CSC 280: Computer Models and Limitations
Course Information Document/Syllabus
Spring 2020 Semester
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Instructor: Lane A. Hemaspaandra, WEG 2317.
Grad TA: Rupam Acharyya, WEG 2305.
Workshop (aka Recitation) Leaders: Michael Chavirimootoo, Christopher Kjellqvist, and Brendon Pon.
UG TAs (aka Tutorial Leaders): Ian Pope, Kenji Mulhall, Sifan (Vincent) Ye, and Yixin (Cecilia) Zhang.

Address for Course-Related Email: If you have any questions about the course, you should see a human during office hours or at weekly workshop or at your weekly tutorial; there are office hours every day, Monday through Friday (starting Thursday, 1/16), and in almost every week you'll have a tutorial on Monday or Tuesday or morning-Wednesday and a workshop on Wednesday evening or Thursday. We will not be using email as a way of accepting questions; we will be using (only) face-to-face, in-person human conversations. Really. The reason behind this is we are devoting the course staff’s time very heavily to in-person contact, as interactive, face-to-face conversations are a very powerful way to identify and clarify issues. (There are some very, very limited exceptions to the nothing-by-email rule. If a TA or workshop leader or I asked you to email them directly and gave you their email address at which to do that, then of course you may use that address for whatever purpose it was given for. For example, this syllabus mentions below issues regarding religious holidays and regarding CETL accommodations, and gives you email addresses to use regarding those.) If your questions are about course logistics, see the grad TA in person at his office hours (or by appointment if his office hours are all conflicts for you), or also he’ll be at each class session (with perhaps a very few exceptions) starting 1/15, although do be aware that there are no exceptions to the rules, and so you should not be requesting an exception, and also be aware of the point made later in this document that this is a Models of Computation course, not a course on designing a Models of Computation course, and so we don’t answer questions about the “why’s of the course’s design or its rules. (Most are designed to help teach a good course within the constraints of its size and its staff support; and to allow us to spend as much of our time as possible on content and on providing you support/practice/exam-grading; and also, some rules are related to CETL-accommodation issues.)

Class Time: M/W 325PM–440PM, Wegmans Hall 1400.

Office Hours: There are office hours each day of the week (starting 1/16). Here are all the office hours, listed by time. (Note: Office hours exist only on days when regular classes are in session, so not during MLK Day and Spring Break, and not after the last class session of our course; so the last office hour of this term will be the Sifan’s 650PM one on Tuesday, April 28.)

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<tr>
<th>Day</th>
<th>Time</th>
<th>(Who, Where)</th>
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<tr>
<td>Mondays</td>
<td>450PM–520PM (Kenji, WEG 2215)</td>
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<td>Mondays</td>
<td>450PM–550PM (Rupam, WEG 2305)</td>
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<td>Mondays</td>
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<td>Mondays</td>
<td>620PM–650PM (Ian, WEG 2215)</td>
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<td>Tuesdays</td>
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<td>Wednesdays</td>
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<td>Thursdays</td>
<td>1120AM–1220PM (Rupam, WEG 2305)</td>
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<td>Fridays</td>
<td>200PM–300PM (Rupam, WEG 2305).</td>
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Office Hours by Time:

1 Any substantially updated versions of this document will be announced as the course goes on via Blackboard and made available on the course home page.

1 My office hours will start 450PM Mondays, and I’ll always stay until at least fifteen minutes in, and starting then I’ll stay on as long as people are there (until 550PM or perhaps longer). So to see me during my office hours, please make sure to arrive no later than 505PM. But don’t panic if you’re there at 450PM sharp and I’m not; sometimes people ask me questions right after class in our classroom and when so depending on how long that lasts I can sometimes be slightly late getting back to my office.
Workshop Sessions: There will be workshops (note: in registrar-speak and CDCS these are “recitations”). These are required. Each student must be signed up (via the registrar) for (exactly) one of the nine workshop sections. You are expected to attend your workshop section every week and participate well at it. (Your first workshop will be 1/22 if you’re in a Wednesday workshop and 1/23 if you’re in a Thursday workshop; there are no workshops on 1/15 and 1/16, during Spring Break, or after the final class session; some other weeks might also be announced during the course as nonworkshop weeks—three are already announced as such later in this document.) Your attendance will directly affect your course grade (see the grading formula). But far more crucially, the workshops are central to the learning of the course; if you skip workshop sections, you’ll miss their value, and will most likely do far worse on the midterms than you would have done had you attended the workshops. The nine workshop section section-names/times/rooms/leaders are:


If any time on or after January 15th you use an add/drop to change which workshop you are in, you are required to immediately send an email to csc280staff “at” cs.rochester.edu noting which workshop you dropped and which you added.

Tutorial Times and Locations: Your tutorial will likely be a group of you and two or three other students meeting weekly for half an hour with a TA.² The tutorials are required, and your tutorial’s time slot for the whole term will be determined right after the first class session, based on information we’ll collect from you there. You’ll have the same time slot all term long. Your first tutorial will be 1/27, 1/28, or 1/29 (there will not be tutorials on 1/20–1/22; side note: 1/20 is MLK Day and there will be no class session, or office hours, or tutorials on that day.). The dates/times/TA for each tutorial, and which tutorial you are assigned to, can be found, after we have made the assignments, via the “Tutorial Assignments” web page that will be linked to from our course home page.

Overview: “This course studies fundamental computer models and their computational limitations. Finite-state machines and pumping lemmas, the context-free languages, Turing machines, decidable and Turing-recognizable languages, undecidability.”

