

CSC 280: Computer Models and Limitations
Course Information Document/Syllabus
Spring 2013 Semester
Version 1.15
2013/1/16; last updated¹ 2013/4/1/8:36PM

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Workshop Leaders:

- Steven Frink, sfrink1 "at" gmail.com.
- Simon Weber, simon.weber "at" rochester.edu.

Address for Course-Related Email: For email directly to Steven or Simon, use their direct addresses, which can be found above. For all other email, make sure to use this email address: cs280 "at" cs.rochester.edu (this will be automatically forked by the system to go to four people, namely, me, the graduate TA Scott, and the workshop leaders Simon and Steven; please make very, very sure to always use "cs280," so that none of us is left out of the process of being on top of any questions and discussion). Although the staff has in theory (no pun intended) made an alias to catch even emails sent by accident to csc280 "at" cs.rochester.edu, for safety please do use the actual address, cs280 "at" cs.rochester.edu.

Class Time: M/W 325–440PM, CSB 601.

Office Hours:

1. Who: Scott Ames. Where: CSB 626.
Mondays: 930-1030AM and 440-540PM.
Tu/Wed/Thu: noon-1PM.
Fri: none.
Please also feel free and very much invited to pop by his office any time.
2. Who: Lane A. Hemaspaandra. Where: CSB 618.
Mondays: 440-540PM. Please also feel free and very much invited to pop by my office any time; before and after class are particularly good.

¹The course web site will have the most recent version always, so if you are looking at a hardcopy, make sure to peek at the web site to look for a more recent version.

Workshop Sessions: There will be workshops. These are required. Each student will be, based on your workshop “bidding” on the first day of class, assigned to one of the four workshop sections. You are expected to attend your workshop section every week and participate well at it. (Your first workshop will be 1/23 if you’re in a Wednesday workshop and 1/24 if you’re in a Thursday workshop; there are no workshops during Spring Break.) 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 quizzes and homeworks than you would have done had you attended the workshops. The four workshop section times/rooms/leaders are:

1. (Gryffindor) Wednesdays 450-650PM (first one: 1/23), Hylan 301.
Workshop Leader: Steven Frink.
2. (Hufflepuff) Wednesdays 500-700PM (first one: 1/23), CSB 703.
Workshop Leader: Simon Weber.
3. (Ravenclaw) Wednesdays 7-9PM (first one: 1/23), CSB 632.
Workshop Leader: Steven Frink.
4. (Slytherin) Thursdays 450-650PM (first one: 1/24), Hylan 301.
Workshop Leader: Simon Weber.

The assignments of people to workshops will be linked to from our course home page starting the afternoon or evening of 2013/1/17.

Overview: This course studies fundamental computer models and their computational limitations. Finite-state machines and pumping lemmas, the Chomsky hierarchy, Turing machines and algorithmic universality, noncomputability and undecidability, trade-offs between power and formal tractability.

Well, that is the course catalog blurb. And what it really 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 languages, about the recursive and recursively enumerable languages, and about the machine models that capture them), and we also will be (perhaps lightly, depending on how time goes) introducing P, NP, and NP-completeness (these are in Chapter 7; I’ve included the entire set of Chapter 7 slides in the online slide set although depending on how time goes we might well not cover all the slides; even on Chapters 1-5, there are various sequences of slides we’ll skip over in class, sometimes with my 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). 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 core undergraduate CS curriculum here, we'll teach it in a very hands-on way. The weekly workshops are the primary vehicle for small-group hands-on problem-solving, and on the homeworks, you'll be working outright on your own or in a group of size two. But the class meetings too will have something of a hands-on flavor. The classes will very often start with a surprise quiz (although since we'll have them almost every class, it won't be too surprising that we're having a quiz), usually quite short, and then we'll immediately go over the quiz's answers—sometimes not by me just telling you, but by having people present their right answers, and even their wrong answers, so we can understand the right ones and understand what is wrong with the wrong ones. We may also at other times stop my lecturing and 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. Also, to make more time for this, 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. 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: CSC162 OR CSC172 OR MTH172. Although MTH150—Discrete Mathematics—is not a separately listed prerequisite, it is important that you know that material, or be bright enough to learn the important-for-this-course parts of it immediately on your own (please do so by going and reading Chapter 0 of our Sipser textbook!). The prerequisites will be very strictly enforced. If you have not already taken and completed with a passing grade one of those three courses, you may not take this course (unless you have explicit permission from me).

