

CSCI 2270 Data Structures and Algorithms
Summer 2014
Instructor: Dr. Rhonda Hoenigman
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ECOT 738 (Engineering Center)
303-492-0084

Hoenigman Office Hours: W-Th, 11-12, 1-2 in ECOT 738 (Engineering Center).

Complete office hour schedule available on Moodle.

TAs:

Ian Smith (Ian.Smith-1@Colorado.EDU)

LAs:

Erik Eakins (Erik.Eakins@colorado.edu)
Michael Swisher (Michael.V.Swisher@colorado.edu)
Michelle Soult (Michelle.Soult@colorado.edu)

Lectures: MTWTh 8-10:30am in MUEN E0046.

Texts:

1. Cormen, Leiserson, Rivest, and Stein: Introduction to Algorithms, third edition
2. Various online C++ resources

Other Materials:

It is highly recommended that you get a Dropbox account, or invest in a USB memory stick, to save files created in the virtual machine environment. This environment is not backed up, and if it crashes, you will lose all of your work.

Course materials, such as lecture notes and assignments, will be available in electronic form on the Moodle site for the course:

<http://moodle.cs.colorado.edu/>

Grading Policy:

Labs 25% (Daily, due by 5pm on day assigned)
Homework 25% (Weekly, due by 5pm on Sunday evening)
Project 10%
Exams 40% (Midterm and final skills test, equally weighted)

Assignment Grading Logistics:

All assignments in the class will be graded through an interview with the TA, Ian Smith. Each week you are responsible for scheduling a 15-minute meeting with Ian, where he will ask you questions about the assignments you submitted the previous week. These questions are designed to test your understanding of the code as well as provide you with an opportunity to ask questions of the TA.

- Grading meetings are 15-minute appointments, 12-5pm, Monday-Friday
- Sign-up is on Moodle
- Not showing up without emailing in advance results in a zero. If you have to reschedule that is okay but you must email Ian at

least an hour in advance (i.e. no waking up 5 minutes before the appointment, realizing you are going to be late, and sending Ian a panicked email cancelling at the last minute). Emergency situations are an exception and will be evaluated on a case-by-case basis.

- There is a 1-minute "grace period" for being late, after that it is 10% off for each minute the student is late, at 6 minutes late you get a zero.
- My advice to all students is to get to the appointment 5 minutes *early* and use the extra time to prepare.

You must attend a grading meeting to receive credit for your assignments.

Final Exam Logistics:

The final exam for this class will be offered during the last two weeks of the class. There will be multiple offerings of the exam, and all students are responsible for scheduling a time to take the exam. The exam will be computer-based, you will be given a set of questions that will need to be implemented in code and described theoretically. You can take the final exam multiple times to improve your score. **You must receive at 70% or better to receive a passing grade in this class, regardless of your other scores on homework and lab assignments.**

Course Outline:

We will be covering concepts of data organization and retrieval. Different methods of structuring data, such as lists, queues, stacks, hash tables, and trees will be covered. Additionally, we will cover algorithms for building and searching these structures and their complexity.

Topic	Approximate No. of Lectures
Introduction to C++, pointers, memory	3
Linked lists	1
Stacks and queues	1
Trees	3
Hash Tables and dictionaries	3
Searching, sorting and algorithmic complexity	6

Approximate Lecture Schedule:

Date	Book pages	Topic
7/8/14		Intro, VM install, C+, Classes and structs
7/9/14		Memory, pointers, arrays
7/10/14		How to read the textbook. Sorting activity. Introduction to algorithmic complexity
7/11/14		

