Welcome!

COMS 4995 Topics in Computer Science
C++ for C Programmers
(aka c2cpp, c2cxx, or just c2)
Summer (A) 2021
Teaching staff

• 4-5 Teaching Assistants (TAs)
  – Names & photos will be posted on CourseWorks
  – Email to all teaching staff: cucs4995-tas@googlegroups.com

• Instructor: Jae Woo Lee
  – Email: jae@cs.columbia.edu
  – Office: 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.
  – More info at
    http://www.cs.columbia.edu/~jae/
Lectures, Homework, Quizzes & Exams

- All lectures are on zoom and recorded
- Four asynchronous assignments or assessments
  - Mixture of homework (4-7 days) and quiz (1-2 days)
- Online but **synchronous** final exam on **Thursday June 3rd, 4:10pm**
  - There are no make-up or alternate exams
  - Please do not take the course if you are not available at that time
- Grading policy TBD
  - Probably between 6:4 & 7:3 (homework/quiz & final)

Plans may change later, except that 6/3 is guaranteed to be the only day where synchronous attendance is required
Registration & auditing

• Overlapping registration is fine as long as you attend the exam on 6/3

• Auditors are welcome to lectures
  – CourseWorks page is public & searchable on Vergil
  – Class listserv is open to public
  – But Linux server accounts and access to teaching staff for questions are reserved for registered students
Prerequisites & workload

• COMS 3157 or equivalent is required
  – MUST know C well
  – MUST be comfortable in UNIX command line
  – SHOULD know make & git
    • If not, you need to learn them this week for lab1

• Workload on the lighter side of CS courses
  – Probably about half of 3157
Why C++ “for C programmers”

• New course born out of last 25-30% of COMS 3157 that was cut since Fall 2020

• Two schools of thought on learning C++:
  – Learn C first
  – Learn C++ as a new independent language

• This course: survey & analysis of C++ language from the C programmer’s perspective
  – Focus on how C++ features are implemented
  – Not just learn to use C++, but *understand* it
Core topics covered

- **C, plus plus**
  - Constructor, destructor, copy, move
  - References, operator overloading
  - Odds & ends like namespaces, exceptions
- **Object-Oriented Programming in C++**
  - Polymorphism
  - Multiple & virtual inheritance
  - I/O stream hierarchy
- **Generic Programming in C++**
  - Containers, iterators, algorithms
  - Function objects and lambda
- **RAII paradigm**
  - Smart pointers
Additional topics (if time permits)

• Advanced templates
  – Type deduction
  – Variadic templates
  – Metaprogramming
  – Concepts

• Concurrency

• Implementing design patterns in C++
Please don’t cheat

- 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 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
  - As a beginner, once you peek at cheat code, you won’t be able to come up with any other way to do the same thing
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

• Please use class listserv rather than the TA mailing list
  – The class is huge; please help us not duplicate work
  – General questions to the TAs may be redirected to class listserv with your ID removed
  – Never send a same question individually to multiple TAs

• There will be an ongoing anonymous feedback form
Manage ListServ emails

• Manage high volume – filter by tags in subject
  – [cs3157] – all emails from 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
  – I will send an example soon

• Please keep up
  – At a minimum, you must read every single ANN
Textbook & References

• A Tour of C++, 2nd Ed. by Bjarne Stroustrup
• Online references
  – C++ Super-FAQ: https://isocpp.org/faq
• “The Definitive C++ Book Guide and List”
HW0: 50 points total

- **Part A (20 points):** due Tuesday 5/4, 11:59pm (tonight)
  1. Subscribe to 4995 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 (might be in your spam folder)**
     - Then receive “Welcome to the "Cs4995" 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
       - Or just use UNI@Columbia.edu instead of first.last or whatever... (please)
  2. **Get the textbooks**
     - Start reading ATC chapters 1,2,3
HW0 continued

• Part B (30 points): due Thursday 5/6, 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: “[4995] 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