Homework Preparation/Class Participation: You may discuss and work with other CSC280 students on the reading, studying, and problems; the goal of the course is not to compete with each other, and, indeed, in real research, collaborative work is very common. However, it is cheating to solicit help from anyone other than your classmates—this includes using electronic forums to ask for answers.

On each homework assignment, you may choose to do it yourself, or to do it with one classmate. If you do it as a group of two, the two of you will hand in a single homework, with both your names on it, and will get the same grade, namely, whatever grade we give that turn-in. There is no penalty for working in a group of two, and we will not grade papers handed in by groups of size two more harshly, or more easily, than we grade papers handed in by a group of size one. (Obviously, even if you work in a group of two, you are responsible for completely understanding all of the group's answers, and you are expected to work on each problem with your groupmate, although of course you might take the lead on doing/writing up some of them while your groupmate takes the lead on others. But you should make sure you come out of the process with a good and full

understanding of even those problems/answers on which your groupmate did more than you. The important reason is that you learn that material. The stick is: Things you don't learn may well come back to haunt you, right away, on the quizzes.)

Also, your group's write-up of its homework answers (on graded homework assignments) must be your group's own work/words, even if you discussed the problems with others; your group may in no case copy all or part of anyone else's write-up. (A very wise way to achieve this might be: Even if you have discussed the problem with others, as your group does its final write-up, have nothing in front of you but rather write just from the knowledge/images of the solution you and your groupmate have in your heads.)

Homeworks must be submitted on time; late homeworks get no credit. It is possible that we may have more than one homework set in progress at the same time, sometimes, especially if one of them is one of the "midterm-like" homework sets. Of course, it is very important to be clear on your homeworks as to which answer is for which problem. Your hand-in should have the problems in the same order as on the set, using the same numbering as on the set, and if a problem is out of our Sipser textbook, please echo back the problem number for clarity. So if on a given set the 3rd problem is to do Problem 1.46(a) of Sipser, your answer should begin "3. (SIP Problem 1.46(a).)" (Also, be careful to write Problem when what you are solving is a SIP "Exercise"; SIP has both problems and exercises.) Your homework hand-ins must be clearly readable. You may prepare them using a computer typesetting system (\LaTeX is by far the best; PowerPoint is problematic due to its limited equation facilities). You may also hand-write them, but only if your handwriting is clear; if we have problems with this, we may ask you, or everyone, to use computer typesetting on the homeworks; so please write clearly if you hand-write your homeworks. If you hand-write your homeworks, you must use pen—never pencil. Also, in-class quizzes must be done in pen—never pencil.

Also, you must write YOURSELF your one-(8.5-by-11-)sheet notes allowed on quizzes (see below). Note, again, that the quizzes make it counterproductive to ever be in the state of having relied so heavily on classmates or groupmates that you do not yourself fully understand everything.

You may (except on the first day of class) bring to each class *one 8.5-by-11 sheet of handwritten notes* (writing on both sides is allowed; again, 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), *prepared yourself*. You are allowed to use this sheet of notes on any surprise quiz that class. (Many people will "grow" their sheet throughout a given chapter, bringing it back, day after day, with new additions, although always of course following the above size limit.)

