

CSCI 1200: Introduction to Computational Thinking

Instructor: Felix Muzny¹ (pronunciation: "Muse-knee"; pronouns: they/them and he/him)

Contact: muzny@colorado.edu

Office: ECOT 734 (engineering center tower, see map posted on canvas)

Credit: 3 credits

Lecture times: Mondays & Fridays 3 - 3:50pm, VAC 1B20

Course website: [Canvas](#)

Office hours: see office hours calendar on course website

For further logistics information and information on who to contact in which circumstances, see the Course Logistics Information on the course website.

Course Overview

Computers are everywhere. Many of us use computers from the moment we wake up until we fall asleep again. Whether you are swiping your BuffOne card to access a building, tracking how far you've walked today, using a route finding application to learn where east campus is, or playing Pokemon Go in between classes, you're using computers.

As computers become integrated into more and more aspects of our everyday lives, it's important to understand how they work, what their limitations are, and how we can use them to do what we want. This class will give you a foundation for understanding all of these things.

We will use the lens of "computational thinking" to approach these topics. That means we will use the techniques of computer science to solve problems, including simple and complex ones. Then, we'll take our newfound skills and understanding and look at real world applications to deepen our understanding of computers, programs, and the effects they are having all around us.

Course Goals

1. Learn to take a systematic approach to problem solving and to formulate algorithms/strategies with a computational approach.
 - a. To understand the form and function of computer programming languages.
 - b. To know the steps in a software development process.
 - c. To understand programs following the input, process, output (IPO) pattern.
2. Understand how computing and computational processes interact with the world at large.
 - a. Apply computational knowledge to the analysis of current events and innovations.
3. Understand and be able to articulate problems that computer scientists study at a high level.

¹ Call them "Felix" or "Professor Muzny"

Topics

There are three broad topics that align with the learning objectives for this course:

Programming	Computing in the modern world	Computer Science
<ul style="list-style-type: none"> - print/input functions - Data types, variables - Functions, parameters, returns - Iteration - Lists - Boolean, conditionals - File input/output - Using modules/libraries - Using objects in programs 	<ul style="list-style-type: none"> - User tracking & privacy - Data and scale - Data visualization - Artificial Intelligence - Algorithmic bias 	<ul style="list-style-type: none"> - Search - Sorting - Runtime - Graphs - Classic computer science problems

A detailed calendar is located farther down in this syllabus.

Classroom Environment & Expectations

CSCI 1200 is a class that requires you to work hard and think in new ways, and I will support you as you do that. Most students will hit roadblocks at one point or another during the semester. The hard work that you put into this class will pay off. My goal is to create a learning environment that actively supports all students and helps you work through these roadblocks. I encourage you to step out of your comfort zone and try new things. This can be scary and difficult. I ask of all students that you do your part to create a safe environment for exploring new ideas. Here are a few things that I will do to support you and that I ask you to do to support each other:

- **Preparation:** Many of you come to this class with different levels of exposure to computers and programming. For those of you for whom this is your first time programming: welcome! Rest assured, this class is for you. Many of the members of our instructional staff were once in the same boat that you're in now!
- **Classroom environment:** It is unusually common in Computer science classes for some students to ask questions that are not really questions so much as opportunities to demonstrate knowledge of vocabulary or facts beyond the topic at hand. This can have a discouraging effect on other students who are not familiar with those terms, causing them to worry that they are less prepared to do well in the class (this is rarely the case—knowing terms outside the scope of the course is not a good predictor of success). If you find yourself wanting to make such a question or comment, please come talk to me about the topic after class or during office hours—I'm always happy to discuss tangentially related topics at those times!
- **Attendance:** I expect you to attend both lecture and lab and to actively participate in group and individual work. We provide lecture recordings so that you can review concepts at a later date or for exceptional circumstances in which, for example, you have the flu and can't make it to class.
- **Accommodation letters:** If you have an accommodations letter, please bring it to me at your earliest convenience so that I can make sure this class is meeting your needs. Exam accommodations need to be brought to me by at least 1 week before the exam so that I can set up the appropriate environment.

- **Name and pronouns:** If your name and pronouns are not in alignment with those listed on our class roster, please let me know either in person or via email so that I can ensure you are correctly addressed in this class.
- **Class expenses:** If obtaining any material for use in our class presents a financial hardship for you, please let me know and I will work with you to locate the resources that you need to succeed in this class.
- **Feedback:** Please don't hesitate to reach out to me if any aspect of this course or class community could be improved.

How will I know if I'm meeting the learning objectives?

