Welcome!

COMS 4118

Operating Systems I

Spring 2018

Teaching staff

- 5 Teaching Assistants (TAs)
  - John Hui jzh2106@columbia.edu (Head TA)
  - JiaYan Hu jh3541@columbia.edu
  - Mert Ussakli mu2228@columbia.edu
  - Kundan Guha kg2632@columbia.edu
  - Howon Byun hb2458@columbia.edu
- TA email & office hours
  - Email to cucs4118-tas@googlegroups.com goes to all teaching staff
  - TA room – 1st floor, Mudd building
  - TA calendar: http://bit.ly/4118-cal (will be filled by this weekend)
- Instructor email & office hours
  - Jae Woo Lee jae@cs.columbia.edu – 715 CEPSR
  - Jae's calendar: http://bit.ly/jae-cal

Who am I?

- Jae Woo Lee
  - Senior Lecturer in Computer Science
    - Teaching first, research second
  - Just call me Jae (pronounced 'Jay')
    - Note that this is NOT a general rule – address instructors as Professors unless told otherwise
- My background
  - Undergrad in Columbia College
  - Many years of professional experience
    - Designing and coding large-scale software systems
    - Running a start-up company
  - Came back to Columbia for Ph.D.
  - More info at http://www.cs.columbia.edu/~jae/
- I'm not an OS researcher
  - Interested in possibly joining OS research group?
  - Then take OS with Prof. Jason Nieh or Prof. Junfeng Yang

Prerequisites

1. C
   - Don't even think about it if you don't know C cold
2. UNIX
   - Must be comfortable at command line
   - Don't take the course if you never worked on UNIX
3. Computer architecture
   - Basic hardware knowledge: register, cache, bus, etc.
   - Should be able to read simple assembly code: load, store, add, jmp, etc.
4. Data structures
   - Nothing fancy, but must be solid on the basics: list, tree, stack & queue

Columbia courses:

For 1 & 2:

W3157 Advanced Programming

For 3:

W3827 Fundamentals of Computer Systems

For 4:

W3134, W3136, or W3137 Data Structures

Topics

- General OS theory
  - Throughout the whole semester
- Advanced UNIX programming
  - First 1/3 of the semester
  - UNIX from outside
    - Processes, threads, networking, concurrency, signals, non-blocking & async I/O
- Linux kernel implementation
  - Later 2/3 of the semester
  - UNIX from inside
    - Syscalls, wait queues, scheduler, file systems, virtual memory

Textbooks

1. **Operating System Concepts Essentials**
   - 2nd Edition, 2013, Wiley – by Silberschatz, Galvin, Gagne
   - E-book available from the publisher: http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002902.html
   - You can use "Operating System Concepts, 9th Ed" instead – OSCE2 is basically a cheaper version of OSC9
2. **Linux Kernel Development**
   - 3rd Edition, 2010, Addison-Wesley – by Robert Love
3. **Advanced Programming in the UNIX Environment**
   - 3rd Edition, 2013, Addison-Wesley – by W. Richard Stevens, Stephen A. Rago
4. **And a few other online materials that will be assigned**

Get them wherever you usually get your textbooks from…

Class mailing list

- 4118 ListServ
  - Communication between all of us, including official announcements
  - Do:
    - Ask & answer questions – 1st place to go for non-personal questions
    - Provide helpful tips & links for your classmates
    - Be considerate & friendly
  - Don't:
    - Ask questions without first trying to solve it on your own
    - Post code or critical info that leads directly to solution
    - Be impatient & rude
- TAs and I respond to emails in this order:
  - ListServ, cucs4118-tas@googlegroups.com, then individual emails
  - NEVER send a same question separately to multiple people
    - You will get banned from ever sending emails if you get caught doing this.
- Learn to manage high volume
  - [ANN] in email subject for announcements – set up Gmail filter
  - Yes, I know about Piazza. Thanks for your suggestion.

Homework

- 8 assignments (subject to change)
  - Some are individual, some are group assignments
  - Some are short & light, some are long & heavy
  - Assignments carry different weights
- Some assignments may not be graded
  - But you won't know until after the deadline
  - HWs picked for grading will be 33% of your grade
- Late policy
  - 20% penalty after deadline up to 24 hours; zero afterwards

15 million lines of code

- "As of 2013, the Linux 3.10 release had 15,803,499 lines of code"
  - Learn to navigate a large code base
  - Learn to read code rather than documentations that are often vague, out-of-date, or flat-out wrong
- You will probably encounter a large existing code base wherever you get a job

Exam

- Exam schedule
  - Two in-class exams during the semester
    - Dates on the course home page
  - No final exam
- Your overall grade
  - HW, Exam #1, Exam #2 – 33% each
  - I reserve the right to boost one's score by a small amount
    - For class & listserv participation, exceptional work, etc.
    - Usually < 0.5% in order to bump up some borderline letter grades

Zero tolerance on cheating

- **REQURED READING:**
  http://www.cs.columbia.edu/~jae/honesty.html
- You are cheating if you:
  - Take code from friends, or search for code on the Internet
  - Look at solutions that your friend has from previous semester
  - Upload any class materials (including your own code) to public repository (ex. GitHub) during or after this semester
- We can tell
  - We compare you submissions to CURRENT AND PREVIOUS submissions
  - You submit work history – minimum 5 commits required
  - Once you look at cheat code, you won't be able to come up with anything else
- Result of cheating
  - Academic penalty – 1 letter grade down for mild cases; F for severe ones
  - Referral to the Office of Judicial Affairs

Six assignments on Day 1!

1. Subscribe to 4118 ListServ today
   - https://lists.cs.columbia.edu/mailman/listinfo/cs4118
   - In the textbox "Your name (optional)" put Your Full Name (UNI)
     - For example: Jae Woo Lee (jwl3)
   - **You must reply to the confirm email (which might be in your spam folder)**
   - Then receive "Welcome to the "Cs4118" mailing list"
     - This email contains your password for accessing archives of past postings
2. Read the following two documents:
   - http://www.cs.columbia.edu/education/honesty
   - http://www.cs.columbia.edu/~jae/honesty.html
3. **HW0 (50 points) – due Thu, 1/18, 11:59pm**
4. **HW1 (100 points) – due Tue, 1/23, 11:59pm**
5. Reading assignments
   - See http://www.cs.columbia.edu/~jae/4118/ for HW0, HW1, and reading assignments
6. Start forming groups of 3 – feel free to advertise on listserv