Well, that is the course catalog blurb. And what it means is we’ll be covering much of (though by no means everything in) Chapters 1–5 of the Sipser textbook (so we’ll learn about the regular sets, about the context-free

²Since the TAs often have quite a few office half-hours and tutorials in sequence, they may choose to end a tutorial or a half-hour office hour a few minutes before the full half hour is reached.
languages, about the recursive and recursively enumerable languages, and we also will be (probably somewhat lightly, depending on how time goes) introducing P, NP, and NP-completeness, and possible things in complexity even beyond those. (I typically put up the slides for Chapters 1–5 at or near the start of the course, but please be aware that in that slide set there are various sequences of slides we’ll skip over in class, sometimes with me pointing you to the textbook to read the particular item/issue-proof/example there—we’ll come back to this point in the next paragraph. Also, much of the basics of regular sets and CFLs was covered in CSC 173, and for much of that we won’t teach it in lecture a second time since you already know it, but will likely assign reading in Sipser on it to refresh your memory, perhaps with also a lightning pass over it on the slides in class; but some aspects of what was done in CSC 173 will be repeated, due to being complex or covered only lightly or partially in CSC 173; so for example, regarding DFAs/NFAs/RegExps, we will rely on CSC 173 and reading in Sipser for their equivalence, and we will start our detailed coverage on the pumping lemma, and then will cover some more challenging issues as to classifying sets as to whether they are or are not regular. Of course, anything that is either touched in class or in the readings is in concept in scope on the midterms; but—though this is not a formal statement or promise but rather is an informal guess/prediction—the midterms are unlikely to dwell very intensely on 173-ish material that was in our readings, except for the parts of such that we ourselves put focus/coverage on. For our brief introduction to P/NP/NP-completeness, we’ll use a different set of slides that will be made available near when we get to that material.) The pace of our coverage will be in part hinged on how things go in this particular instance of this course; I’m more interested in you understanding well what we cover (which already will be quite a lot) than in covering a zillion things so fast that no one understands them.

Also, although this is by far the most abstract material in the BS core undergraduate CS curriculum here, we’ll teach it in a very hands-on way. The weekly workshops are a key vehicle for small(ish)-group hands-on problem-solving, and your weekly tutorials will have you and usually two or three other students interacting for half an hour with one TA, so that also is a setting with an even smaller group, and in those too you will often be discussing/presenting your solutions or working on new problems given to you by your tutorial leader (or me). And at times, even in class, we may swap into a mode when we right in class try to discover or develop a given technique, or examples related to something we’ve learned. Partly to make some time for this, and partly to allow the rest of the material to be less rushed, for some proofs, esp. ones that don’t come across clearly on transparencies and in the time crush of class, I’ll assign them to you through the readings. (The readings will be assigned via being listed on our course home page in the list of assigned readings; usually any reading assigned on a given day will be listed on the site that same day, before midnight, so please do checked the page to find the assigned reading; I will often though not always also mention in class the reading assignments.)

Indeed, following the lead of Sipser, we won’t be obsessed with proofs (and we especially won’t be focused on proof details); rather, we’ll try to give you the functional, hands-on ability to really work with these different grammars/models of computation (and for the most interesting, important proofs, will try to give you a good understanding of what is the key idea behind the proof).

Prerequisites: CSC 173 and MTH 150. Really. Really really. If you have not taken and passed both, you’ll need to drop the course now and come back in a later term after you have passed both of those.

The Flow of the Course, Including a Discussion of Tutorials and Workshops and How They Fit In: The general flow of the course will be as follows.

In a given week, there will be material presented in class, or exercises and examples done in class (by you or by me), on Monday and Wednesday. You’ll on Monday, Tuesday, or Wednesday have your (required, scheduled) tutorial. And on Wednesday or Thursday you will have your (required, scheduled) workshop.

Sometimes, I will give you exercises that you will be expected to work on before either a coming tutorial or workshop; those will be posted in the “Exercises/Problems” part of the web page, along with a clear description of by when you are supposed to do them (and I’ll try to remember to mention in class or by a Blackboard announcement that exercises are posted—but please yourself do check the homepage for whether ones are posted). For such problems, you should work on them so you can come into your tutorial or workshop with (written down) either a solution or at least your partial work that failed to get to a solution, on the given problem. Even if the latter case holds, having worked on the problem, and thus knowing what its obstacles and challenges are, will help you understand the solution far more deeply when it is reached at your tutorial or workshop.

Sometimes, the tutorials and workshops will be about you working on problems (that the tutorial or workshop leader knows the answers to) together with your tutorial and workshop colleagues, with the tutorial or workshop leader of course helping with the process, and perhaps presenting an answer if the group doesn’t get to one.
Sometimes, the tutorials and workshops will be you and the tutorial or workshop leader working together on a problem that I assigned that even the leader does not know an answer to, and that will be gone over in a coming class. On such problems, your group will be working jointly with your tutorial/workshop leader, usually a more experienced undergraduate, and so you’ll be able to observe how that leader approaches solving a fresh problem. (If you are the Nth tutorial or workshop the leader has led that is on that problem, the leader may already know a solution, and if so, likely will hold back a bit and try to not get in the way of your approaching the problem, although perhaps giving hints if the group seems stuck.)

Sometimes, tutorials and workshops will be the tutorial or workshop leader showing you some material, or running some examples so that you see some.

And sometimes, tutorials and workshops will be a mixture of the various things above.

It is perfectly legal, and indeed is a good idea, to take notes at the workshop. It is also totally typical and ok—except if there were exercises for which I asked you to come in with written answers—to come into the tutorial workshop and to just there be given problems to solve; that will be very common, and in some sense the tutorials and workshops to a large extent are the exercises and homeworks of this course—real hands-on, medium- and quite-small-group problem-solving. However, it is not ok to come in to a tutorial or workshop without having reviewed what was covered in the course, e.g., in that week’s lectures and in any readings that were due before the time of the workshop.

The goal of the course is not to compete with each other, and, indeed, in real research, collaborative work is very common. And as fellow learners, the class’s students can be great helps to each other. After all, the primary goal is getting to a state of better understanding of the material. For this reason, I am at least initially setting the rules on working together to be very permissive. You may discuss and work on at-home exercises together with groups (even large groups) of your classmates, as long as that work happens face-to-face, in-person. You in fact may discuss the exercises with any UR students. You may look at books to help learn the material.

However, it is cheating to electronically post or distribute or share your answers to problems (e.g., if I assign a problem to work on and write up before a tutorial, it is cheating to put up a solution on your web site or even to email it to a friend; but you can discuss the problem and its solution with a friend or multiple ones, as long as the discussion is face-to-face, in-person). It is cheating to create an electronic forum for discussing the problems and their answers; you must do that face-to-face in-person and only with fellow UR students. It is cheating to grab answers electronically (whether from a fellow student or from the web).

