

Introduction to Computer Science II

Spring 2021 as CS-199-128

University of Illinois at Urbana-Champaign

Instructor

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Learning Objectives

At the end of the course, a successful student should be able to:

- Manage, organize, and compile C++ projects of simple complexity using basic Unix-based tools
- Use basic editing and debugging tools such as GDB and Valgrind
- Understand the features of computer systems that make them useful for solving problems, including computation, memory, storage, data access and networking
- Use object-oriented design to appropriately structure data and couple data and behavior
- Decompose problems of modest complexity into simpler components with well defined interfaces
- Formulate and implement useful algorithms that solve real problems and can be implemented and run on a computer
- Construct and test code from a simple specification

Important Dates

- **Midterm exam** – Monday, Mar 8, 2021
- **Final exam** – Monday, May 3, 2021
- **Final project due date** – Wednesday, May 5, 2021

Asynchronous Lectures

This class breaks from traditional collegiate lectures by delivering course content through a series of asynchronous daily lessons available on-demand through our course website. Each lesson introduces new material through a combination of text, video, and interactive walkthroughs. You will find interactive coding exercises interspersed throughout each lesson, which are designed to reinforce the material that you have been reading about and listening to.

Synchronous Class Meetings

Class meetings are scheduled on Mondays, Wednesdays, and Fridays from 11:00 am to 11:50 am Central Time (CT). These are not lectures, but are designated to accommodate different activities.

Labs on Mondays

11:00 am to 11:50 am CT

During the “class period” on Mondays, you will attend a lab (via Gather) and will work collaboratively with a partner on interactive exercises and problem sets. Each lab will be choreographed by a facilitator who will introduce the activities and answer your questions.

Instructor Office Hours on Wednesdays

11:00 am to 11:50 am CT

During the “class period” on Wednesdays, Professor Nowak will hold walk-in office hours (via Zoom). Please stop-by sometime, even if it is only to say [Howdy](#).

Discussion Sections on Fridays

11:00 am to 11:50 am CT

During the “class period” on Fridays, you will attend a discussion section (via Zoom). At the beginning of the semester, your preceptor will introduce you to the basic development tools that we will be using throughout the semester. Thereafter, your preceptor will review key learning objectives for the week’s lessons and lab activities and will involve question-answer and group discussions.

Other Synchronous Programs Available

Class meetings are scheduled on Mondays, Wednesdays, and Fridays from 11:00 am to 11:50 am Central Time (CT). These are not lectures, but are designated to accommodate different activities.

Office Hours and Help Sessions

See course calendar

All course staff participate in running online office hours on the online help site. Both group and individual help sessions will be available, with available course staff dropping by periodically to offer suggestions and advice. Office hour times will be posted on the calendar.

Additional Programs

See course calendar

CS 128 staff run many regular programs. Topics include new and old homework review, conceptual content, quiz preparation, and help with the longer machine project that you will complete this semester. Program times and details will be posted on the course calendar.

Note that CS 128 programs are not all just general help sessions. Some may be, but course office hours are the primary way to get help with a specific problem.

Course Resources

For more information on our resources (how to access them, when and how to use them, etc), please refer to the [Getting Started](#) document.

Development Environment

Install the cs128@illinois development environment by following the directions on the [development environment page!](#)

Style Guide

In this course, we will use the [Google C++ Style Guide](#).

Assignments and Grading

Course grades will be assigned according to this scale:

Minimum % of Total Points Earned	93.0%	90.0%	87.0%	83.0%	80.0%	77.0%	73.0%	70.0%	60.0%
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D

* You will fail this course if you earn below 60.0% of the total available points.

Method of Evaluation

Course grades will be calculated using the following weights:

Category	% Contribution	Category	% Contribution
Machine Problems	35%	Final Project	10%
Quizzes and Midterms	35%	Laboratory Assignments	8%
Topic-Review Activities (TRAs)	12%		

* No categories will overflow—you cannot earn more than the total number of available points for each respective category.

