Welcome to AP!

COMS 3157
Advanced Programming
Fall 2018
Teaching staff

- 16 Teaching Assistants (TAs), all former 3157 students
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  - Hans Jr Montero hjm2133@columbia.edu
  - Eli Goldin eg2917@columbia.edu
Teaching staff contact info

• TA email & office hours
  – Email to cucs3157-tas@googlegroups.com goes to all teaching staff
  – TA room – 1st floor, Mudd building
  – TA calendar: http://bit.ly/3157-cal (will be filled by this weekend)

• Instructor email & office hours
  – Jae Woo Lee jae@cs.columbia.edu – 715 CEPSR
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.
Reviews

"Jae is a fantastic lecturer."
"Jae Lee is a terrible professor. I wouldn't even want him as a TA for this class."
"The best! His remarks will live with me for the rest of my career."
"Jae Lee is the worst human being I have ever had as a professor."

[ . . . ]

"You will learn a lot. Just ignore Jae."

Sources:
CULPA - http://culpa.info/professors/3509
This course

According to BWOG:

One of “The Best Classes Ever”
One of “Classes To Take Before You Die I Mean Graduate”

• Introduction to systems programming
  – One of the most important course in CS curriculum

• *Follow the River and You Will Find the C*
  – Paper published in SIGCSE 2011
  – Describes this course: what, how, and why
  – Great overview of what you are in for

But after all, it’s just a class

• Focuses on skills for systems programming
  – Precision and attention to detail
  – Systematic approach to problem solving

• And that’s one narrow aspect of CS
  – Not a gauge for general CS potential
  – Not even a gauge for general programming ability

• Please don’t get stressed out about this class
Registration and forms

• Two sections
  – Identical lectures and assignments
  – Different exams – must take all 3 exams in one section
  – Audio or video recording lectures is fine
    • Share with class, but not on the Internet

• Auditors are welcome to lectures
  – But no Canvas; no Linux account; no homework; no exams; no TA access; no review sessions

• SPS students must contact SEAS Dean’s office
  – Registrar told me never to sign add-drop form

• All forms and other paperwork in my office hours
  – Please don’t ask me to read and sign things after class
Review sessions

• Logistics
  – One topic / week, multiple sessions by different TAs
  – Most likely evenings between Friday and Monday
    • Time and place TBA
  – Attendance optional, but recommended

• Topics
  – UNIX basics, editors, Git, etc. (in the beginning)
  – Lecture reviews
  – Lab assignment clarifications & reviews
  – Lab solutions walk-through
  – Exam preps
Participate in class, please!

• Classes is no fun (for me, at least) if we don’t interact
  – Answer questions I pose
  – Ask questions anytime
  – Embarrass me when I’m wrong

• People are afraid to ask when they think:
  – “I’m the only one who doesn’t know this.”
  – “I can’t frame this question clearly and eloquently.”
  – “Maybe he just said it when I dozed off just now…”

• Big class, so I may not entertain all questions, but:

NEVER BE AFRAID TO ASK ANYTHING, IN THIS CLASS AND IN LIFE!
Prerequisites

• Absolutely required
  – 2 or 3 semesters of Columbia-level programming courses
    • Ex) 1006-1004-3134; 1007-3137; etc.

• Pretty much required
  – Data Structures (3134 or 3137)
    • For general CS & programming maturity
    • Ex) I’ll assume you know all about recursion
    • Taking DS and 3157 together is not recommended unless you have a very light load

• Recommended
  – Familiarity with UNIX environment – if not, learn ASAP
  – Knowledge of Java – only to draw comparisons with C++

• No C/C++ knowledge assumed
Course objective

• Simply put:
  – Right now, you are a programming student
  – After this course, you will become a programmer

• How?
  – Move beyond Java
    • Learn C/C++
    • Become proficient in UNIX programming tools
  – Move beyond toy programming
    • Learn advanced techniques used in real-world software
    • Learn design principles used in large-scale software
Why C?

• It’s cool
  – There are two kinds of programmers: those who know C and those who don’t
    • Corollary: There are two kinds of Java programmers: those who know C and those who don’t
  – Your kung fu will be better than theirs

• It’s fundamental
  – Understand how other languages work
  – Understand how computers work

• It’s useful
  – Get ready for OS class
  – Build foundation to learn C++
Topics covered

Course is divided into 3 parts:

1) C
   - Mastery of C language is the most important part
   - Everything else depends on it!

2) UNIX systems programming
   - Process control, signal, I/O, TCP/IP networking
   - Sockets API and HTTP protocol
     • Write your own web server from scratch!

3) C++
   - C++ language: we will not cover everything
   - Generic programming: templates and STL
COMS 3136 for non-CS majors

- COMS W3136 Essential Data Structures in C/C++
  - Please consider 3136 if you’re not a CS major
  - Usually offered in Fall semesters
    - Fall 2018: TR 5:40pm-6:55pm, 614 Schermerhorn Hall
- A fusion of 3157 and 3134
  - 3157-lite: C & C++, but no heavy systems stuff
  - 3134-extract: only the most important data structures
  - Bridges E1006 and many 4000-level CS courses
  - Perfect for EE & IEOR folks who came to 3157 to learn C/C++ but found it a bit too much
Grading