By the way, the above even extends, to some extent, to written material. That is, sort of restating the above footnote about the web to now be phrased in terms of both texts and the web: When doing some exercise I gave you, you indeed may use the library and the internet to search for information and examples on techniques and so on. But you should not attempt to find/look up a solution to a given in-progress exercise/problem; doing so is cheating. If you by accident stumble on a web page (or textbook page) that happens to explicitly solve an in-progress exercise/problem, that in itself is not cheating. But as mentioned above you should, immediately the moment you realize that this has happened not read or copy the solution. The experience and skills you’ll build by working on solving problems are an important part of doing this course; again, this is not a course about web-searching for answers. So as noted before, Googling/etc. to find an exercise answer is sooooooo not allowed; and to expand things a bit further still, it also holds that looking for or getting exercise answers from earlier versions of this course or courses elsewhere or textbooks or etc. is also not allowed.

At least initially, since such exercises are not formal, graded homeworks and their answers are not graded as

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3...in which case you should; they will not be collected or graded, but as time permits the problems will typically be gone over and some students will get to present their written solutions, most especially so in tutorials as those are just three or four students. However, if the tutorial or workshop leaders let me know there is a pattern of students coming in unprepared as to written material or as to having reviewed the class material and done the readings, I may change the setup away from having tutorials and workshops simply counting based on attendance (except for the fact that workshop leaders have up to two possible bonus points on the workshop attendance score that they can give, see later in this document). For example, for all still-to-come ones, the workshop leaders might test/judge you and give a grade to you based on what skill you displayed; or to grade you simply based on whether you even do have something to turn in plus whether you are there, e.g., 0% if you don’t attend, 20% if you attend but don’t have a turn-in solving or hitting a dead end on the problem, and otherwise 100%. However, for those components of the course, I’d much rather they be supportive rather than judgment-y/grade-y; it is a nicer, kinder, better dynamic, as long as the class’s students put in the concern and effort to use that set-up well. That does not mean there is no judgment-y/grade-y aspect to the course; rather, the midterms are that, but the tutorials and workshops—and your focus and effort on them and the course—are a key tool in helping you build your skills so that you can to do well on the midterms (and, more importantly, have those skills).

4If when browsing the web by bad luck you by no fault of your own bump into a solution to an in-progress problem, simply stop looking at it the moment you realize that that is what it is. The goal here is for you to build the skill of solving the problem; the goal is not to test your ability to look up answers with Google. Most problems will be given and done right in tutorial and workshop of course, and so you won’t have a chance to even try to look them up; but even if problems are in-hand, you learn better and more by doing them yourselves, not by using Google to look up an answer.
to correctness, and at least as far as I am concerned it is not an academic honesty violation to even get help on
understanding problems from UR-student tutors at the CSUG Tutoring Center. (However, under their policy regarding
homeworks, and as these are not insanely far from being homework though they actually are pretty far from it, tutors
may quite reasonable decide to decline to touch an in-progress exercise/problem, and you should respect that if they do.
And I would suggest that if you go to the tutoring center because you want help on some concept/technique, you try
to avoid doing any exercise that currently is in-hand and active—because doing that with the tutor cheats you of the
chance to solve it. So, instead ask for a different similar problem from the tutor. And with the skills you learn from that,
you’ll be with luck ready to tackle the problem that previously was giving you problems.)

If there were exercises to be done at-home for a particular tutorial or workshop session, you of course should at that
session ask about any such that you did not get to an answer to, so your session-mates or the leader can share/discuss
solutions and help you understand the problem and answer (they probably will routinely cover such, but in case they are
assuming that you found an answer, you should try to communicate well with them about what you do and don’t follow,
e.g., at a given tutorial if there as a two-part problem to be done and brought in, it is possible all three or four students
will quickly agree that they all totally follow the first part, but that they really need to go over the second part). If even
after that you have questions, the best places to next ask are the grad TA’s daily office hours, or the other office hours, or
at whatever next tutorial or workshop you have, or with a classmate, or the CSUG Tutoring Center.

I said this above, but since this is an item that can easily lead to academic honesty cases, let me repeat it for
emphasis. It is cheating to solicit help for in-progress exercises from anyone other than UR students. And even
regarding UR students, although there is the allowed “face-to-face, in-person” path mentioned above, it is cheating to
use any electronic forum for discussion or work together, so you may not post or answer questions on course-related
materials to newsgroups/wikis/Piazza-or-so-on/Facebook-or-Goole-or-etc.-groups or to places such as Stack Overflow,
or even by using email lists; remember: “face-to-face in-person.” (A borderline case is things like Skype. For now,
initially, I’ll let you consider small-scale use—let us define that as at most 4 people participating via Skype—of Skype
to be as if it was face-to-face in-person, though I really do think it is less helpful than being actually face-to-face
in-person. This Skype exception does not apply to class/workshop/tutorials, where Skyping in is not allowed, see later
on.)

Of course, none of my faculty colleagues can excuse you from this course’s classes, workshops, tutorials, midterms,
etc.

By the way, I try to never give out answers to in-progress for-work-at-home exercises; so you certainly won’t get
me to solve your in-progress exercises for you. And if you want clarification of what a question means, well, a big part
of solving problems is understanding them and understanding what is appropriate as a solution to them (if a problem is
from Sipser, looking at the Sipser chapter or section it is attached to will typically clarify any issues of what notations
mean and so on). And recall that we do not answer questions via email; the course is about face-to-face interaction. But
if you are so confused as to be quite lost about what a problem even means, the natural thing to do is to ask about it at
the grad TA’s office hours, or other office hours, or your workshop, or your tutorial, or to ask a classmate (if you have
left things to the very last minute, that last path may be your only path).

So, if you ask me questions via email (such as asking for answers or even clarifications on in-progress exercises),
you are likely to get either no reply or the answer “no comment” (perhaps with a pointer to this document)—most likely
the former. In fact, if you get no answer at all, please consider that to implicitly be the answer I just gave above. Of
course, if you have questions about the underlying material (that a question might be related to), you can and should
use the office hours or the workshop sessions or the tutorial sessions to ask questions about or better learn about that
material. We also don’t answer emailed questions about either course content (rather, see a human during office hours)
or course logistics (except if it is something broken such as “Blackboard does not have a column that by now should be
up”; but course-design questions/rule-change-requests we don’t answer by email or in person, as described elsewhere)
and so please consider each such email to be implicitly answered by this sentence itself, when/if I don’t reply to it.