* We reserve the right to modify these weightings during the semester if unforeseen circumstances with course infrastructure warrant us to do so.

Machine Problems 35%

- A new machine problem will be released every Friday and you will be given exactly one week from the release date to satisfactorily complete the assignment.
- You must **individually** compose your solution to these assignments.
- Each week's MP increases in difficulty and sophistication from the previous week's MP.
- All machine problems are automatically graded by the CodePost auto grader; you will have the opportunity to earn partial credit by passing some of the test cases, but non-compiling solutions will not be awarded any points.
- **Submission policy:** Each machine problem prompt will specify the number of submissions you have been allocated; your final score will be that recorded for your most recent submission, not your maximum score across all submissions. This policy is due to a limitation with the auto-grading system employed this semester.
- **Late policy:** In order to accommodate illness and other potential excused absences, we will accept each machine problem up to three-days past the due date without penalty; past three-days you will not receive any credit for the assignment.

Quizzes and Midterms 35%

- All quizzes and midterms will be given online during your assigned Monday lab time.
- You must **individually** compose your solution to these assignments.
- CS 128 quizzes and midterms will consist of multiple-choice and programming questions.
 - Quiz questions are a mix of multiple-choice questions drawn from lesson content and small programming problems.
 - Programming problems may be drawn from previous homework or appear later as homework.
 - The multiple-choice questions should be easy if you have followed the daily lessons; you may find the programming questions more of a challenge.
- In comparison to the quizzes, midterms will be more comprehensive; anything covered up to a midterm's date can be covered. You should expect about half or more of the points on each midterm for programming problems.
- All questions will be graded automatically; you will have the opportunity to earn partial credit, but non-compiling code for programming questions will not be awarded any points.
- **CS 128 does not have a final exam.** We will run the last midterm on the Monday of the final week of class, and we will not give an assessment during this exam week.
- **Late policy**
 - **Quizzes:** You must take quizzes within your assigned lab window, and not at some other time. In order to accommodate illness and other potential excused absences, we will drop 10% of the total number of available quiz points when computing the quiz component of your final grade. Accordingly, your grade should be calculated as $\text{number of points you scored} / [0.9 * \text{total number of available points}]$.
 - **Midterms:** If you miss a midterm, you will receive a zero. In very exceptional circumstances, involving health or other emergencies, a makeup midterm will be considered.

Topic-Review Activities (TRAs) 12%

- These activities will be completed at the end of each week to evaluate a student's understanding of the content disseminated during that week's lesson.
- Our intention is for these activities to be a helpful resource for students to solidify their knowledge on these concepts prior to moving onto MPs.
- Students will write their solutions to these activities on the course website.
- All questions will be graded automatically and you will have the opportunity to earn partial credit according to the rubric you will see when grading your code; however, non-compiling code will not be awarded any points.
- **Late policy:** You must complete these activities by their due date. In order to accommodate illness and other potential excused absences, we will drop 10% of the total number of available points for this category when computing this component of your final grade. Accordingly, your grade should be calculated as $\text{number of points you scored} / [0.9 * \text{total number of available points}]$.

Final Project 10%

- During the last few weeks of the course, the final project will provide you an opportunity to complete an open-ended project; however, your project description and scope will have to be approved by the course staff.
 - Ideally, you will be able to build whatever you want, work in small teams, and will be encouraged to freely and appropriately use available open source libraries.
- Grading of the final project is quite generous, but we do expect you to try something and take advantage of an early opportunity to do an open-ended project.
- We'll discuss the final project more later in the semester.
- **Late policy:** If you miss the deadline, you will receive a zero. In very exceptional circumstances, involving health or other emergencies, an extension will be considered.

Laboratory Assignments 8%

- Laboratory assignments will be assigned during the lab period on Monday; we expect and require you to collaborate in small groups on these activities.

