
COSC 290 Discrete Structures

Fall 2017

Time	Lecture MWF 8:20–9:10 am Lab A W 12:45–2:35 pm Lab B W 2:45–4:35 pm
Location	314 McGregory (lecture), 329 McGregory (lab)
Instructor	Prof. Michael Hay (303 McGregory, mhay@colgate.edu)
Office hours	TBD (see course website).

Course Description

This course introduces discrete computational structures, methods, and concepts utilized throughout computer science. Topics include types, relations, functions, equivalence and congruence relations, recursion, order relations, partially ordered sets, lattices, Boolean algebras, logic, semi-groups, monoids, morphisms, languages, graphs, trees, and finite state machines. Concrete and abstract data types, circuits, syntactic and semantic program structures provide standard motivating examples and applications.

The required credit-bearing laboratory COSC 290L must be taken concurrently with COSC 290.

Prerequisites: COSC 102.

Materials & Resources

Course schedule/website: <https://github.com/colgate-cosc290/cosc290-fall12017> (link is also available through Moodle)

Textbook (required): *Discrete Mathematics for Computer Science* by David Liben-Nowell, 2016. The book is available in the Colgate Bookstore.

Piazza (required): We will use Piazza for online discussion. It's accessible via Moodle.

Software (optional): The lab computers have all of the software needed for this course installed. These computers are available during lab and open lab hours in the evenings (schedule TBD). If you prefer to work on a different machine, you are responsible for installing the necessary software and figuring out how to adapt the lab instructions to match the particulars of your computer setup. This includes some kind of text editor (e.g., Atom, <https://atom.io/>) and Java 8. Each lab will include any additional software dependencies as well as instructions on how to get up and running.

Course Work

Reading: Reading assignments for each lecture will be posted on the schedule. Please complete the reading *before* class.

Problem sets & Lab: The bulk of the out-of-class work for this course consists of problem sets and labs. The problem sets will consist mostly of selected problems from the textbook. Lab meets every week. Lab activities are intended to reinforce concepts from lecture and provide an opportunity to develop skills in programming and writing proofs. Most lab assignments will require additional work outside outside of the formal lab period.

Exams: There will be a take-home midterm and a take-home final exam.

Participation in lecture: You are expected to attend class though I will not take formal attendance. My goal is to make the classroom a fun and supportive learning environment. To achieve this goal, I need your help. Please come to class on time, mentally and physically ready to engage in the learning process (i.e., pay attention, ask questions, answer questions, give your best effort on in-class exercises, etc.).

Participation in lab: Since lab time will be used to work intensively on the lab assignments, it is important that you come prepared and attend every lab session. Please attend the lab section to which you are enrolled.

Participation on piazza: You are expected to monitor piazza for course announcements and you are strongly encouraged to ask (and answer!) questions on Piazza.

Grading

Lab work is a significant component of the course work. Therefore, lab assignments factor into your course grade. I plan to assign a single grade for the course as a whole and that one grade will be submitted to the registrar for both the lecture (COSC 290) and lab (COSC 290L). However, I reserve the right to assign different grades for lecture and lab if the circumstances warrant making a distinction.

An outline of the composition of your final grade is as follows. Grading is on an absolute scale (*i.e.*, no curve).

Coursework	Portion of grade
Participation	10%
Problem sets	15%
Labs	35%
Midterm	15%
Final	25% (see note 1)

[Note 1] To pass the course, you must pass the final exam.

Final course grades are determined as follows. As a general rule, fractions are rounded down (e.g., an 89.9 is a B+, not an A-). A grade of A+ is awarded when the student demonstrates truly exceptional performance and is not simply determined by having a high final course grade.

F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
< 60	60-62	63-66	67-69	70-72	73-76	77-79	80-82	83-86	87-89	90-92	≥ 93	*

Schedule & Topics

The course schedule is posted on the course website. It will be updated regularly. You are responsible for checking it after each class.

The course closely follows the textbook, focusing on the following concepts:

1. Basic data types: sets, vectors, matrices, functions (Ch. 2)
2. Propositional and predicate logic (Ch. 3)

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3. Proof techniques (Ch. 4)
 4. Induction (Ch. 5)
 5. Analysis of Algorithms (Ch. 6) and Number Theory (Ch. 7). *These topics are covered in depth in COSC 302, so we may not spend much time on them in this course.*
 6. Relations (Ch. 8)
 7. Counting (Ch. 9)
 8. Probability (Ch. 10)
 9. Graphs and Trees (Ch. 11)

Policies

Late work A late submission is one that is not submitted before the deadline. An assignment submitted one second after the deadline is considered late.

For *lab* assignments, late submissions can earn partial credit. For such an assignment, if it is submitted within the first 24 hours after the deadline can receive a maximum score of 90%; within 24-48 hours, a maximum score of 80%; and so on.