Separate from this is the issue of bringing in notes on the homework problems. If you are called on to present some of the homework problems—if we happen to go over some such problem in class or at a workshop—you may bring with you to the blackboard as many sheets as you like of your own handwritten notes on the problems. In fact, you

should keep for yourself a copy of the homework you hand in; this copy will be valuable for example if you are called on regarding the homework, either in class or in your workshop session sections, or if partial work you did on one homework set is useful on the next set (which you might be doing before the earlier set is graded and handed back). (We will in general not give out answer sets for homeworks or quizzes. But we'll usually go over quizzes right away in class. And as to homeworks, after they are handed in, if you have questions, then—after that workshop has gone over whatever new problems it has on its agenda to go over—at your next workshop, ask your workshop leader if that past homework problem can be discussed. In fact, ideally ask that to your workshop leader by email ahead of time, so he can plan ahead regarding that. Also, it is not impossible that we may in class go over some homework problems some time after they are handed in. By the way, I try to never give out answers to in-progress homework questions, so no, you can't get me to solve your in-progress homework question for you. Also, part of solving homework problems is understanding them and understanding what is appropriate as a solution to them, so requests for answers to the problems, or questions on the problems, or even just requests for clarifications of the problems, while the problem set is in progress, are likely to get either no reply, or the answer "no comment" (perhaps with a pointer to this document), or the answer "part of solving homework problems is understanding them and understanding what is appropriate as a solution to them."

Regarding class participation, you are expected to participate in class insofar as the large class size allows. This is not a separate chunk of your grade, but rather it is an expectation (like class attendance), and you risk having your grade lowered if you do not meet it. For example, if you are called on to put up your answer to a for-home-thought problem and it is clear you have not put in a substantial amount of time and thought, that could lower your grade. Note that, even if you do not know a perfect answer, if you clearly have put in careful thought (e.g., you have partial results or a clear description of what issue is stumping you), then you would not have your grade lowered. Also 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 weekday, and if you are both doing poorly and not using them, then you're in a doubly bad state: both from the poor grades, 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 separate appointments with the TA. Also, you'll have your weekly workshop section.

Audio or video recording of the class sessions is not permitted, nor is having an open computer (laptop/tablet/PDA/etc.) in class, except if you have a documented disability that would need such recording/assistance, in which case please speak to me about this.

Since the class is large, please when asking a question prefix your question with your first and last name, as that will help me to (I hope) eventually learn all your names.

By the way, if you have a question about some of the course material, it usually is a very 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. Thus please do not ask course-design/course-logistics questions such as “Why is there so many quizzes?” or “Why can’t I use my computer, my full notes, my supersmart pet dog Fido, and our textbook during quizzes?,” and I typically won’t answer such questions—most especially not during class time.

A Interesting Twist Regarding Making Workshops Work The philosophy of workshop is that on most 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 student-led nature of workshops (itself, a very good thing), sometimes the solutions reached may not be 100% clean as the group may have had to vary and re-vary 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 cleanness, 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 he or she knows 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!

Grading: This is not a class where you ignore the material for much of the course, then just before the exams cram like crazy, and (maybe) learn (or learn to fake) the material for a day. Rather, this course expects each student to work hard throughout the course. And the grading system reflects that, by putting most of the grading weight on the day-to-day things (quizzes and homeworks) that ensure that you are staying on top of the material. You also get a workshop grade determined mostly by your attendance, but also with a potential bonus from the quality of your participation.

Your quiz grade counts for 50% of your course grade. Your homework grade counts for 25% of your course grade. Your workshop grade counts for 25% of your course grade.

At the end of the course, we will when computing your homework grade drop your lowest homework set and average the other sets. At the end of the course, we will when computing your quiz grade drop your two lowest quizzes and average the other quizzes. However, do put your best effort into all parts of the course (all the homeworks and all the quizzes too!); that may help your grade and, more importantly, it may help you learn lots too.

Your workshop grade will start at 100%, but for each workshop you miss beyond two missed, will drop by 10%. 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) 15 percentage points, based on strong participation. So for example, if you miss 1 workshop but your workshop leader at the end of the term adds 5%, your workshop grade would be a 105%. Yes, a 105% is above 100%, and yes, we'll really average in the 105% when computing the weighted average of your three components. On the other hand, if you skip lots of workshops, it might be possible to get a workshop grade of less than zero, and then we'd really average *that* in when computing the weighted average of your components.

