Welcome!

COMS 4995 Topics in Computer Science
C++ for C Programmers
(aka c2cpp, c2cxx, or just c2)
Summer (A) 2022
Teaching staff

• Four Teaching Assistants (TAs)
  – Hans Montero hjm2133@columbia.edu – Head TA
  – Maïlis Whetsel mw3391@columbia.edu
  – Fangxin Lin fl2571@columbia.edu
  – Xijiao Li xl2950@columbia.edu

• TA access
  – 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, and Exam

• All lectures will be recorded
  – Watch live, or later on CourseWorks / Video Library

• 4 or 5 homework assignments (65%)

• Final exam on **June 30th, 5:00-7:20pm** (35%)
  – There are no make-up or alternate exams
  – Please do not take the course if you are not available at that time

• Grading policy may change later
Final Exam Logistics

• Final exam will be **in-person**
  – Traditional pencil & paper exam
  – Closed-everything

• Remote proctoring for CVN students and pre-arranged special cases
  – We send exam PDF at 4:15pm; you go print the exam and come back within a few minutes
  – You are in a zoom session with video, microphone, and speaker ON
  – Your zoom camera is placed at a distance so we can watch your entire surroundings
  – **You must have access to a printer**
Auditing

• Lectures & listserv are open to auditors
  – Anyone can attend lectures in-person
  – Videos on CourseWorks open to all UNIs
  – Anyone can subscribe to class listserv

• No HW & no TA access
  – Linux server accounts for hw skeleton code & submission restricted to registered students
  – TA access is reserved for registered students
Prerequisites

• 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
1. New course born out of last 25-30% of COMS 3157 that was cut since Fall 2020
2. Two schools of thought on learning C++:
   – Learn C first
   – Learn C++ as a new independent language
3. 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
  – [cs4995] – all emails from class listserv will have this tag
  – [ANN] – important announcements from me or TAs
  – [LABn] – information relevant on a particular lab
  – Examples:
    • [cs4995][ANN] Sample final
    • [cs4995][ANN][LAB4] Correction on lab4 instruction
    • [cs4995][LAB3] in case you’re curious about ...

• 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 5/24, 11:59pm (tonight)

  1. Subscribe to 4995 ListServ today
     • https://lists.cs.columbia.edu/mailman/listinfo/cs4995
     • 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 5/26, 11:59pm

1. Read the following two documents:

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
Request for remote final proctoring

• If you:
  1. Are a CVN student
  2. Cannot attend the final in-person, but would really like to take the course (whether you already spoke to me or not)

• Please send me a request for remote final proctoring with the following info:
  – Reason why you cannot take the exam in-person
    • If you’re a CVN student, simply say “Registered in CVN section”
  – Confirmation that you will make sure to have access to a printer for the exam
  – Email subject: [4995] UNI: Request for Remote Final
  – **Deadline for request: Thursday May 26th, 11:59pm**
  – If your request is granted, you will receive an email with a detailed instruction for remote proctoring