7/12/14		
7/13/14		
7/14/14		Dynamic memory allocation, Linked Lists and double linked lists
7/15/14		Stacks and Queues
7/16/14		Trees
7/17/14		Problem: choose the correct data structure
7/18/14		
7/19/14		
7/20/14		
7/21/14		Trees, Exam (not in class)
7/22/14		Tree traversal
7/23/14		Depth-first, breadth-first search
7/24/14		Tree balancing
7/25/14		
7/26/14		
7/27/14		
7/28/14		Dictionaries - Hash tables
7/29/14		Hash functions, collisions
7/30/14		Sorting algorithms and their complexity
7/31/14		Binary search, other search algorithms
8/1/14		
8/2/14		
8/3/14		
8/4/14		TBD
8/5/14		TBD
8/6/14		End of semester project
8/7/14		End of semester project
8/8/14		Final

Other Information:

1. You are allowed one late assignment, either lab or homework, during the semester. Please contact me if you will be turning your work in late and I will change your deadline on Moodle. No more than one late assignment will be accepted.
2. Written work must be neat and readable, with adequate spacing and margins. Your name, the date, and your section number must be at the top right of the first page. Code files should have your name, date, and homework number included as comments at the top of the file.
3. Attendance at all class meetings is highly recommended. You are responsible for knowing the material presented during class, even if you were not in attendance when the material was presented. Previous experience has shown me

that students who do not attend class regularly often receive a failing grade and have to repeat the class the following semester.

4. Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. You can find the details at www.colorado.edu/policies. You must notify me of any such conflicts by the end of the first week of classes so we can work out alternatives.

4. A limited amount of printing may be required in this class. You need to ensure that your printing account has sufficient funds for this. Your initial allocation may deplete quickly, depending on your other printing activities. If this causes problems, please come see me.

5. If you qualify for accommodations because of a disability, please submit a letter to me from Disability Services by the end of the second week of classes so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact info: www.colorado.edu/disabilityservices, 303-492-8671, Willard 322. That office also maintains guidelines about temporary medical conditions or injuries.

6. In Class Expectations: It is my expectation that each of you will be respectful to your fellow classmates and instructors at all times. In order to create a professional atmosphere within the classroom, you are expected to:

- * Arrive to class on time
- * Turn off your cell phone (talk and text).
- * Bring your laptop to class if you have one to participate in classroom activities. Please restrict laptop use to these activities only, no email, Facebook, Youtube, etc.
- * Put away newspapers and magazines
- * Refrain from having disruptive conversations during class
- * Remain for the whole class; if you must leave early, do so without disrupting others
- * Display professional courtesy and respect in all interactions related to this class

Compliance with these expectations will assist all of us in creating a learning community and a high quality educational experience. The University of Colorado Classroom behavior policy compliments these classroom expectations:

University of Colorado Classroom Behavior Policy:

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 differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. 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. See policies at www.colorado.edu/policies/classbehavior.html or

www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

7. Out of Class Expectations: Though many of the above stated policies address academic climate within the classroom, these policies should also be upheld outside of the classroom. As a member of the CU community you are expected to consistently demonstrate integrity and honor through your everyday actions. Faculty, TAs, and staff members are very willing to assist with your academic and personal needs. However, multiple professional obligations make it necessary

for us to schedule our availability. Suggestions specific to interactions with faculty and staff include:

- * Respect posted office hours. Plan your weekly schedule to align with scheduled office hours.
- * Avoid disrupting ongoing meetings within faculty and staff offices. Please wait until the meeting concludes before seeking assistance. Respect faculty and staff policies regarding use of email and note that staff and faculty are not expected to respond to email outside of business hours. Send email messages to faculty and staff using a professional format. Tips for a professional email include:
 - * Always fill in the subject line with a topic that indicates the reason for your email to your reader.
 - * Respectfully address the individual to whom you are sending the email (e.g., Dear Professor Smith).
 - * Avoid email or text message abbreviations.
 - * Be brief and polite.
 - * Add a signature block with appropriate contact information.
 - * Reply to email messages with the previously sent message. This will allow your reader to quickly recall the questions and previous conversation.