Your course grade will be based on the resulting weighted average as mentioned above, with the instructor also keeping in mind your class participation. Note that final grades are not based on any fixed curve/scale, but are based on the instructor's judgment of what the given performance deserves.

Again, note that, very informally put, the "homework/quiz"-dropping rule above in effect covers you for a one-homework/two-quiz super honeymoon (choose them wisely, or do everything and really reap the bonus, as you choose). Note that those drops are a bow to sicknesses, broken cars, tragedies, sport teams, scholastic teams, and all other compelling and noncompelling excuses, so you probably don't want to skip quizzes or homeworks, so that when you do have some sickness/etc., you have those drops available to use.

Academic Honesty: You should read and follow the school's academic honesty rules. Violating them is an utterly 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.

Class Attendance: Required.

(By the way, 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 to fill you in on what you missed or send you a copy of the quiz/etc., if any, that was given; your three or four buddy classmates, mentioned above, can tell you the flavor of the quiz and probably even the answers as we'll typically go over the answers immediately after the quiz, right in class; of course, you'd similarly help them if they missed a class.) However, do keep in mind that there will be quizzes almost every class, and zeros do quite bad things to averages, although we do drop the lowest two quizzes for each person. Of course, you'll miss a class, do make sure that despite that your homework (if any) due at the start of that class is handed in to Scott the TA before its deadline.)

Quizzes, Homeworks: No makeups. No exceptions (except for observance of religious holidays, discussed long in advance² or unless you have a letter from a convincing Dean who has the authority to grant such exceptions). As a bow to sicknesses, broken cars, tragedies, and other compelling excuses, each 280 student student will have his or her lowest homework and two lowest quizzes dropped (but no more, even with good excuses, 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). The quizzes will usually be surprise quizzes.

There will be neither midterms nor a final. (However, since you may naturally want something that is midterm-like in flavor, to help you yourself evaluate whether you've picked up well a given big unit, we may well have two or three homeworks that in their nature are very much like midterms, in that they'd be covering about 1/2 or 1/3 of the course in a big-picture overview way. These will be regular homeworks and will count just like all the other homeworks, including being drop-able if one is your lowest homework grade. I was tempted to make these be "Lone Wolf" homeworks that you had to do individually, but, rather, I'll leave the standard homework rules in effect, and so you can work on them either as an individual or in a group of size two. However, you might want to choose to do the homework on your own, or even if working in a group, you might want to first try all the problems yourself, just as feedback to yourself.)

²To be explicit: You must, no later than January 22, noon, send me an email at "cs280 at cs.rochester.edu," if any of the class days or days of workshops to which you are assigned fall on days where due to observance of a religious holiday you will not be able to attend; in that email, you need to let me know all such days for the entire term. This regards quizzes and workshop attendance (if you have a religious conflict told to me by the above date, I'll usually for quizzes give you a makeup oral quiz or will simply try to avoid having a quiz on that day; and for workshops I'd usually let your workshop leader know to please credit you as attending on that day even though you didn't). If a homework falls due on a religious holiday, you should take that into account and simply hand it in early to the TA.

People sometimes email requests for extensions or to be excused from deadlines/exams/etc., and sometimes think that not getting an instant reply means they have permission. To avoid such... confusion... let me state the reply to all such email requests right now: no extensions, no excuses.

All quizzes are closed-book unless they explicitly say otherwise. The quizzes are also closed notes, except for the 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 cram-notes hand-prepared by yourself, as discussed elsewhere.

Anyone with a documented disability for which an accommodation is required should inform me of this immediately, i.e., please speak privately with me immediately after the first class.

Note that a quiz may be on material that is related to homework/class/etc. but that you have not seen before. Often, quizzes will be related to the workshop material that came recently before, or the homework that you just did, or a reading that you just did; so a good approach to quizzes is to do all the work and stay on top of everything.

