Welcome to…

C++ Deep Dive for C Programmers

(a.k.a. c2cpp, c2cxx, or just c2)

Fall 2025

c2cxx.github.io/www/2025-9/

Teaching Staff

Hans J. Montero (just call me 'Hans')
Adjunct Instructor

Software Engineer @ Google – Colossus distributed file system

Previously…
- Columbia SEAS: BS'21, MS'22
- TA'd various systems CS classes: AP, OS, PLT, c2cpp
- Adjunct experience: OS Spring 2023, ASP Spring & Fall 2024
- …more info at http://cs.columbia.edu/~hans/

Teaching Staff

Two teaching assistants, both former c2cpp students:

Shriya Mahakala <srm2245@columbia.edu>
Julien Remy   <jr4404@columbia.edu>

Course Homepage

c2cxx.github.io/www/2025-9/

Please see the homepage for:

- Lecture schedule and notes

- Office hours calendar for Hans & TAs

- Exam dates and assignment deadlines

- Other course material

Course Prerequisites

1. Solid C programming experience is required!
    - This class assumes you know C; tough to keep up if you don't
    - Must have taken COMS 3157 (AP) or equivalent

2. You should be comfortable with UNIX env, make and git
    - It's OK if you're rusty, you can pick these up over the semester

Mailing Lists

[C2cpp]   (whole class)   c2cpp@lists.cs.columbia.edu
[TA-c2cpp] (teaching staff) ta-c2cpp@googlegroups.com

Look for subject tags in brackets, e.g.:

- [C2cpp] **[ANN]** [LAB2] Lab 2 released

- [C2cpp] [ANN] **[EXAM1]** Important Information for Exam 1

- [C2cpp] **[LAB4] [PART3]** Frequency Cache Strategy

(Listservs prepend list tag to your subject, don't add it yourself)

Class ListServ Etiquette

[C2cpp]   (whole class)   c2cpp@lists.cs.columbia.edu

Do:

- Ask & answer questions. First place to go for non-personal questions

- Provide helpful tips & links for classmates

- Be considerate & friendly

Don't:

- Ask questions without first trying to solve it yourself

- Post code/critical info that leads directly to the solution

- Be impatient & rude

Learn to manage high volume of emails – **set up Gmail filters**

At the very least, ensure you won't miss any **[ANN]**s

Teaching Staff Mailing List Etiquette

`[TA-c2cpp]`   (teaching staff)   ta-c2cpp@googlegroups.com

TA mailing list is intended for questions specific to you

- We may redirect general questions to class mailing list with your UNI redacted (unless you tell us not to)

Prefer emailing the TA mailing list over emailing any teaching staff individually

Anonymous feedback form available – see course homepage

Textbooks and References

A Tour of C++, 3rd Edition – by Bjarne Stroustrup, the creator of C++
- High-level overview of C++20 for experienced developers

Online references (to name a couple):
- C++ Super-FAQ: https://isocpp.org/faq
- C++ reference: https://en.cppreference.com/w/

"The Definitive C++ Book Guide and List":
https://stackoverflow.com/questions/388242/th e-definitive-c-book-guide-and-list

Lectures

In-person lectures: **Mon/Wed 5:40pm – 6:55pm, 750 CEPSR**

- Attendance will be taken at the start of lecture

- Lectures will be recorded and be made available shortly afterwards

- Optional review sessions may be held by TAs over the semester – details TBA

Auditors are welcome to lectures & class mailing list

- …but no Linux account, no lab/exam submissions, no TA access

Attendance

Attendance will be worth 5% of your final grade (enough to put you over/under a letter grade boundary)

- You're allowed to **miss 6 lectures** before losing the attendance grade (all or nothing)

- Reach out to me about extenuating circumstances

Attendance will be taken every lecture starting **Monday 9/15**, which is after change of program period

Exams

Two **synchronous** and **in-person** exams:
- Exam 1: Wednesday October 22
- Exam 2: Wednesday December 17

No make-up and no alternative exams
Please take c2cpp another semester if you can't make these times

Extended-time exams at ODS/CARDS must overlap with class exam time by at least an hour

- You may not be able to have a class before/after c2cpp

Homework

Five labs (not including hw0)

We reserve the right to drop labs (but you won't know until after the deadline)

Labs have a 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 48 hours past the soft deadline, no submission will be accepted

You have 5 late days total; up to 2 can be used for a single lab
- Late days are for unforeseen circumstances such as sickness
- Please do not ask for additional extensions

We reserve the right to adjust the late policy

Grading Policy

Attendance (5%) + Labs (25%) + Exam 1 (35%) + Exam 2 (35%)

Letter grades are curved – no predetermined letter grade cutoffs
Expect mean/median to be around B/B+

We reserve the right the adjust the grading policy

Zero Tolerance on Cheating

REQUIRED READING: http://www.cs.columbia.edu/~jae/honesty.html

You are cheating if you:
- Take solution code from other people, the Internet, or AI
- Look at solutions that your friend has from previous semester
- Upload any class materials (including your own code) to public repository (e.g. GitHub) during or after this semester

We can detect cheating cases:
- We compare you submissions to **CURRENT AND PREVIOUS** submissions
- You submit work history – **minimum 5 commits required**

DON'T BECOME A HUMAN BEING THAT AI CAN REPLACE!

Syllabus

- 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++
  - STL containers, iterators, algorithms
  - Function objects and lambda
  - Template metaprogramming & concepts

- RAII paradigm
  - Smart pointers

- Concurrency
  - C vs. C++ threads
  - C++ synchronization

- Other topics as time permits...

Let's get to work! (1/2)

1. Subscribe to the C2cpp ListServ TODAY:
    https://lists.cs.columbia.edu/mailman/listinfo/c2cpp

- In the textbox "Your name (optional)" put **Your Full Name (UNI)**

    - For example: Hans Montero (hjm2133)

- You must reply to the confirm email (which might be in your spam folder)

- Then receive "Welcome to the "C2cpp" mailing list"

    - This email contains your password for accessing archives of past postings

- If you register late, you might miss ANNs and other emails – check the archives

Let's get to work! (2/2)

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

3. See course home page for **HW0**: c2cxx.github.io/www/2025-9