I do expect you to use the office hours and other such availabilities to the full extent needed to do well in the course.
There are office hours each M/Tu/W/Th/F, and if you are both doing poorly and not using them, then you’re in a doubly
bad state: both from doing poorly and from the fact that by not making the effort to use the office hours to learn the
material you are not making the expected effort to participate and do well in the class. Of course, not every student
can make all the office hours, but all of you should be able to make some of them; or if not, you can make a separate
appointment with the grad TA. Also, you should plan ahead and use those hours you can make. Also, you’ll have your
weekly workshop section, which is a powerful weekly 75-minute resource.

You may not Skype in—not even in silent view-only mode—on days you can’t attend class (and this all similarly
applies to workshops and tutorials), nor may you have a classmate electronically record or transmit the session for/to you. If you cannot attend, though, of course do make sure to get from a classmate (in the dream case, one that you have warned to please take notes for you due to you having to miss the class session) a detailed account of what happened in class and if some of our course slides were covered in class that day you’ll want to find out from your classmate which were, and read them, and also missing a class when a midterm was handed back does not change your regrading window, so do pick up from the grad TA your handbacks at his very next office hour or if that is beyond the regrading window or is too close to its end, try to arrange with him to get it back even earlier, as needed.

Related to the above, you absolutely will want to have three or four students in the class with whom you’ve exchanged email addresses and phone numbers, so that if you do have to miss a class session, you can get from them a description of what was covered. (Do not ask me or the TAs to fill you in on what you missed; your three or four fellow classmates are your go-to source; of course, you’d surely similarly help them if they missed a class. It is your responsibility to yourself find out what happened during any class that you miss.)

Since the class is large, please (unless when I call on you I myself have already mentioned your name) when asking a question prefix your question with your first and last name, since that may help me to (I hope) learn your names.

By the way, if you have a question about some of the course material (i.e., technical content, e.g., “Does that definition imply that no DFA can have more than one start state?”) during class, it usually is a good idea to ask your question. Probably other students have exactly the same question, and you will be doing yourself, them, and the class a big favor by asking, so we all can explore whatever issue you raise! A caveat: This is a course on certain material, not a course on how to design and teach a course on that same material. So do not ask course-design/course-logistics questions such as “Why are there not more midterms?” or “Why can’t I use my computer, my full notes, my supersmart pet dog Fido, our textbook, and the Web during the midterms?” I don’t answer such questions. (If you have a matter of something outright broken as to Blackboard or so on and need to inform us of that, then the address to use to report it is csc280staff “at” cs.rochester.edu.)

A Interesting Twist Regarding Making Workshops Work (and in Large Part This Applies also to the Tutorials)
The philosophy of the workshop is that on many things the workshop members themselves seek and find solutions to problems—most typically, problems that they are seeing for the first time right there at the workshop. This doesn’t get to a solution as quickly as you would if the workshop leaders just gave you a solution—but it is likely to end up with you understanding the solution far, far better than if the workshop leader just tossed it his or her solution in your lap, since as we’re doing things, you will have been part of the process that arrived at the solution.

And that in general is a very good thing, and students have tended in this course to find that the workshops are a real help. However, there is a potential downside to this approach, so let me mention it, and mention a good way around it.

The worry is as follows. As a side effect of the class-student-driven nature of workshops (itself, a very good thing), sometimes the solutions reached may not be 100% clean, since the group may have had to vary and re-try approaches to get to a good solution. And a good approach addressing that worry is that if you as workshop members are, after arriving as a group at a solution, not comfortable with the solution’s beauty or clarity or cleaniness, then please, please suggest to the workshop leader right then and there that the solution seems perhaps nonoptimally clear/clean, and then the leader can (depending on time) either have the workshop members re-investigate the problem, to seek a cleaner, more beautiful solution, or (if time is tight) the leader in some cases may just jump to the cleanest solution they know of. However, of those two, I think the former is the better one... and in fact, reminds me of a quote from our main course web page, namely, and this is one of my very favorite quotations in CS:

After solving a challenging problem, I solve it again from scratch, retracing only the insight of the earlier solution. I repeat this until the solution is as clear and direct as I can hope for. Then I look for a general rule for attacking similar problems, that *would* have led me to approach the given problem in the most efficient way the first time.

– Robert Floyd, 1978 Turing Award winner.

So please don’t be at all shy about urging your workshop leader to let you, like the late Prof. Floyd, seek the most lovely, insightful solution to a problem, through rethinking an initial solution. It certainly worked well for Prof. Floyd!

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5Even professors sometimes—more often than they would like to admit—don’t understand talks/lectures, even in their own areas! Here is a cute, relevant anecdote from Moshe Vardi’s introduction to the September 2011 issue of CACM, where he mentions asking, at a top theoretical computer science conference, how many people understood at least N% of at least N% of the papers—to get 50% of the people to say yes, he had to drop N down to 50. Understanding lectures is a nontrivial challenge, and requires a lot of focus!
**Grading:** You course grade has the following components.

Your workshop attendance grade (which as mentioned below isn’t all about attendance; good participation at workshops can get you some bonus points in this part of your average; this is a slight exception to some comments made earlier in this document) counts for 12% of your course grade. Your tutorial attendance grade counts for 12% of your course grade. Your class attendance grade counts for 12% of your course grade. Your midterms count for 64% of your course grade. There is no final exam.

Those grade components values are computed as follows:

Your midterm component, which counts for 64% of your course grade, is the average of your Midterm I and Midterm II grades (so each of those counts for 32% of your course grade).

The other components are a bit more complex to describe.