Regrading and Administrative Error Corrections and Blackboard and Other Logistics

If you want something regraded, you must notify the graduate TA of that by email (to cs280 "at" cs.rochester.edu, but with the email starting "Dear Scott" so he knows it is directed to him) within 48 hours (Sat. and Sun. do not count against those) of it being given back, along with an emailed explanation of what you feel was graded incorrectly. Late regrade requests will not be honored. Also, immediately after you send your email, and this also still must fall within the 48-hour limit, put in the graduate TA's papermail-box the paper you wanted regraded, but you must also keep a photocopy of the paper for yourself. Note that the entire thing (e.g., the whole homework set or the whole quiz or etc.) that you are asking to be regraded will be regraded (not just the issue about which you are asking), and the grade may move either up or down. We will usually have your regraded paper back to you by the next class or the one after.

We will be using Blackboard to maintain the course grades. If the grade we wrote on your homework set (or quiz) differs from the one that we recorded in Blackboard, you must inform us of that (and email the graduate TA and provide him with a copy of the graded item in his papermail-box or via FAX) within 48 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). 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 drift in your grades, since Blackboard will show you all your grades so far in the course); in brief, when you get something back, 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 "1/30 Quiz" for a quiz on January 30, or "1/3031 Wkshp" for the workshops that for each of you will fall on January 30 or 31, or "1/28 HW1" if the first homework is due on 1/28). (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. In fact, I'll often make columns for anything we *might* have coming, namely, I'll typically make quiz columns ahead of time for each class, and then if we do *not* have a surprise quiz on that given day, I'll just delete the column. Having a quiz column for a future date does *not* guarantee there will be a quiz—it says little or nothing about whether we'll have one... except we'll have short quizzes at the start of many or most classes, I'd expect.)

Your attendance at each workshop will be a column in Blackboard, so you should check that too, along the lines of the above. The attendance column for a given week's workshops will probably be a text grade that will be Y if you attended and N if you didn't attend that given workshop session (since Blackboard requires a point total even for text grades, but then mishandles those for text grades, I'll make the workshop attendance columns be 0-point columns in the eyes of Blackboard; but do remember please that as per the grading formula mentioned earlier in this document, workshop attendance counts tremendously much, using the formula discussed earlier; the 0-point setting in Blackboard is just because Blackboard does not understand how to handle text with respect to points and so might do crazy things). You generally *must* attend your correct one of the four workshop slots each week to get the attendance credit for that week (if you have some one-time exception so extraordinary that you can convince your workshop leader to as a one-time thing let you attend and get credit for attending another section that one week, I'll probably not disallow that, but it is up to you to make sure that—despite whatever confusion is caused by your special case—your correct attendance credit shows up in the grading column within the 48-hour window, and whether to allow this is up to the workshop leaders and they are completely free to say no to any request along these lines; also, if your workshop leader allows you to, with the other leader's agreement, attend for one week a workshop of the other leader, keep in mind that your workshop leader won't be seeing you perform that week—and your workshop leader is who will be deciding on your potential bonus workshop points at the end of the term). As to whether you get a Y or a N if you come in 5 seconds or 5 minutes late, I'll leave up to the workshop leaders how to handle people who are late to their workshops, but since you are expected to be at the workshop on time, the wise thing to do, not just for grades but for the learning, is to be there safely and completely on time each week. (If you attended your workshop 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 cs280 "at" cs.rochester.edu, but with your letter starting Dear [put your workshop leader's name here].)

We may sometimes enter in Blackboard for you a grade of 0.1% on items on which your actual score was a 0%. This isn't to give you a slight bonus for showing up, even if you get a zero, though you actually will get that very, very slight effect. But, typically, we'll enter 0.1% if you handed in the homework/quiz but got a 0%, and we'll enter a 0% in Blackboard if you didn't hand in the homework/quiz. That will help me and the TA notice if/when someone has stopped handing things in.

