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CSCE 235H – INTRODUCTION TO DISCRETE STRUCTURES (HONORS)  
Spring 2021

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“Computer Science is no more about computers than astronomy is about telescopes.”  
–Edsger Dijkstra

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## 1 Course Info

Lectures: Time & Venue	Monday, Wednesday, Friday 12:30 p.m.–1:20 p.m. Avery Hall 119
Recitations: Time & Venue	Monday 1:30 p.m.–2:20 p.m. Avery Hall 119
Prerequisites	CSCE 155 and Math 106. CSCE 156 recommended but not required.
Course Web Page	<a href="https://cse.unl.edu/~cse235h">https://cse.unl.edu/~cse235h</a>
Textbook (required)	<i>Discrete Mathematics and Its Applications</i> Kenneth H. Rosen, McGraw Hill, <b>7<sup>th</sup> Edition</b> , 2011

Manual (recommended)	<i>Student's Solutions Guide</i> ISBN-10: 0-07-310779-4; ISBN-13: 978-0-07-310779-0
Instructor	Berthe Y. Choueiry Office hours: Mondays and Fridays, 4:30 pm – 5:30 pm or by appointment 259 Avery Hall also by Zoom at the same time
UTA (Grader)	Tomo Bessho Office hours: Thursdays, 11:00 am – 12:00 pm Meeting by Zoom only

## 2 Course Description

Computer Science is not programming. Rather, Computer Science is the mathematical modeling and study of what computation is—that is, what problems have a computational solution and how *efficient* that solution can be. Thus, a strong foundation in mathematics is essential to your success as a computer scientist. At the heart of computer science are fundamental, discrete structures which we will study in this course. Specifically, you will learn many of the mathematical definitions, techniques, and ways of thinking that will be useful in Computer Science.

## 3 Tentative Schedule

Below is a *tentative* list of topics I intend to cover along with the relevant sections of the text. This schedule may be changed and topics added/removed. Furthermore, though we will follow the book, additional material may be introduced (with sufficient resources) while the depth of each topic may vary.

Topic	Sections
Propositional Logic	1.1 - 1.3
Predicate Logic	1.4 - 1.6
Proofs	1.6 - 1.8
Sets	2.1 - 2.2
Functions	2.3
Relations	9.1, 9.3 -9.5
Partial Orders	9.6
Induction	4.1 - 4.3
Algorithms	3.1 - 3.3
Counting	5.1 - 5.2
Combinatorics	5.3 - 5.5
Recursion	7.1 - 7.2
PIE	7.5
Graphs	9.1 - 9.5
Trees	10.1 - 10.3

I intend to teach from a combination of slides and board work. I will make handouts of the slides available, but you are ultimately responsible for the material, thus regular attendance is strongly encouraged. Furthermore, you will be expected to read the relevant sections of the textbook *before* coming to class.

Recitation meets every Monday from 11:30 a.m. to 12:20 p.m. Avery Hall 19. Recitation will primarily serve as a question/answer session and an opportunity for you to see more examples of concepts presented in lecture, therefore you should come prepared with any questions or examples that you wish to see worked out. *There will be a quiz at almost every recitation.*

Another goal of the recitation is to study a solver of the satisfiability problem (SAT). SAT is a central

problem in Computer Science (e.g., Artificial Intelligence, Theoretical Computer Science, and software and hardware verification) where it is used to model many constrained combinatorial problems in terms of the satisfiability of a Boolean sentence in Propositional Logic. The study of a SAT solver will be directed by Daniel Geschwender, a graduate teaching assistant (GTA).

## 4 Grading

Grade distribution is as follows:

Homework	34%
SAT Study	10%
Midterm	28%
Final	28%

- If you have questions about grading or believe that points were deducted unfairly, you must first contact the TAs (Tyler Bienhoff and Daniel Guo) to see if the problem can be resolved.
- Such questions should be made *within seven (7) calendar days* after the graded assignment has been returned. No further consideration will be given to any assignment seven calendar days after it has been graded and/or returned to you.