The late policy is different for problem sets. Because these are tied to specific readings and lectures, we will likely review the assignment in class and therefore *late work will not be accepted for such assignments*.

Academic honesty You are expected to abide by Colgate's academic honor code: <http://www.colgate.edu/docs/default-source/default-document-library/honor-code8-20.pdf>. The next bullet clarifies what forms of collaboration are permitted in my course.

Collaboration, Plagiarism, and the Difference Between the Two There are two different kinds of working together: collaboration and plagiarism.

Collaboration

- Collaboration is good.
- You are encouraged to collaborate on ideas and high-level program design.
- Programming is often a social effort, and there is much you can learn by talking out the ideas in this class with each other.
- You can by all means talk to each other and share ideas.
- You are permitted to look at each others' programs *under the right circumstances*. For example, what about helping a classmate *debug* their implementation after you completed yours? That can be good for both of you, providing that you are *helping them fix their code* and not simply sharing your solution. On the other hand, turning to a neighbor and saying, "I have no clue how to write this method. What did you do?" is *not* collaborating – it's a one way transfer of information from someone who has learned to someone who hasn't. Not good.

Plagiarism

- Plagiarism is bad. DON'T DO IT!
- Any submission should be your work.
- Even if you work with someone else and share ideas, you must still write your own program/solution. If a piece of your submission uses someone else's idea, you must give that person credit (e.g., in program comments).

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- Do not simply give your code to other students. I encourage you to work together to help debug your code, but you should do so sitting together.

The following are examples of plagiarism:

- Taking someone else's program, changing comments and variable names, putting your name at the top, and turning it in.
- Finding a similar program online, changing the variables and comments around, putting your name at the top, and turning it in.
- Finding a similar program in a book, changing the variables and comments around, putting your name at the top, and turning it in.

I am compelled by University policy to report instances of plagiarism and cheating. The potential consequences are outlined in the honor code.

[As an illustration of academic honesty, I will tell you that credit for the above description belongs to Dave Musicant, a professor at Carleton College. What you see above is slightly modified from the version on his syllabus. Thanks, Dave!]

Academic Support and Disabilities Services If you feel you may need an accommodation based on the impact of a disability, please contact Lynn Waldman, Director of Academic Support and Disability Services at 315-228-7375 in the Center for Learning, Teaching, and Research.

<http://www.colgate.edu/centers-and-institutes/center-for-learning-teaching-and-research/academic-support-and-disability-services>

Student Resources

NASC Liaison Group NASC liaisons are a group of natural science and mathematics faculty members dedicated to providing science-interested students from underrepresented groups with mentorship, motivation, and individualized support as they navigate their paths in the sciences at Colgate. NASC liaisons do not replace the role of an academic advisor or offer formal academic advising. Rather a NASC liaison may meet one-on-one with a student to give another perspective on their academic plan; give tips on effective studying; or introduce a student to upper-class peers, alumni, or other faculty members that might be able to help them. The roles of NASC liaisons will depend on students' needs, and we encourage students to reach out for mentorship and moral support.

The NASC Liaison Group includes professors Gerry Gogel (Chemistry), Engda Hagos (Biology), Silvia Jiménez Bolaños (Mathematics), Patricia Jue (Chemistry), Spencer Kelly (Psychology & Neuroscience), Amy Leventer (Geology), Rebecca Metzler (Physics & Astronomy), Jason Meyers (Biology), and Elodie Fourquet (Computer Science).

Case Library/Informational Literacy and Reference: Use of the stellar library offerings, including the services of the outstanding reference and informational literacy librarians, is something to be made the most of during your time at Colgate. I suggest you get to know the librarians and to use their exceptional and imaginative expertise for assistance in ways that will enrich and enliven your intellectual studies and academic work.

Writing and Speaking Center: Regardless of ability, all writers benefit from having someone else read their essays and offer feedback. At the Writing and Speaking Center, writing consultants can help native and non-native speakers alike with a written paper's focus, development, organization, clarity, citations, or grammar. If you're preparing a speech or oral presentation, speaking consultants can help you organize your content and improve your delivery to an audience. All meetings are private, and you may visit at any stage of your process, from clarifying your initial ideas to reviewing a final draft or practicing an oral performance. See <http://www.colgate.edu/writingcenter> for more information or to reserve an appointment. The center is located in 208 Lathrop Hall. Phone: (315) 228-6085.

Counseling Center: Dawn LaFrance, Director. <http://www.colgate.edu/offices/support/counseling>. The first year can sometimes get bumpy; if you are experiencing emotional and personal difficulties (related to college or not), the Counseling Center offers completely confidential and highly professional services, both for individuals and groups.

ITS: IT Service Desk. Support and expertise related to computer and technology questions and problems, such as Moodle, email, Internet and public access computers on campus. Phone: (228-7111) Location: Third Floor of Case Geyer Library <http://www.colgate.edu/offices-and-services/information-technology>