- The purpose of these assignments is to engage the material with your fellow students, hear their perspectives and share your own through lively discussion, and reinforce/clarify topics and concepts taught in the lessons.
- Exact lab formats are subject to change on a week-by-week basis, but the collaborative nature will be maintained throughout the semester.
- **Late policy:** You must complete these activities by their due date. In order to accommodate illness and other potential excused absences, we will drop 10% of the total number of available points for this category when computing the lab assignment component of your final grade. Accordingly, your grade should be calculated as $\text{number of points you scored} / [.9 * \text{total number of available points}]$.

Course Communication

We have set up a comprehensive and well-organized course website and discussion forum to help you find what you need to know. Our goal is to avoid email and other 1-to-1 forms of communication that don't scale well to large numbers of students.

There are two primary sources of information for CS 128:

1. This website
2. The course forum at forum.cs128.org

Most policy questions are answered in this syllabus. For almost anything else, search the forum—maybe another student has asked your question and we've already answered it. If you still can't find an answer, post your question on the forum.

What You're Responsible For

You are responsible for email sent to your [@illinois.edu](mailto:illinois.edu) email address. We will occasionally use a course email list to send important announcements.

You are also responsible for announcement messages posted in the course forum. These announcements are important and we will frequently post in this category in lieu of using email.

Contacting the Course Staff

Course forum is your primary point of contact with the staff.

You may think that the professor spending five minutes responding to your email is not a huge problem. Five-minute responses to 100s of students can consume many hours though. We kindly ask you to post to the course forum.

This is not because we don't like you. It's simply because there are a lot of you, a much smaller number of us, and many of the questions that you have are shared by other students. If you email us, we can answer your question to one person: you. If you post on the course forum, we can answer your question to the entire class. You may find that your question has already been answered by searching prior to posting, or that another student can answer it for you before the course staff.

Here is a general guide about how to contact the course staff:

- *I need help installing...* post on the course forum.
- *I'm confused about the concept...* post on the course forum.
- *I need help with...* post on the course forum.
- *I can't find...* post the course forum.

In contrast, here are some cases where you can and should contact the course instructors:

- *I think that my friend is cheating in CS 128...* contact the course staff.
- *I'm really sick and getting behind in the class...* contact the course staff.
- *I'm feeling really overwhelmed and need someone to talk to...* contact the course staff, or an academic advisor, or a friend.

That said, we're here for you when you need us.

Sometimes, things get hard for no apparent reason. These are unprecedented times for all of us, and we know how important it is for you to get the help you need. That is why we are pleased to introduce these two new initiatives to help you reach your goals and academic standards.

Time Zone-Friendly Help Sessions

We know our students are scattered all around the world. We don't want the time difference to get in the way of you getting the help you need. Thanks to our staff members also all around the world, we are offering Time Zone-friendly help sessions. Look for these sessions on our course calendar.

Multilingual Staff Members

Course materials can get hard. It can be even harder when you are not learning in your native language. If you feel like you are getting nowhere because of the language barrier, we may have a staff member that speaks your language. Look for the staff member in the directory that speaks your language, and feel free to email them directly to seek help.

Reporting Problems

If you believe that you have identified a problem with a quiz or midterm question, machine problem, lesson, or otherwise, please report the problem to the course staff through a private note on the discussion forum. **Do not post your questions publicly.**

Once we have received your report, we will do one of the following:

- **If the question has a bug**, we will fix it and ensure that all students receive full credit—even those that took the quiz before the bug was identified.
- **If the question has a minor typo** that we don't think affects its ability to be correctly answered, we will fix it and distribute that change.
- **If the question is fine**, we will not do anything.

Reporting Infrastructure Failure

Although we do our best to ensure this doesn't happen, course infrastructure may fail time to time. For more information on how to report this and how we process your report, please refer to [this post](#) on the course forum.

Copyright Statement

The course materials used in this course are copyrighted. All material prepared for this class is copyrighted; this includes the syllabus, lecture slides and notes, exams, machine problems, lab work activities, etc. Given that all course material is a copyrighted work, you do not have the rights to copy or distribute the course material, unless the author expressly grants such permission.

