

Welcome!

COMS 4118
Operating Systems I
Spring 2019

Can you drop the course now?

- Class is full with 86, plus 56 in the wait list
- Registrar has no other room that's bigger
- If you are going to drop, please do it early to help others

Teaching staff

- 4 TAs
 - John Hui jzh2106@columbia.edu (Head TA)
 - Jonas Guan jg3949@columbia.edu
 - Jennifer Wenjun Bi jb3495@columbia.edu
 - Suhyun Kim ek2993@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. PLEASE PLEASE DO NOT TAKE THIS COURSE 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 knowledge of computer hardware: 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 Systems: Three Easy Pieces

- **Version 1.00, 2018** – by Remzi H. Arpaci-Dusseau, Andrea C. Arpaci-Dusseau
- Free in PDF form: <http://pages.cs.wisc.edu/~remzi/OSTEP/>

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

- 7-8 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 40%, Exam #1 30%, Exam #2 30%
 - 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

- **REQUIRED 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 your 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

Let's get to work

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, 1/24, 11:59pm**

4. HW1 – coming soon

5. Reading assignments

- See course home page for HW0, HW1, and reading assignments:
<http://www.cs.columbia.edu/~jae/4118/?asof=20190121>

6. Start forming groups of 3 – feel free to advertise on listserv