At each class session (except during the two midterms, and I during the course might announce some other sessions as not counting toward the class attendance calculation\(^6\)) you will get a 0% if you do not attend and a 100% if we record you as attending. (We likely will use either Qwickly or a passed-around-by-hand attendance sheet to take attendance at class sessions. Most likely, we will use the former, and so you will need to bring to class a smartphone or laptop that will let you via Blackboard/Qwickly be counted as attending. Electronics are generally forbidden in class, but this is a brief exception: at one point—often the very start—during class, I’ll pause, give you the code you need to be counted as attending, and you can get out and use your smartphone to be recorded as attending class. It is academic dishonesty to try to circumvent this system—such as by texting the code to a friend or being texted the code by a friend. And if you happen to not be in class when we do this, or to forget to bring a device, then you will be counted as not attending even though you attended—well, actually, if you are in class without a device and manage to quickly borrow a device from a neighbor fast enough that both of you can do the Qwickly checkin dance then you would be checked-in and counted.) The average of those grades, but with the 4 lowest ones dropped if you are taking this as 280 and the 2 lowest ones dropped if you are taking this as 480, is your class attendance grade. (Because of the way Qwickly works, it is possible that during the semester, you will not see the day-by-day Qwickly scores in our main Blackboard grade center, but will just see some summary column that is not computed using the above rule as to drops and so on; I’ve tried to set Qwickly up so that for now it generates, so you can see that, a single column on Grade Center that is the total number of days—with no drops built into that column—when you were marked as Absent, i.e., it was a class session where attendance was taken but you did not check in during the minute-or-two time window during that class using the day’s PIN. We will as needed by hand at the end of the course, based on the Qwickly data, compute your correct class attendance average. During the term, you can and should in the Qwickly part of Blackboard for the course check to make sure that nothing is crazy such as you being registered yet not even existing in Qwickly; but do keep in mind that Qwickly is not internally doing droppings and so on, so any average column it shows is not relevant—basically all that is relevant is the number of absences and the number of attendances, and whether you are signed up for the course under the 280 number or under the 480 number.)

At each tutorial (during weeks when we have tutorials, and I during the course might—though it is not too likely—announce some other tutorials as also not counting toward the tutorial attendance calculation) you will get a 0% if you do not attend or you arrive late, and otherwise you will get a 100%. The average of those grades, but with the 2 lowest ones dropped if you are taking this as 280 and the 1 lowest one dropped if you are taking this as 480, is your tutorial attendance grade. Tutorials will not use Qwickly but rather the attendance will be hand-added to Grade Center by your tutorial TA.

Regarding the tutorial grade computation above, you will be credited for attending a week’s tutorial only if you attend the tutorial session you are assigned to; you will not get credit for attending any of the other ones, and indeed you may not attend any of the other ones (unless, rather exceptionally and I don’t encourage them to do that, your tutorial leader or another lets you, but even in that case, that won’t give you credit for tutorial attendance for that week). There will be no exceptions to this, except regarding issues of religious holidays, discussed long in advance, see later in this document. If you miss a tutorial, you’ll have missed your chance to chat there about the material, but you still will have the course office hours as a useful resource if you have questions.

Both tutorials (see above) and workshops (see below) give you a 0% if you skip or “are late.” But how strict will the tutorial leaders and workshop leaders be as to deciding whether it counts as “late” if you come in 3 seconds or 3 minutes late? I’ll leave up to those leaders how to draw the threshold as to what counts as late (but it likely will be pretty strict). However, since you are expected to be at those meetings on time, the wise thing to do, not just for grades

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\(^6\)For the Spring 2020 CSC 280/480, whether the 4/29/2020 class session will be counted toward the class attendance calculation will be announced at the 4/29 class session.
but for the learning and out of respect for your groupmates and leader, is to be there safely and completely on time each week. Naturally, we expect you as part of attending things to stay until the earlier of when their time period ends and when the leader says it is over; except... for some or all tutorials, I may via a posting set a minimum amount of time you must spend to avoid getting a 0%; on such days, if the amount of time I specific is \( N \) minutes—\( N \) will never be more than 30 of course—then you will get a 0% unless you stay until \( \min(30 \text{ minutes in}, \max(N \text{ minutes in}, \text{whenever the tutorial leader says things are done}) \). (During weeks that have such an \( N \) specified, you and the tutorial leaders will know of \( N \), but if your leader forgets and tries to push you out the door at time less than \( N \text{ minutes in} \), remind the leader of the applicable \( N \) and spend the time between then and \( N \) minutes in in discussion of material/problems/etc. If people are acting responsibly and things are flowing well, I likely will not specify such an \( N \).)

At each workshop (during weeks when we have workshops, and I during the course might announce some other workshops as also not counting toward the workshop attendance calculation) you will get a 0% if you do not attend or you arrive late, and if you arrive nonlate and attend then you will get a 100% for that day. The average of those grades, but with the 2 lowest ones dropped if you are taking this as 280 and the 1 lowest one dropped if you are taking this as 480, is an intermediate result on the way to your workshop attendance average. And then your workshop leader will at the end of the term be allowed to raise the grade that attendance portion yields by up to an extra (additive) 2 points, based on strong participation. So for example, if you miss 1 workshop but your workshop leader at the end of the term adds 2 points, your workshop grade would be a 102%. Yes, a 102% is above 100%, and yes, we’ll really average in the 102% when computing the weighted average of your various grade components.

Regarding the workshop grade computation above, you will be credited for attending a week’s workshop only if you attend the one workshop session you are registered for; you will not get credit for attending any of the other eight; there will be no exceptions to this (except regarding issues of religious holidays, discussed long in advance). You may if you can’t make the workshop that you are registered for attend one of the other eight, and that is a good idea, but that will not (regardless of how good your reason is for not attending your own workshop) be counted as having attended that week’s workshops for the purpose of the workshop grade computation. Also, you may—for example if you are having particular problems with the current material—in a week choose to attend more than one of the workshop sessions, e.g., your “home” one and another one (perhaps given by a different workshop leader).

Not being registered for a workshop section does not mean you don’t need to attend workshops. You are required, as part of taking this course, to be registered for a workshop session. If you are not, I’ll likely have the registrar remove you from the course (though the registrar these days usually forces workshop registration in parallel with course registration, avoiding such a case in the first place); but even if I don’t catch your workshop nonregistration, the workshop nonattendance would surely severely lower your course average.

On some weeks we will simply not have workshops and tutorials. For example, if a midterm is on Monday then there likely will be no tutorials or workshops that week. We also for example might not have tutorials during the final week—or perhaps even two—of the term. Such days simply won’t generate any column that participates in the relevant items’ attendance averaging. Times when there will not be WSs or tutorials will be clearly announced via Blackboard or the home page or in class, or are announced later in this document.

Your course grade will be based on the resulting weighted average, from the components. If you would like to know what letter grade you will get (though focusing on grades is the wrong thing to do; the ideal thing to focus on is to learn as much and as well as one as one can), here is the scale the course will use:

FOR CSC 280:
A starts at 95.0%
A- starts at 90.0%
B+ starts at 86.6% (so, yes, 86.63% would get a B+).
B starts at 83.3% (so, yes, 83.31% would get a B),
B- starts at 80.0%,
C+ starts at 76.6%,
C starts at 73.3%,
C- starts at 70.0%,
D starts at 66.6%,
and lower is E.