This is a course with a fairly high amount of quizzes and homework, which you should use as feedback about which topics you may need to spend more time understanding. If you find that you are unsure about your mastery of a topic, practice explaining that topic to a friend, classmate, TA, LA, or at any point during office hours. We're happy to help!

Make sure that when you get feedback about your homework that you read it carefully and make sure you understand why you lost any points that you did. Ask any member of the teaching team if you are unsure why you got the score that you did.

You should expect to spend between 6 and 9 hours outside of class every week studying and working on assignments.

We cannot emphasize enough the importance of doing homework and quizzes to your success in this class.

If, at any time, you find yourself wondering how you are doing in the course, or how if you are understanding any particular topic, office hours are a great time to check in with any of the course staff!

Late Policy

All homework must be turned in on time. Incomplete homework that is turned in on time will receive credit for the parts of the homework completed. Late homework will not receive credit.

Extensions will be given in the case of *exceptional* circumstances accompanied by a healthcare provider letter, military activation order, obituary/memorial service notice, police/fire report, etc.

All requests for extensions should be directed to the course staff email: csci1200-staff-f19@colorado.edu.

Make-Up Policy

If you are unable to attend the lab that you are registered for during a particular week, it is your responsibility to contact both your TA and the TA of the lab that you wish to attend instead to get approval beforehand. You should contact the TAs at least 24 hours before the earlier lab whenever possible. Use the course staff email to request a make-up lab: csci1200-staff-f19@colorado.edu.

Collaboration Policy

Since this is a new subject area for many of you, the line between collaboration and plagiarism in this course might also be new for you. Take a few minutes to read the collaboration policy below. The policy boils down to "you are expected to do your all of your work yourself".

Here are three big-picture points to remember when collaborating with your classmates:

- **Strategies:** You may talk with your classmates about *general strategies* but you may not talk about *specific solutions*.
- **Explaining concepts:** You may talk with your classmates about how certain techniques work *in general* but not how to write any part (or sub-part) of the solution needed for the homework.
- **A good rule of thumb:** don't show your assignments to other people; don't look at other people's assignments; don't write code together unless the assignment explicitly states that you may work in pairs. This includes working through solutions on whiteboards as well as telling your friend verbally what you have written.

The finer-grained details:

- **Do not search for a solution online:** You may not actively search for a solution to the problem from the internet. This includes posting to sources like StackExchange, Reddit, Chegg, etc.
 - **StackExchange Clarification:** Searching for basic techniques in Python is fine. If you want to post and ask "How do convert a float to an integer" that's fine. What you **cannot** do is post are things like "Here's the function my prof gave me to write. I need to convert this temperature in celcius to fahrenheit".
- **Plagiarism:** assignments **and code** that you turn in should be written entirely on your own. You should not need to consult sources beyond your textbook, class notes, posted lecture slides and notebooks, and Python/Matplotlib documentation.
- **Tutors:** you should always consult the TAs and LAs for this course if you need extra help. They are here specifically to help you! You should never have anyone else write code for you. This includes tutors, friends, strangers, friends of friends, or anyone who is not you.
 - **A second note on tutors:** our TAs are here for you. They are not paid to do your assignments, but to help you learn. If you are using a tutor that is not helping you learn, **they are not helping you**.
 - **A third note on tutors:** if you turn in work that you are unable to explain, this will result in an honor code violation and a loss of credit.
- **When in doubt, ask:** If you have doubts about this policy or would like to discuss specific cases, please ask the instructor.

Copying and/or soliciting a solution to a problem from the internet or another classmate constitutes a violation of the course's collaboration policy and the honor code and will result in a trip to the honor council and loss of credit for the assignment.

Course Resources

This course uses iclickers in class. If you do not yet have an iclicker, these can be acquired from the campus bookstore.

This course is largely supported by the course notes provided by the instructor, linked from Canvas.

The notes provided by the instructor are supplemented by readings and resources that will be intermittently posted on piazza as well as an interactive online free textbook located at:

<https://runestone.csel.io/thinkcspy1200/>

Software

This course uses JupyterLab and Python 3. We highly recommend installing Anaconda, which will install JupyterLab, Python 3, as well as a number of libraries for Python 3 that we will make use of over the course of the semester.

Students who work on Chromebooks or who wish to work on their homework from campus should use <https://coding.csel.io/>. You may not have access to this site by default (you would get a 403 error), in which case you should email the course staff at csci1200-staff-f19@colorado.edu with your identikey.

