CS 16: Problem Solving With Computers

Lecture 1
Who am I?

- **Name**: Chad Spensky
- **Call me Chad or Prof. Spensky**
- **Hometown**: Weirton, WV
- **Hobbies**: Beach Volleyball, Traveling, Basketball, Motocross, Surfing, Cooking, Camping, Line Dancing, Guitar, …
- **Research**: Authentication, Embedded-systems analysis, hardware-level security, smart cards
My Credentials

• University of Pittsburgh 2004-2008 (Magna cum laude)
  • B.S. in Computer Science (Honors)
  • B.S. in Mathematics
  • Minor in Economics
• University North Carolina at Chapel Hill 2008-2011
  • M.S. in Computer Science (Focus in Security)
  • Ph.D. dropout
• MIT Lincoln Laboratory 2012-Present
  • Computer Security Researcher
• UC Santa Barbara 2015-Present
  • Ph.D. Candidate in Computer Science (Focus in Security)
My Teaching Philosophy

• I am here to guide/help you learn

• Grades are there to provide feedback (not to hurt you)

• I am not smarter or better than you (I just have more experience)

• The curriculum of this course is only one suggested path for learning (explore! I’m happy to help)
Who are you?

- Which programming languages do you know?
- Which operating systems are you familiar with?
- What year are you?
CS 16 Outline

• **Professor**: Chad Spensky (Office Hours: Appointment)

• **TA**: Adam Ibrahim (Office Hours: TBD)

• **TA**: Mohammad Javad Amiri (Office Hours: TBD)

• **Class**: Tuesday/Thursday @ 12:30-1:50pm in Phelps 1260

• **Lab 1**: Monday @ 9:00-10:15am in Phelps 3525

• **Lab 2**: Monday @ 10:30-11:45am in Phelps 3525
CS 16 Outline

• Course website
  • http://cs.ucsb.edu/~cspensky/cs16.html
  • or http://cspensky.info/cs16.html

• My Information
  • E-mail: cspensky@cs.ucsb.edu
  • Cell: (740) 632-6257
CS 16 Outline

• Course Resources
  • Piazza: https://piazza.com/ucsb/summer2016/cs16/home
  • Submit.cs: http://submit.cs.ucsb.edu/ (We’re figuring this out)
CS 16 Outline

- **Feedback Mechanisms**
  - Labs every week (3% each, 30% of total grade)
  - Quizzes every 2 weeks (10% each, 40% of total grade)
    - The lowest 1 out of 5 will be dropped
  - Midterm programming project (10% of total grade)
    - Test your programming knowledge
  - Final programming project (20% of total grade)
    - More comprehensive programming assignment
CS 16 Outline

• Quiz Format
  • Short answer questions, True/False, and Fill-in-the-blank type questions
  • 40 minutes to complete them
  • A well-prepared student should complete them in ~20 min
CS 16 Outline

- **Course Projects**
  - Intended to test your programming knowledge and will not be covered in lab
  - You are encouraged to propose a project, otherwise we will offer ideas for projects
    - E.g., solve Sudoku, crack passwords, create a card game, build a robot
  - Midterm project proposal due by the end of Week 2
  - Final project proposal due by the end of Week 6
CS 16 Outline

- Late submissions will only be accepted with a REALLY good reason
Course Policies

• Teamwork makes the dream work

• Cheating can only hurt you

• Collaboration is an important skill to learn, but everyone must do their own work

• Just the act of re-typing something can help you retain the knowledge
Course Policies

• No phones or laptops!
  • It will inhibit your learning and distract the class
  • All notes will be posted online
Course Policies

• The phone game rules

```c
void phone_game(char * first_violator_caught_by, int violator_count){
    if (violator_count == 0)
    {
        throw_pizza_party("08/25/2016");
    } else if (compare(first_violator_caught_by,"Chad") == 0)
    {
        // No pizza party!
    } else
    {
        // Provide a gift and dinner to the helper
        transfer_gift("Chad",first_violator_caught_by);
        buy_dinner_for(first_violator_caught_by);
    }
}
```
Our Journey

• Goals

• Get you **excited** about programming and computers in general

• Teach you the **skills** you’ll need to create useful programs

• Provide the **foundation** required for your future careers
What are we going to learn?

• How a computer works
• How to program a computer to do useful things
• How to efficiently utilize available resources (e.g., Google)
• How to *debug* the programs that we write
Seriously, what are we going to learn?

- The C++ programming languages and basic programming techniques
  - Variables
  - Logical Operators (+,-,/,^,|,&,%)
  - Basic Algorithms
  - Problem solving skills
  - Good programming practices
  - Recursion
  - Data Types
CS 16 Outline

- C++
  - Powerful language built on C
  - Enables very low-level interactions with computers with a lot of helpful syntax
  - Typically used for high-performance applications
CS 16 Outline

• Why C++?
  • Extremely feature-rich language
  • Easy to directly interact with the hardware
  • The same concepts apply to most other popular languages (Python, C, Java, JavaScript, etc.)
C++ Example

```cpp
#include <iostream>
using namespace std;

int main( )
{
    cout << "Hello World!\n";
    return 0;
}
```
Pro Tip

• Google everything!

• Stack overflow = Google for programming
Pro Tip

- Debugging is just as useful of a skill as writing good code
- Even the best programmers will encounter errors
Class Expectations

• The only out of class work that you are expected to do is programming

• You are expected to learn a significant amount through trial/error on your own (Experience can’t be taught unfortunately)

• Myself and the TAs are here to help with specific questions, not to guide you step-by-step
Let the Journey Begin

Any Questions?