### 4.1 Homework

One homework (approximately) will be assigned per week. Homework is usually assigned on a Friday and due the following Friday *before* class. Homework may consist of selected exercises from the textbook as well as original problems and programming assignments. Please carefully follow the indications below:

- You will be expected to follow all instructions specified on each homework assignment.
- Clarity and legibility are of great importance. If homework is sloppy or unclear, points *will* be deducted.
- You are not *required* to typeset your homework assignments, however, it is *strongly* recommended that you do so using L<sup>A</sup>T<sub>E</sub>X or a similar typesetting system. Bonus points are give for typesetting homework in L<sup>A</sup>T<sub>E</sub>X only, but in *no other word-processing program*. Resources for L<sup>A</sup>T<sub>E</sub>X are available on the course web page. If you typeset your homework, you must submit the TEX and PDF files by webhandin.
- Two students can work together and submit a single homework under the condition that they *must* typeset their homework in L<sup>A</sup>T<sub>E</sub>X.
- Programming portions (if assigned) of each homework must be completed using C++ or Java, and must compile and run on `cse.unl.edu`. Code that does not compile or run on `cse.unl.edu` will be ignored, considered as incorrect, and will receive no partial credit.
- Source files, both L<sup>A</sup>T<sub>E</sub>X and program code, and all relevant files *must* be handed in using the CSE *web* handin program (<http://cse-apps.unl.edu/handin>).

### 4.2 Exams

There will be one midterm exam and one final exam given in class (see the schedule for dates). Exams are semi-comprehensive in the sense that

- Topics covered by a previous exam may be included in a future exam if student's performance on those topics was not satisfactory.

- Any topic from the entire course may be the subject of true/false questions in any exam after the topic has been discussed in class.

All exams are closed-book exams, but you have the option of using a single 8.5x11 sheet of *hand-written* notes (front and back). You will hand in your cheat sheet along with your exam. Cheat sheet must have only definitions, theorems, or general comments. No proofs, solutions of examples or of problems are allowed.

In general, *there will be no make-up exams*. Exceptions may be made in certain circumstances such as health or emergency, but you must make every effort to get prior permission. The projected exam dates are:

- Midterm: Friday, March 19, 2021.
- Final: Wednesday, May 5, 2021, 3:30 p.m.–5:30 p.m.

Exam copies are not given back to students but can be checked with the TA's and/or instructor during the two weeks following the exam. The goal is to understand errors, discuss responses, verify grade, etc. Grades are posted on Canvas. Constantly monitor your grades on Canvas and duly report errors.

### 4.3 Late work

Please make note of the following policies:

- All homework are due at the beginning of each class on the due date (usually, Friday) unless specified otherwise.
- You are allowed to turn in two, *at most two*, late assignments (without penalty) the following weekday after the homework was due, *regardless of school holiday or closing* (e.g., if the homework was due on Friday, the homework would have to be turned in by Monday). No assignments will be accepted after this time. The web handin program that you will use enforces a *strict* handin time based on the CSE server's clock.
- Programs or homework that are even a few minutes late will be marked as late so is *extremely* important that you handin your electronic files well within the time that they are due.
- All parts of a homework must be handed by the deadline.
- When giving your paper copy, make sure it is given by hand to the GTA or the instructor. If they are not available, you can give it the CSE Office Staff, *explicitly asking that they put a time stamp* when they receive it from you. Copies that are not time stamped by CSE Staff will be considered as handed in whenever the GTA or the instructor physically receives them.

### 4.4 Bonus points

You can collect bonus points for participating in class discussions and providing useful feedback:

Bonus: Course evaluation	1%
Bonus: Ugrad research	2%

- *Because of lack TA support, this year, the quizzes will be done and corrected during the recitation.* There will be almost weekly quizzes given *at any time* during the recitation on Monday. In general, *there will be no make-up quizzes*. Exceptions may be made in certain circumstances such as health or emergency, but you must make every effort to secure prior permission from the instructor. All quizzes are administered *before* the homework is due, Their goal ensure that you are keeping up with the required readings and the class discussions, and quickly identify misunderstandings. They will generally be short and will cover recent topics. Quizzes will cover all material from:

- The required reading.
  - Textbook examples.
  - Class discussions.
  - Slides.
- Exams will include bonus questions.
  - An individual who typesets her/his homework in L<sup>A</sup>T<sub>E</sub>X will receive bonus points.
  - Bonus points will be awarded for class participation and for finding errors in discussions.
  - Submitting a course evaluation will be awarded one (1) bonus point.
  - Making an agreement with a CSE faculty for starting an honors thesis or submitting a UCARE proposal (due date March 19, 2021) will be awarded two (2) bonus points.

