of all computer science!

Numbers	Data Structures	Operations
Languages	Algorithms	Objects
Functions	Memory	Disk I/O
Operating Systems	Graphical User Interfaces	Keyboards
Et cetera	Et cetera	Et cetera

"Leaky" Abstractions

- Sometimes we need to know concrete details about abstractions
- For instance, numbers are abstract:
  - Properties: Infinite, associative, commutative, distributive, well ordered
- Computer Arithmetic sometimes "leaks"
  - (x+1) < x (see xmp_counting)

- The idea of leaky abstraction was stolen from Joel Spolsky…
  http://www.joelonsoftware.com/articles/LeakyAbstractions.html
  Co-founder of https://stackoverflow.com/

Course Mechanics

- Lectures : Mon/Wed – Abstract Concepts, Fri – Concrete "C"
  - Attendance Expected
  - Added incentive: Pop Quizzes (3 or 4 over the semester)
- Labs: Tuesday
  - Attendance Expected
  - Practice coding
  - Simple lab reports
- Homework
  - Reading
  - Practice – small problem solving, due Friday at Midnight
- Projects
  - 3 or 4 Larger Coding projects

Textbooks

- Randal E. Bryant and David R. O'Hallaron,
  - "Computer Systems: A Programmer's Perspective, Third Edition" Prentice Hall, 2015
  - http://csapp.cs.cmu.edu

- Brian Kernighan and Dennis Ritchie,
  - "The C Programming Language, Second Edition", Prentice Hall, 1988

Grading

Quizzes, Attendance, Participation	10%
Homework	10%
Labs	10%
Projects	30%
Tests	20%
Final Exam	20%