• Grading logistics may change later
• You get overall score out of 100, comprised of:
  – Midterm exam #1 – 15%
  – Midterm exam #2 – 25%
  – Final exam – 30%
  – Lab assignments – 30%
• I look at everyone’s lab & exam scores in a big spreadsheet sorted by the overall score
• I decide cutoffs for letter grades A+, ..., D, F
  – No predetermined formula
  – Last semester, mean and median were in B+
• Booster: I reserve the right to raise one’s overall score by a small amount
Booster

- Grade boost based on subjective evaluation
  - Most people will not get it
  - Have been used to boost some borderline cases
  - Usually a small amount (like less than 0.1%)

- Based on:
  - Class participation
  - Mailing list participation
  - Beautiful code
  - Awesome documentation
  - Optional work
10 assignments (aka labs)

• Some labs may not be graded
  – A random subset of at least 7 out of 10 will be graded
    • Assume that a lab is graded unless I say otherwise after the deadline
  – Lowest score will be dropped (i.e. converted to zero)
    • In other words, everyone is forced to get zero on one lab
    • Note that labs have different weights (between 100 and 150), so you’d be at a disadvantage if you end up dropping a bigger one

• Deadline
  – Soft deadline, and then hard deadline 2 days later
    • You use 1 late day if you submit within 24 hours after the soft deadline
    • You use 2 late days if you submit between 24 and 48 hours after the soft deadline
    • After 48 hours past the soft deadline, no submission will be accepted
  – You have 7 late days total; up to 2 can be used for a single lab
    • Check your late days by running: `/home/w3157/submit/check-late-days`
  – Absolutely no exception under any circumstances
  – After you receive grade, you have 2 weeks to send re-grade request
Lab grading

• Grading model
  – You are a software company
  – I hire you to develop a product according to spec
  – You ship the finished & polished product on time
  – TAs are the end users who will pay you with grade

• What this means:
  – Your software doesn’t work, they don’t pay
  – Your software didn’t follow spec, they don’t pay
  – Your software didn’t ship on time, they don’t pay
  – But you worked so hard... they sympathize, but they don’t pay

• For example:
  – Your software doesn’t compile – you get ZERO
  – Deductions for not following spec EXACTLY
    • Ex) Spec asked for README.txt file, not README, not README.md, not Readme.txt
How to do well on exams

Exams are normally closed-book, written, and based on labs and lectures. So I suggest you should:

1. Do the labs. I mean, really do the labs.
   – Don’t let TAs fix your problems – it’s all about the process
   – Don’t just “get it working” – understand every detail
   – Don’t code by trial & error – understand your errors

2. Learn to read code on paper
   – Read & understand every line of solution code
   – Read & understand every line of sample exams
   – Read & understand code from the textbook
   – Then try coding them yourself without looking

3. Attend lectures and pay attention
Zero tolerance on cheating

• **REQUIRED READING:**

• 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 – anywhere between 1 letter grade down and F
  – Referral to the Office of Judicial Affairs
Class ListServ

• Communication between all of us
  – Official announcements, lecture notes, lab assignments
  – Should be the 1st place to go for non-personal questions

• Do:
  – Ask & answer questions
  – Provide helpful tips and fun 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:
  1. All pending questions on the listserv first
  2. All pending questions sent to cucs3157-tas@googlegroups.com
  3. Then individual emails
  4. NEVER send a same question separately to multiple people
    • You will get banned from ever sending an email if you get caught doing this.
Manage ListServ emails

• Learn to manage high volume – filter by tags in subject
  – [cs3157] – all emails from the class listserv will have this tag
  – [ANN] – important announcements from me or TAs
  – [LABn] – information relevant on a particular lab
  – Examples:
    • [cs3157][ANN] Sample midterm
    • [cs3157][ANN][LAB7] Correction on lab7 instruction
    • [cs3157][LAB6] in case you’re curious about fdopen()

• Setup Gmail filters
• Keep up diligently

• Yes, I know about Piazza. Thanks for your suggestion.
Textbooks

• Required
  1. *The C Programming Language* (2\textsuperscript{nd} ed.) – aka K&R C
     • By Kernighan and Ritchie
     • Simply the best
  2. *A Tour of C++*
     • By Bjarne Stroustrup
     – Survey in Spring 2016: only 4% bought them at the local bookstore
     – So get them wherever you usually get your textbooks

• Recommended for self-studying beyond this class
  – *Advanced Programming in the UNIX Environment* (3\textsuperscript{rd} ed.)
    • By Stevens & Rago
HW0: 50 points total

• Part A (20 points): due Tuesday 9/4, 11:59pm (tonight)
  1. Subscribe to 3157 ListServ today
     • 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 "Cs3157" mailing list”
       – This email contains your password for accessing archives of past postings
     • All emails to listserv, TAs, or me MUST include your UNI
       – Sign it with UNI if you don’t use UNI@columbia.edu
  2. Get the textbooks
     • Start reading K&R chapters 1,2,3,4
HW0 continued

• Part B (30 points): due Thursday 9/6 11:59pm

  1. Read the following two documents:
     • http://www.cs.columbia.edu/education/honesty
     • http://www.cs.columbia.edu/~jae/honesty.html

  2. Send me an email containing:
     • Subject: “[3157] hw0-UNI”
       – Without the quotes, sole space before hw0, UNI replaced with your actual UNI in lowercase
     • Your name, major & school program, year
       – Ex) Jae Woo Lee, Physics, Columbia College, class of 1994
     • Your pledge
       – see honesty.html above
     • CS classes taken and/or other programming background
     • Optionally anything else you want to let me know
     • Optionally attach a picture of you, but please reduce image file size to about 100KB