FOR CSC 480:
A starts at 95.0%
A- starts at 90.0%,
B+ starts at 86.6% (so, yes, 86.63% would get a B+),
B starts at 83.3% (so, yes, 83.31% would get a B),
B- starts at 80.0%,
C starts at 73.3% (this is not a typo; there is no graduate grade of C+),
and lower is E.

I will use the above 280 scale for the midterm warning reports to the Dean that (via the Dean) undergraduates get, based on the grades on all items up to spring break, but using in my calculation the dropping of just the prorated portion of grade-drops, so 2 classes and 1 workshop and 1 tutorial. Aside from that, I do not give predictions of grades. However, you at any point are of course free to yourself use the above to do the calculation. (I mention that I will not give you a grade lower than that which the above listing specifies. Although it is extremely unlikely and I won’t comment on this ahead of time, I do leave myself the freedom to, if I think that following the above scale is not appropriately reflecting the quality of the class’s work, shift the boundary values to more generous ones; again, this is extremely unlikely and you would be exceedingly unwise to hope for or plan on it.)

Again, note that, very informally put, the and “class/tutorial/workshop-missing” rules in effect covers you for four class days and two tutorials and two workshops of misses in 280 (in each case, half of that if are taking this as 480). However, I would emphatically urge each of you to (except when sick) attend every class/tutorial/workshop; you will learn far more and enjoy the course far more; and that will let the drops for example just end up dropping whichever days you were truly sick/etc. on, rather than ones you skipped outright in the hope that you would not later get sick or have other needed misses. Do keep in mind that the stated numbers drops/misses are a bow to sicknesses, broken cars, family tragedies, sport teams, scholastic teams, and all other compelling and noncompelling reasons for missing; you do not get more, not matter how many reasons you have or how good they are.

Academic Honesty: You should read and follow the school’s academic honesty rules. Violating them is a severe mistake, and will throw you into a process that you very much don’t want to get thrown into—and violating the honesty rules just plain isn’t the right way to operate. The rules from earlier in this document as to how and from whom and from where you can (and cannot) seek help/answers or work with are a very important part of the academic honesty policy of this course.

Disability Accommodations  If you are entitled to and wish ADA-related accommodations (for example, regarding extended-time arrangements on the midterms), please immediately contact CETL Disability Resources to both (1) confirm extended time arrangements and (2) have them send me (ideally by email) an accommodation letter (they have a “Letter to Faculty” form on their web site—https://www.rochester.edu/college/cetl/disability/current.html—to guide that process). If taking the midterms under extended time, you will take the midterms at CETL, if possible the same day the class does but timed to end only after the class has started the exam; if that is not possible, you’ll take it early the next day. If you are entitled to and wish the ADA-related accommodation of extended time, please also make sure to, right away after you’ve asked CETL to send me an accommodation letter and confirmed with them your extended-time arrangements, send an email to (be careful; this is a special address to use ONLY for that; only the grad TA gets those emails, and I get a cc) csc280gradta “at” cs.rochester.edu noting that you’ll be taking the midterms at CETL. (Please remember all three: (1) Confirm extended time arrangements with CETL, (2) Have CETL send me an accommodation letter, (3) [For those accommodations that mean you’ll be taking the midterms at CETL, also:] Send the above-mentioned email to csc280gradta.) If you have and we have been informed by CETL of an accommodation that lets you use a laptop or tablet or so on during class, please make sure that in addition to the notification from CETL both the grad TA and I know what you look like so that we don’t mistakenly enforce the no-electronics rule against you while proctoring the class sessions; the best way to do that is simply, perhaps along with a forward of the CETL email that went to you and me, email to csc280gradta “at” cs.rochester.edu a picture of yourself with a sentence mentioning that as per the CETL email you are allowed to use electronics in class (if you just let us know verbally then given the size of the class we may not have good enough memories to capture and remember you face throughout the term, but an email from you will help us to perfectly implement the accommodation, as we of course are committed to doing and want to do well and right).

Class Attendance: Required.

Missed Days as to Attendance Grades (of All Three Types) and Missed Midterms:  No makeups. No lateness. No exceptions (except for observance of religious holidays, discussed long in advance7 or unless you have a letter from

7To be explicit: You must, no later than January 27, 5PM, send an email having as its title—since we may be doing a search for exactly this
a convincing Dean (i.e., one with the authority to mandate exceptions to course policies). Again: As a bow to sicknesses, broken cars, tragedies, and other compelling reasons, each 280 student will have their lowest four class-attendance grades, two tutorial-attendance grades, and two workshop-attendance grades dropped (but no more, even with good reasons, unless you have a letter from a convincing Dean as mentioned above; this dropping rule builds in and covers all sicknesses, disasters, and so on; we do not make exceptions, so do not ask for an exception). For 480 students, the same holds except the number of drops are respectively not 4, 2, and 2, but 2, 1, and 1.

There will no final. Note that missing a midterm means you got a 0% on 32% of the course’s grade, and so if it is the first midterm you’d need to withdraw (you’d be from that alone only a whisker above an E), and if it is the second you likely will fail the course. (In fairness to those student who would have liked and benefited from more preparation time but knew the rules and so showed up and did their best, I do not give incompletes to people who miss the second midterm.)

People sometimes email requests for exceptions or to be excused from attendances/deadlines/exams/etc., and sometimes think that not getting a reply means they have permission. To avoid such confusions let me state the implicit reply to all such email requests right now: no exceptions, no excuses... and this reply is so fixed that you won’t get a reply... both because the reply is preset and because, as mentioned earlier, in this course, students will not be using email for questions about the course; if you have questions, you should see a human during an office hour (or tutorial or workshop).

The midterms are closed-book. The midterms are also closed notes, except that you may prepare and use one 8.5-by-11 sheet (writing on both sides is allowed; you may alternatively bring two 8.5-by-11 sheets on which each has one side with handwritten notes and one side that is totally blank) of handwritten cram-notes hand-prepared by yourself. (If taking the midterm at CETL, typically they will have you photocopy your above-mentioned cram-notes before starting the midterm and you may have the photocopy (but not the original) out during the midterm; the photocopy will be turned in with the midterm (but not counted at all in the grading, and there is no promise it will be returned); the original will remain in your possession, so you can use it for future purposes.)