You should not view the class as a competition against your fellow students. The class is not graded on a fixed curve. 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 most or, typically, all grade columns (well, except the workshop ones as those are text grades). On the other hand, we will have Blackboard not show at all 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 than 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 do homeworks in groups of size up to two, 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 of course I assume and expect that you will keep each given-back item), can typically read the average/median info from Blackboard page on individual items (except workshop attendance columns), and at the end of the course will receive his or her course grade either from the registrar or from me. However, I in general do not give out grade/distribution info beyond that (or provide guesses of what letter grade a student is "headed toward"), though of course if a student wishes to share with some classmate his or her grades on some items or the course, that is up to him or her.

This class is not available for audit.

Textbook: The required text is:

- (In the course we will sometimes refer to this as SIP.) Michael Sipser, Introduction to the Theory of Computation, Third Edition, ISBN-10: 113318779X, ISBN-13: 978-1133187790, Course Technology/Cengage, 2012.

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 sometimes get 0 points due to doing the wrong problems due to the sometimes different numbering.

Note 2: Do not confuse the 3rd edition, which just came out in the summer of 2012, 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 well differ, so you will really want to use the third edition.

Books on Reserve: On reserve, for this course, at Carlson Library, are quite a few books, including our Sipser textbook, 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. You can get to the reserve list directly from the link to it within our course's area within Blackboard.

Among the on-reserve books that provide many worked examples are: (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.

Also, beware: Although the one and only version of Sipser that we are using is the 3rd edition, I did put on reserve at the library also the 2nd edition—but do be aware of the huge warning I put above regarding it being dangerous and confusing to use the second edition, due to changes in numbering of problems and pages and even changes in the content of definitions. By putting the 2nd edition on reserve, I am not in any way saying it is equivalent to the 3rd edition or recommending that you use it; in fact, using the second may well cause you grief. Sipser (in both the 2nd and 3rd editions) is on 2-hour reserve, and the other about two dozen reserve books are on 1-day reserve.

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

<http://www.cs.rochester.edu/courses/280/spring2013>

regularly (i.e., daily, so that, for example, you see and do the reading and homework assignments 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 them), will include a link to the workshop section assignments, and has various other important links (such as regarding academic honesty information) and (near the bottom of the page) tidbits of advice. This web site, however, does not have any day-to-day announcements. Those will mostly 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. By default, Blackboard will *not* send you these by email. But you can, by changing your settings in Blackboard, arrange for it to do so (although the UR Blackboard administrator warns you that that option is not necessarily reliable; and so you even if you have it turned on you should very frequently peek at the course's Announcements area within Blackboard). (I might prefix the topic/subject field of each announcement with some distinctive string such as zbb, to make searching for them within email easier, but

I'm not sure that I will, and perhaps they come with some clear tag in the subject field already thanks to Blackboard.) Homeworks and reading assignments will not be here, though; rather, they will be posted on the non-Blackboard web site mentioned above.

So, how do you turn on email notification of Announcements? Here is how, thanks to the UR Blackboard Administrator:

Go to the notifications dashboard. The notifications dashboard is a sub-tab of the Main tab. So go to Main and click on it. And then you'll have subtabs below saying Main and Notifications Dashboard, and click on the latter. It will take a while to load. Once it does, you'll see that every module has a button to "Edit Notification Settings." You can tell what the UR BB system administrator has allowed by what options you have. Although mere notification in the dashboard is ON by default (and you can't turn that off), at UR, the default is that email notifications are all OFF by default. But through choosing to Edit Notifications related to this course, you can (and surely should!) turn on email notifications (or maybe even mobile notifications, if that works—got me) for our Course Announcements, and perhaps for others in the huge list of items you'll get to set your notification preferences for. Again, though, be warned: Even the BB Administrator here warns that, to give her exact words, "Notifications are updated hourly. In the past, there have been issues with notification reliability. While Blackboard reports this fixed in the current version, please be sure to also check your course directly."