

COMP 590-079: Discrete Structures, Fall 2011

Instructor: Jack Snoeyink, snoeyink@cs.unc.edu,

Lectures: TTh 3:30 – 4:45p, Sitterson 014

Office hours: Sitterson 329, 962-1969, TBA, or by appointment

TA & TA hours: TBD

Welcome: Underlying the many applications of computers in our daily life are discrete structures like Boolean logics, relations, finite state machines, graphs, and networks that have mathematical specifications. You can tell others that the primary aim of this class is to introduce these discrete structures and the formal proof techniques that support the production, verification, and maintenance of correct software. Don't tell them how many examples are from puzzles and games: e.g., already in 1990, *Super Mario World* expected kids to immediately understand the drawing of a finite state machine to the right.



Math381, Discrete Mathematics, shares many of our goals of teaching formal reasoning and mathematical rigor, but they do so by delving deeply into number theory. We will find our examples more broadly, so that we can also provide students with a toolbox of mathematical techniques and concepts that are fundamental in most areas of computer science.

Prerequisites: 1st semester of Calculus, an enjoyment of puzzles, and a willingness to work to separate truth from falsehood.

Web site: Sakai, <http://sakai.unc.edu>, gives access to handouts, email, on-line gradebook, and a Q/A site that is like <http://stackoverflow.com> in which you gain reputation for asking questions, answering them, and editing others' answers. In this way we will be collaboratively building an ebook that is the record from this class. You need your ONYEN to access the sakai site. <http://onyen.unc.edu> Forgotten passwords reset in the Ugrad library basement. The Q/A site has a direct link: <http://comp-590-discrete-structures.shapado.com/>

Textbook: Required: J. Hein, "Discrete Structures, Logic, and Computability," 3rd ed., Jones & Bartlett, pub., ISBN 978-0763772062. There is a lot of good stuff in this book, but he doesn't write as simply and clearly as I would like. We may actually benefit from this in two ways: first, with the Q/A site, we'll collaboratively rewrite sections that we can say better, and second, it seems easy to get cheap used copies through half.com or amazon.com.



Recommended: "Discrete Math and its Appl.," by Rosen (any edition) is a good reference, and their online material (including [self-assessments on various topics](#)) is helpful, but the textbook itself does not connect topics, and is expensive. Also, Math381 uses a custom subset that omits chapters 9-12, so be careful if you buy it used that you get the entire book.

Other texts: If price was no object, I would use the new (4th) edition of Epp's "Discrete Math with Appl." (list \$240; no used copies yet), which is clearer than Hein or Rosen. If you want a more fun book than any of them, Invitation to Discrete Math, 2nd ed., by Matousek and Nesetril is great, and not that expensive in paperback.

Evaluation Grades are based on regular assignments, quizzes, participation in the Q/A site, two midterms, and a final exam. The registrar has scheduled our **final at 4pm, Thurs, 15 Dec.**

Assignments: There will be regularly assigned problems, of four types: Q/A, Challenge, Quiz, and Hand-in. Q/A are to be answered on the Q/A site, although you can replace Q/A problems with Challenge problems for more of a challenge. Quiz problems can optionally be solved on the Q/A site, and will be the basis of a 10-minute quiz at the end of class on most Tuesdays. No makeup is given for missed quizzes, but you can earn points on the Q/A site if you miss a class with a quiz. Hand-in problems are due by the end of Tuesday, either on Sakai, or turned in on paper in class or to my mailbox or office. Once grading has begun, late assignments will not be accepted. If we get good participation on the Q/A site, and the quizzes show that students are all learning, then there will be very few problems to hand in.

Midterms and final exam are cumulative, and will have a combination of take-home and in-class problems. The schedule below is subject to change.

Cheat sheets: For any in-class midterm or exam, you may take a one-page, 8.5x11 in "cheat sheet" with whatever you want to write on both sides. (Definitions, formulae, theorems, words of encouragement...) You must, however, write it yourself; photocopies or scans are only permitted if that is how you reduce larger writing to smaller size. (The process of preparing a sheet is usually more valuable than the sheet itself.)

Collaboration: Collaboration is encouraged on assignments and on the take-home parts of the midterms and final. I insist that whatever you hand in must be your own writing/typing. (In class portions will test whether you understand what you turn in for your take-home portions). Good scholarship requires that resources used and collaboration be acknowledged. Thus, if you collaborate on the solution of a problem set, I expect that you list your collaborators at the top of the page. Collaboration on in-class evaluations is, of course, a violation of the Honor Code. <http://www.cs.unc.edu/Admin/Courses/HonorCode.html>

Courtesy: Remember in your assignments that you are communicating with a human – be neat, complete, and concise. Please staple if you hand in > 1 page. No cell phones ringing in class.

Suggestions: Come to class ready to think, and to make the instructor think.

Write your own versions of definitions or proofs to make them your own; doing so gives you an early start on your cheat sheets, too.

Look over take-home assignments early to give your thoughts time to percolate.

Collaborate – two heads can be better than one. Use lots of scratch paper.

Assignment #1 preview: Check that [Java is installed](#) on your computer.

Download www.cs.unc.edu/~snoeyink/c590/kara-en.jar to your desktop and double click to run. Click [?] (upper right) to see help; click Exercises to try some. Do the checkerboard exercise, save your program as Assn1.kara, and submit on sakai.

Can you create a more general solution than those given as samples?

Course outline: to be posted on sakai by the start of class.