8. The University of Colorado at Boulder policy on Discrimination and Harassment, which can be found at www.colorado.edu/policies/discrimination.html, and the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes she or he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at www.colorado.edu/odh

9. IMPORTANT!!! All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include cheating, plagiarism, academic dishonesty, fabrication, lying, bribery, and threatening behavior. Plagiarism includes using material from outside sources (e.g., the web) without clear identification and citation.

This class also has specific guidelines for what is considered collaboration and what is considered academic dishonesty. The collaboration policy is given here:

CSCI 2270 Summer 2014 Collaboration Policy

The Computer Science Department at the University of Colorado at Boulder encourages collaboration among students. To support students in collaboration the Department has created a Collaboration Policy that makes explicit when their collaborative behavior is within the bounds of the Collaboration Policy and when it is actually academic dishonesty, which would be considered a violation of the University of Colorado at Boulder's Honor. All students of the University of Colorado at Boulder are responsible for knowing and adhering to the University's Honor Code. Violations of this policy may also include cheating, plagiarism, academic dishonesty, fabrication, lying, bribery, and threatening behavior. Collaboration on homework assignments is allowed and encouraged. Students are most successful when they are working with other students to understand new concepts. The ultimate goal is that you fully understand the code you develop. Plagiarism includes using material from outside sources (e.g., the web) without clear identification and citation. Unless otherwise specified, you may make use

of outside resources (internet, other books, people), but then you must give credit by citing your sources in the comments inside your code.

Examples (assuming // indicates beginning of code comment):

```
// Modified version from https://github.com/Phhere/MOSS-PHP
// Adapted from Program #7.2 in book "Accelerated C++" by Stroustrup
// Worked with Joe Smith from class to come up with algorithm for
sorting
// Received suggestions from stackExchange website (see http://....)
```

A good rule of thumb: "If it did not come from your brain, then you need to attribute where you got it."

Note: you do not need to cite if you are adapting from slides for the course or the required textbook for the course or from the hired staff for the course. Certain homeworks, quizzes, or exams may be required to be completed without outside resources (see course overview for details). In these cases it is your responsibility to know the extent of approved resources and use only those that have been specifically allowed. Use of outside resources in these cases would violate the collaboration policy.

Adhering to the Collaboration Policy

Some examples of violating the collaboration policy include (but are not limited to):

- Sharing a file with someone else.
- Submitting a file that someone else shared with you.
- Stealing a copy of someone else's work and submitting as your own (even with modification).
- Copying or using outside resources and not citing your sources.

Examples of collaborating correctly:

- Asking another student for a helpful suggestion.
- Reviewing another student's code for issues/bugs/errors.
- Working together on the whiteboard (or paper) to figure out how to approach and solve the problem. In this case you must include that person's name in your collaboration list at the top of your submission.

One way to know you are collaborating well is if everyone fully understands the code that is developed. If you do not understand what is in your code or why certain parts of the code are included, you need to ask someone to clarify! This collaboration policy requires that you be able to create the code (or solve the problem) on your own before you submit your assignment.

Any discovered incidents of violation of this collaboration policy will be treated as violations of the University's Academic Integrity Policy and will lead to an automatic academic sanction in the course and a report to both the College of Engineering and Applied Science and the Honor Code Council. Students who are found to be in violation of the Academic Integrity Policy can be subject to non-academic sanctions as well, including but not limited to university probation, suspension, or expulsion.

Other information on the Honor Code can be found at

www.colorado.edu/policies/honor.html and www.colorado.edu/academics/honorcode.

Collaboration boundaries are hard to define crisply, and may differ from class to class. If you are in any doubt about where they lie for a particular course, it is your responsibility to ask the course instructor.

10. GRADES follow the standard percentage breakdown for the College of Engineering:

93%-100%	A
90%-93%	A-
87%-90%	B+
83%-87%	B
80%-83%	B-
77%-80%	C+
73%-77%	C
70%-73%	C-
67%-70%	D+
63%-67%	D
60%-63%	D-
0%-60%	F