As to the midterms, ideally you’ll do those in black or blue pen, but if you truly feel that writing in pencil is far better for you than using pen, you may do your midterm in (black, number 2) pencil (but if it is a smudgy, erased-and-overwritten mess you’ll likely get no points). In no case may you use any color other than blue or black.

No questions may be asked during the midterms, and none will be answered; the process breaks the flow and concentration of the class, can be unfair as to who gets what information due to having asked or not having asked questions (even if one tells the whole class something about a problem in the middle of the exam in response to a question, such as a correction/change to a problem, some people may have already spent/wasted time on that flawed problem and some may have not, and the former group will be put at a disadvantage just due to the order they tackled the questions in), and can be unfair if due to reasonable-accommodation issues the exam is taken at different times by different people. If you see on a midterm something that you’re sure makes solving the problem impossible (or equivalent to something such as resolving P versus NP that is something I wouldn’t possibly intentionally ask you on a midterm) or makes the problem meaningless or incoherent, what you should do is that as part of your answer you should clearly explain what you have noticed, and why it seems to make the problem impossible or meaningless or incoherent. If what you notice seems to be a very minor technical typo and you are sure it is and you see the correction, you should note that, fix it, and then solve the fixed problem (but if the original one was really what was meant, you probably won’t get credit if you change it to a different problem; and just noticing for example a spelling error or a missed “the” doesn’t get you out of having to solve a problem).

Midterm Dates  The dates of the midterms are Monday, March 2 for Midterm I and April 20 for Midterm II. (And in light of that, we will have no tutorials or workshops during the weeks of March 2–6, April 20–24, and April 27–30. The midterms are during our regular class time (on Monday March 2 and Monday April 20), but might be located in a room other than our standard room (if so, that will be announced ahead of time in class and via Blackboard announcement).
Regrading and Administrative Error Corrections and Blackboard and Other Logistics  If you want a midterm regraded, you must notify the staff of that by email (to csc280staff “at” cs.rochester.edu, not to our personal addresses) within 48 weekday hours (Sat. and Sun. do not count against those) of it being given back (this holds even if you did not attend the class at which it was given back), along with an emailed explanation of what you feel was graded incorrectly. You must include as an attachment to the email a good-quality color scan of the entire midterm (not just the problem you are asking to have regraded). Late regrade requests will not be honored. Note that the entire thing (e.g., the whole midterm) that you are asking to be regraded may be regraded (not just the issue about which you are asking), and the grade may move either up or down, e.g., if if I (or a TA) discover that a TA (or I) missed some errors, or just graded overgenerously relative to what the regrader thinks during the regrading. (Note that some or all the regrades may be done by me, and although your TAs are excellent and sharp-eyed, I’m perhaps even more sharp-eyed and perhaps more demanding, especially regarding having clean, clear, complete answers; like most professors, I spend much of my research time finding flaws in my own and in other professor’s argument lines, and so we tend to want arguments to be complete, clear, and error-free. And I am not a fan of partial credit for flawed proofs—proofs are right or are wrong; one flaw lets in a universe of invalid conclusions.) We will typically have your regraded paper back to you within one or two weeks.

We will be using Blackboard to maintain the course grades. If the grade we wrote on your midterm differs from the one that we recorded in Blackboard, you must inform us of that (and email the TAs at the “csc280staff” address and provide the grad TA with a copy of the graded item as paper at an office hour of his or by emailing it as pdf) within 48 weekday hours (Sat. and Sun. do not count against those) of it being given back (grades will typically be available in Blackboard by the time the item is given back, as we use Blackboard to hold your grades) (of course, for the case of us merely correcting, within the allowed window, a grade that is misrecorded in Blackboard, your request that we do that does not trigger a regrade of your item). A corollary is, you are expected to, frequently and routinely, check Blackboard to check on your grades and to make sure to catch any such errors. Grade problems after the 48-hour window won’t be changed; it is your responsibility to keep in such close touch with Blackboard that you catch errors within the time frame noted (and as a side effect, you’ll become quickly aware of any overall pattern grades such as lots of missed classes/workshops/tutorials, since Blackboard—or Quickly for the case of class attendance—will show you all your grades so far in the course); in brief, when you get something back (or know a grade was due to come up), immediately check within Blackboard that we didn’t misrecord its grade in Blackboard.

FYI, I’ll typically label grade-items by their dates (so a typical grade-item label might be “1/2223 Wkshp” for the workshops that for each of you will fall on January 23 or 24). (Note: Often, I’ll make a grade-item placeholder in Blackboard before we’ve graded what will go in that location, so you may sometimes see grade-items (with no grades in them) for things that are not yet collected or even not yet assigned.

Your daily attendance scores for class/workshops/tutorials will be columns in Blackboard (class itself may be a partial exception, as it during the term may show not right in grade center in a clear way but rather via the Quickly tool that University IT recommends to attendance in large courses), so you should check that too, along the lines of the above. We will put up the grade for each class/workshop/tutorial by the end of the calendar day on which it happened (and so the 48-hour clock of asking for corrections of misrecordings will be viewed as starting at 1159PM on the day of that item). So should put into your smartphone a reminder to check (in Grade Center or Quickly, as appropriate to the case), one day after each class/workshop/tutorial, that your attendance was correctly recorded, so that in the (we hope very rare) case that it was not you can get your correction in before the deadline for such requests has passed.

If you attended your workshop/tutorial appropriately and the column says you did not, then the 48-hour window mentioned above holds regarding bringing that to our attention—by email to csc280staff “at” cs.rochester.edu, but with your letter needing to explicitly mention which workshop you are registered for, e.g., “early-Wednesday Brendon”; again, to avoid any lack of clarity about time, the 48 hour window will start at 1159pm on the day of your item, so for workshops, at 1159pm Wednesday or 1159pm Thursday; similarly for tutorials, explicitly mention who you leader is and what your day/time are. (Classroom attendance generally—unless we find that Quickly has somehow broken down—can’t be appealed as it is done precisely and via Quickly, and so if you were there and did the right thing at the right time, you should have been recorded.)