Grading

	Due Dates & other info	Total points	Grade percentage
Homework (6 total, 1 required interview grading)	Due Saturdays at 9pm. 4% bonus points awarded to homework turned in by 9pm on Fridays.	300	30%
Data Visualization Project (4 checkpoints, 1 required interview grading)	Task 1 - November 9th Task 2 - November 16th Task 3 - November 23rd Task 4 - December 7th	200	20%
Quizzes (23 total)	Due on Mondays and Fridays before lecture. Each quiz is worth 4 points. There are 23 quizzes total. All points over 75 that you earn in this category are extra credit.	75	7.5%
Labs (15 total)	All labs are worth 5 points. To earn credit for a given lab you must attend and work diligently for the full duration of the lab.	75	7.5%
Exams	Friday, September 27th, 3 - 4:50pm (100 points) Friday, November 1st, 3 - 4:50pm (100 points) Final — date likely Wednesday 12/18 at 7:30pm — (150 points) https://www.colorado.edu/registrar/sites/default/files/attached-files/fall2019final_exam_schedule.pdf	350	35%

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Interview Grading

There will be interview grading conducted throughout the semester. Interview grading is when you meet with the instructional staff to discuss a homework that you have turned in. You will be asked to explain certain aspects of the work you did, how you would go about improving your solution, and other conceptual questions relating to the homework.

All students will be required to attend interview grading at least twice (and possibly more times) during the semester:

1. During weeks 9/10, after Homework 5 (loops) is due.
2. During the final week of class, after the final project is due.
3. For the 6 “regular” homework assignments, you will be eligible to attend interview grading for that assignment if you receive a grade below 75%. Attending interview grading will give you the opportunity to earn back up to half of the points that you lost.
 - a. This interview grading is optional for students receiving between 50% and 74.9%.
 - b. This interview grading is required for students receiving less than 50% on the homework.

For all required interview grading, failure to attend interview grading will result in a grade of 0% on the associated assignment.

Calendar of Topics

Note: this is a draft calendar and may change at the instructor's discretion. All due date changes will be announced in class.

Week (Monday date)	Lecture 1	Lab	Lecture 2	Homework
8/26	Introduction to computational thinking	Orientation, computational thinking	how computers work, early computing history Quiz 1 due	
9/2	no class - labor day	Computer mechanics, computer organization	"mid" computing history, data types and variables Quiz 2 due	Homework 1 due

9/9	"late" computing history, using functions, input function, pseudocode Quiz 3 due	pseudocode, casting, input	using functions with parameters Quiz 4 due	Homework 2 due
9/16	Functions, parameters Quiz 5 due	Writing and using functions	Functions, returns Quiz 6 due	Homework 3 due
9/23	Functions Quiz 7 due	Review	Midterm 1	
9/30	boolean logic, conditionals	boolean logic, conditionals	Strings, strings-as-objects Quiz 8 due	
10/7	while loops Quiz 9 due	while loops	while loops, lists Quiz 10 due	Homework 4 due
10/14	while loops, lists, mutability Quiz 11 due	while loops, lists, mutability	accumulator pattern Quiz 12 due	Homework 5 due
10/21 Interview Grading HW 5	accumulator pattern, file input/output Quiz 13 due	accumulator pattern, file input/output	nested loops Quiz 14 due	Homework 6 due
10/28 Interview Grading HW 5	nested loops, review Quiz 15 due	review	Midterm 2	
11/4	data visualization, projects, using matplotlib	data viz projects	graphing with matplotlib Quiz 16 due	Checkpoint 1 due
11/11	using matplotlib, optional parameters	graphing and testing your loaded data	graphs and graph analysis	Checkpoint 2 due

	Quiz 17 due		Quiz 18 due	
11/18	Classic computer science problems, runtime Quiz 19 due	runtime experiments	Classic computer science problems, graphs Quiz 20 due	Checkpoint 3 due
11/25	FALL BREAK			
12/2	Artificial Intelligence Quiz 21 due	projects workshop	Artificial Intelligence Quiz 22 due	Final checkpoint due
12/9	review Quiz 23 due	review		
Interview Grading Final Project				

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see [Temporary Medical Conditions](#) under the Students tab on the Disability Services website.

This course requires the use of Jupyter Notebooks which have currently not been reviewed fully for accessibility. If you use assistive technology to access the course material, please contact the course instructor and/or Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu as soon as possible to discuss other effective means for providing equal alternate access.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct intimate partner abuse (including dating or domestic violence), stalking, protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, contact the course staff at least 7 days in advance to reschedule a test. Contact both your TAs and the TAs of the lab that you wish to attend at least 24 hours before the earlier of the two to reschedule a lab.

See the [campus policy regarding religious observances](#) for full details.