## 4.5 Grade conversion

Letter grades will be awarded based on the following scale.

A+	≥ 97	B+	≥ 87	C+	≥ 77	D+	≥ 67	F	< 60
A	≥ 93	B	≥ 83	C	≥ 73	D	≥ 63		
A-	≥ 90	B-	≥ 80	C-	≥ 70	D-	≥ 60		

## 4.6 Academic integrity

All homework assignments, programs, quizzes, and exams must be your own work. No collaboration with fellow students, past or current, is allowed unless specified otherwise. The Computer Science & Engineering Department has an Academic Integrity Policy. All students enrolled in any computer science course are bound by this policy. You are expected to read, understand, and follow this policy. Violations will be dealt with on a case by case basis and may result in a failing assignment or a failing grade for the course itself. The most recent version of the Academic Integrity Policy can be found at [http://cse.unl.edu/ugrad/resources/academic\\_integrity.php](http://cse.unl.edu/ugrad/resources/academic_integrity.php).

## 5 Communications

We will use the following tools to communicate:

1. Course webpage: <https://cse.unl.edu/~cse235h/>.  
Another valuable communication tool is the course web page. Announcements and resources will periodically be made available.
2. Canvas: <http://canvas.unl.edu/>  
Grades are posted on Canvas. Regularly check your grades and report grading errors within seven (7) calendar days.
3. Piazza: <http://piazza.com/unl/spring2021/csce235h>.  
The best way to communicate with the instructor and the UTA is through Piazza. Messages posted on this forum will be received by the instructor and UTA, who will respond to the requests within regular business hours. Moreover, I may send out emails to the class using Piazza.  
Because spam filters may reject some emails, it is very important that you use your CSE email account for Piazza (which will not filter the emails as spam). If you choose not to use your CSE email account to receive emails, it your own responsibility to make sure the messages are not filtered as spam and we will not provide you any exceptions for unreceived email messages. All email messages are also posted on Piazza.

4. Webhandin: <https://cse-apps.unl.edu/handin>  
All homework, reports, projects, etc. (whatever is applicable) must be submitted via the webhandin system of CSE.
5. Anonymous suggestion box:  
On the course webpage, there is also an anonymous suggestion box that you may use to voice your concerns about any problems in the course if you do not wish to be identified.
6. Office hours:  
Finally, the instructor will hold regular office hours in Avery Hall 259. The UTA will hold one office hour per week on Zoom. If you have a question, post it on Piazza to the entire class. Generally speaking, you should talk to Dr. Choueiry for questions about course material, lecture, recitation, and quiz. You should talk to the UTA for the homework and grading.

## 6 CSE Department Specifics

The CSE Department has an anonymous suggestion box that you may use to voice your concerns about any problems in the course or department if you do not wish to be identified. You can access this tool at <http://cse.unl.edu/department/suggestion.php>

The department may also send out periodic emails containing important announcements. Thus, it is important to check your email often.

The Student Resource Center is located in Avery 13A but may be accessible only online during the pandemic. You may be able to obtain help with this class and other CSE classes. More information can be found at <http://cse.unl.edu/src> (checking on updated link).

## 7 Copyrights

Any work and/or communication that you are privy to as a member of this course should be treated as the intellectual property of the speaker/creator. It is not to be shared outside the context of this course. Students may not make or distribute screen captures, audio/video recordings of, or livestream, any class-related activity, including lectures and presentations, without express prior written consent from me or an approved accommodation from Services for Students with Disabilities. If you have, or think you may have, a disability such that you need to record or tape class-related activities, you should contact Services for Students with Disabilities. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Failure to follow this policy on recording or distributing class-related activities may subject you to discipline under the Student Code of Conduct.

## 8 Special Needs

Students with disabilities are encouraged to contact the instructor or a teaching assistant for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodations to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

UNL offers a variety of options to students to aid them in dealing with stress and adversity. Counseling and Psychological Services (CAPS) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological and emotional well-being when issues arise. CAPS can be reached by calling 402-472-7450. Big Red Resilience & Well-Being provides fun events, innovative education,

and dynamic services to help students understand emotions, manage stress, build strength, connect with others, develop grit and navigate transitions.