You should not view the class as a competition against your fellow students. The class is not graded on a fixed portion-curve such as “only the top BLORT percent of the students can get an A." Indeed, ideal would be if everyone did very well and got a very good grade. However, as a limited concession to the desire of some to know how they did comparatively on a given item, we set Blackboard to show the average/median of the midterm-exam columns. On the other hand, we will not have Blackboard show a “Total” column—not just because such a total would give you
an incorrect impression, given that the course grading systems is far more complicated that a simple totaling, but also because in this course the goal is learning, and even regarding grades, the course is not at all about competing with classmates... indeed, ideally, at the workshops, and even in letting you discuss exercises in (in-person) groups (see the rules on that), you’ll very often be cooperating with classmates to help each other learn better than you would alone. So, to recap in part, as to grades (and what is made public and what is not), each student gets his or her own grade on each individual item, and can typically read the average/median info from Blackboard page for both exams (but not on attendance columns or workshop bonus points), and at the end of the course will receive his or her course grade either from the registrar or from me. I in general do not give out (regarding individual items or the course letter grade) grade/distribution/cutoff info beyond what is mentioned above in this document (or provide guesses of what letter grade a student is “headed toward,” though again, see the numbers/cutoffs given above regarding that, and you are free to do the calculations yourself in light of those), though of course if a student wishes to share with some classmate their grades on some items or the course, that is up to them.

This class is available for audit if space permits, but please do speak with me if you want to do that (and do be aware it won’t be any help toward your CS major requirements if you take it as an audit).

The only exception to this document’s 48-nonweekend-hour time limits is that during the last 10 calendar days before the last day of classes (i.e., from April 19 onward), attendance score on which you want to request a correction has a single 24-calendar-hour-after-the-class-where-it-was-available-for-return-or-was-up-in-Blackboard time limit for being submitted for regrading (so look over attendance grades during the last ten days within the first 24 hours of getting them back or them going up, please). However, that 24-calendar-hour exception does not apply to the second midterm; even though it will be given back during the last 10 days most likely, you still get 48 weekday hours to ask for a regrade. There is one more exception: The attendance grade for the last class will (if that class is not excluded from counting toward the attendance grade) will not be subject to correction as I will right in class read off what is in the column and that will be your one and only chance to ask for a correction on that one grade item.

**No-Show TA Handling:** The TAs know how very important each tutorial and workshop is, and know they need to arrange coverage if for some extraordinary reason they cannot make it to a session. However, in the case—which should ideally never happen, and our deepest apologies if it ever does happen—that you show up for a tutorial or a workshop and even six minutes after its scheduled start time the TA is not there, please go to our course home page’s “Other Important Links” section, and click on the item there “What to do if your TA does not show up at workshop or tutorial,” and follow the steps listed there.

**Textbook:** The required text is:


  **Note 1:** Do not confuse the 3rd edition named above with the Third Edition (International Edition), as that has different problems/problem numbering in some places; if you use the Third Edition’s “International Edition” version, you’ll probably do wrong problems due to the sometimes different numbering.

  **Note 2:** Do not confuse the 3rd edition with any of the earlier editions! If you use the second or first or preliminary edition, beware, as problem-numbers and pages and sections and even the core meaning of some notions may differ, so you will really want to use the third edition.

**Books on Reserve:** I’ve put in a reserve request, for this course, at Carlson Library, for quite a few books, including our Sipser textbook (make sure to use the 3rd edition, even if I also put earlier editions on reserve), texts covering some or all of course’s topics, some more advanced (and less advanced) textbooks, some review books on discrete mathematics, and some just-plain-interesting books that I thought you might enjoy as developing computer scientists. After the library processes the list, you will be able to get to the reserve list directly from a link to it within our course’s area within Blackboard; the library estimated to me that the list will be processed before our second class session.

Among the on-reserve books that provide many worked examples will be: (a) (In the course we may refer to this as MAR, though I doubt we’ll draw on it much or at all—SIP is quite excellent itself) J. Martin, Introduction to Languages and the Theory of Computation, McGraw Hill and (b) Daniel I.A. Cohen, Introduction to Computer Theory, Wiley. But beware: Different books use different notations and different models/pictures/conventions, and that can be confusing.

**WWW Site:** You are expected, as part of taking this course, to visit the course web site

http://www.cs.rochester.edu/u/www/u/lane/=courses/=CSC280/
regularly (i.e., daily, so that, for example, you see and do the reading and any exercises-to-prepare that will be listed on that web site). Be very, very, very careful to make sure your browser isn’t caching and showing you an old version (browsers love to do that). The web site also provides a copy of the slides (and warmest thanks to Prof. Ogihara, who created the original version of most of them), has various other important links (such as regarding academic honesty information), and (near the bottom of the page) has tidbits of advice. This web site, however, does not have day-to-day announcements. Those will be transmitted using the Blackboard “Announcements” feature.

**Blackboard Announcements:** Most day-to-day announcements, if any, will be transmitted using the Blackboard “Announcements” feature. You can see these announcements within Blackboard, and I will try to have each sent to you as email by Blackboard.

However, in case on one of them I don’t remember to check the “mail-to-all” box, I strongly recommend that you make the slightly tricky change to your Blackboard settings that will cause Blackboard to send to you by email all course announcements. Here is how to do that (unless Blackboard has transformed itself again—it is a moving target), with my thanks to the UR Blackboard Administrator who provided this: In your main BlackBoard screen, click on the caret near your name in the upper-right, then choose Settings, then choose Edit Notification Settings. Fixing your general settings won’t save you; the course ones override it in a bad way. So under Edit Individual Course Settings, select this course, and then check the Email box at the top of the email column, and then make sure to click on Submit. (If you get an error message, retry it, or wait a hour and retry it, and with luck it will work.)

**Conclusion:** This document contained quite a few rules and details on logistics. And those all are important—both to doing well in the course and to not falling afoul regarding academic honesty. So do keep those all in mind, and refer to this document for those if you are uncertain about rules and logistics. But please do keep in mind the content big-picture of this course: We’re learning about, as the course title says, computer models and their (powers and) limitations! And, insofar as one can in such a large class, we also are trying to give you hands-on experience at doing this, in settings ranging from few-person tutorials to dozen-person workshops to our 90-person class. Underpinning it all is a desire to help you have a better sense of what models look like and how to understand or even prove or construct things within them, and related, a desire to help you be more experienced and confident about tackling problems (even ones that are phrased in somewhat formal ways). And even if the rest of your career is not spent in theory—and most of you will be in other areas—my hope and believe is those skills, and the confidence that you can handle formalism and solve problems, will help you throughout your career.