Recording Statement

Students may not record audio or video of any course activity unless the student has an approved accommodation from Disability Resources & Educational Services permitting recording. This accommodation letter must be presented to the instructor in advance of any recording being done. Students who are allowed to record classes are not permitted to redistribute audio or video recordings of statements or comments from the course to other individuals without the express permission of the faculty member and of any students who are recorded.

Academic Integrity

The University of Illinois at Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code [here](#).

Academic dishonesty will result in a sanction proportionate to the severity of the infraction, with possible sanctions described in [1-404 of the Student Code](#). Every student is expected to review and abide by the Academic Integrity Policy as defined in the Student Code. As a student it is your responsibility to refrain from infractions of academic integrity and from conduct that aids others in such infractions. A short guide to academic integrity issues may be found [here](#). Ignorance of these policies is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity. It is imperative that each student clearly understand those rules and the severe consequences that can result from the adjudication of an Honor Code Violation.

Cheating

All work submitted to this course must be your own. Cheating in this course will result in a grade reduction, your removal from the CS program, or from the University of Illinois. Specifically, the following activities constitute cheating and will be dealt with according to relevant [departmental](#) and [university](#) policies. You may not:

- **Turn in work that was completed by anyone other than yourself.**
- **Copy or paste code that you did not write from any source.**
- **Misrepresent your work as the work of another student.**
- **Examine another classmate's solution, reproduce it, and submit it as your own work.**
- **Share information about the content of quizzes or other private course assessments.**
- **Publish your MP or coursework anywhere where other students can find them.** Note that this includes publishing your MP publicly on GitHub. Nobody wants to see your solutions to the MP anyway. If you want to impress employers, fill your GitHub page with your own independent projects.

We will run cheating detection software on all submitted student work. These programs are extremely accurate, and any evidence of cheating that they uncover will initiate academic integrity violation proceedings. We are serious about this, and ask you to be serious about learning. If you want to learn more about how accurately this software detects cheating and plagiarism, [read this article](#).

A Simple Rule of Thumb about Collaboration

A general rule of thumb is that exchanging or soliciting ideas about how to solve the MP and TRAs is not cheating, but exchanging code is cheating. Feel free to discuss your solutions with other students as long as you do not provide them or allow them to view your source code. If you are talking in English or another spoken human language that's fine. If you are exchanging computer code, that's cheating. **An exception to the rule:** collaboration (exchanging ideas, soliciting ideas, or otherwise) is not permitted on quizzes or midterms.

Penalties

If you are caught cheating in CS 128 you will (without question) receive a FAIR violation. Depending on the severity of the situation, you may also have any of the following penalties applied:

- A letter grade reduction in the class. Note that this will likely make it impossible for you to transfer into the Computer Science department.
- An F in the course. This will definitely make it impossible for you to transfer into the major.

Plagiarism

Plagiarism is the presentation of the work of someone else without giving him or her due credit. You can copy the words of others as long as you identify them as such. In fact, documented use of program libraries is encouraged. Submitted work will be examined for plagiarism using computer software designed for that purpose. Examinations are meant to measure the knowledge or skill of each individual, so giving or receiving unauthorized assistance during tests and quizzes is cheating. It is assumed that college students know what is honest and what is not.

Americans with Disabilities Act Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603, e-mail disability@illinois.edu or go to <https://www.disability.illinois.edu>. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available that can help diagnose a previously undiagnosed disability. You may access these by visiting the DRES website and selecting "Request an Academic Screening" at the bottom of the page.

Tentative Schedule

Week	Topics
1	Introduction to C++, including compilation and execution
2	Formal and informal testing
3	Compound types (pointers, references, arrays), classes
4	Data representation, files, and the filesystem
5	Networking
6	Databases
7	Memory
8	Classes with dynamic memory
9	Generic programming using templates; Inheritance and polymorphism
10	Trees
11	Graphs
12	Design patterns (eg. iterators)
13	Select topics on modern C++ (eg. smart pointers)
14	Functional-style programming in C++
15	Concurrency and concurrent algorithms in C++