CS 30/ENGS 66 Winter 2015 Syllabus

Instructor

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Graduate Teaching Assistants

- Anup Joshi
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Professor's and TAs' Office Hours

All office hours (by the professor and the TAs) will be held in **Sudikoff 214**.

- Monday: 1.00-2.00pm (Professor)
- Tuesday: 1.00-2.00pm (Professor) (TA)
- Wednesday: 1.00-2.00pm (Professor) & 5.00-6.00pm (Srivamshi Pittala, TA) & 6.00-7.00pm (Anup Joshi, TA)
- Thursday: 11.30am-1.30pm (Professor) & 4.00-6.00pm (Anup Joshi, TA) & 6.00-8.00pm (Srivamshi Pittala, TA)

Additional Graders

- Avery Feingold
- Harry Qi
- Yifei Xie

Course Description

Computer science focuses on solving problems with a computer. Given a problem, we like to know *is it solvable?* If it is, *how?* Once we have a method, we ask *does it work correctly?* If so, *how fast does it run?* Once we have analyzed that, we ask *but can we do it faster?*

To answer these questions, we need to know what these words mean: What does it mean to be *solvable*? How can we prove that, anyway? What is a *method*, and how do we analyze its running time? For all this, we must study *discrete mathematics*.

One purpose of this course is for you to become comfortable with mathematical thinking and writing clean, logical proofs. You will also learn about probability, combinatorics (counting), some graph theory, asymptotic analysis of running times, and similar mathematical topics that are important for students who want to understand computer science.

Prerequisite

CS 1, ENGS 20, or placement through either AP or local placement exam.

Text books (recommended, but not required)

- Discrete Mathematics and its Applications, Seventh Edition, by Kenneth H. Rosen ISBN: 978-0-07-338309-5
- Lehman, Leighton, and Meyer. Mathematics for Computer Science (May 2014 revision; Ebook).

Topics Covered

- Logic and Proof
- Induction
- Graphs and Trees
- Sets, Functions, Relations
- Counting
- Public key encrytion (RSA) and the number theory underlying it
- Asymptotics
- Recurrence relations and solving them via the Master Theorem
- Discrete Probability
- Hashing

Lectures

Lectures are in Wildrer Hall 104 in the 11 hour: MWF, 11.15-12.20. X-hours are Tuesday Noon-12:50pm.

X-hours

I expect to use nearly all x-hours. Please make sure that you have no other engagements during X-hours.

Keeping up

Avoid falling behind in this class. If things are not making sense, please come to office hours to get help. Topics build on one another, so don't think that you can get behind and catch up later. You might find that the next topic does not make sense.

Homework

There will be weekly homework assignments. They go out on a Friday and are due by midnight the following Thursday. The first homework will be assigned on Friday, January 9.

A few points about the homework assignments:

General Advice
: Start early. Difficult problems are not typically solved in one sitting. Start early and let the ideas come to you over the course of a few days. Use good mathematical notation to express your thoughts rigorously and concisely.

Study Groups
: Some problems could be difficult and it might be helpful to discuss them with others. Feel free to form study groups. The idea, however, is for *everyone* to understand the problems and experience working through the solutions. So you should not simply "give" a solution to another classmate. In particular, each student should write up his or her own homework solutions and should not read or copy the solutions of others. For each problem, if you worked on that problem with anyone, you should write down their names at the start of the solution to that problem. If you receive help from the professor or the TA, be sure to acknowledge their names also.

Work on your own before talking to others
: Although, as I said above, you can work with others on the homework problems, you will learn

the most by first trying out each problem on your own. Make as much progress as possible on your own before you meet with your study group. If you get used to working with others and often don't come up with the solutions on your own, you may do okay in the homework component of your grade, but you will suffer in the exams where you are entirely on your own.

Protocol during office hours:

Please use the office hours to ask questions and receive help. During office hours, the TAs and I require that you don't write anything at all. The idea is that you should understand what we discuss and be able to reconstruct it later on on your own to write up the solutions.

Extra Credit problems

Rarely, I might assign extra credit problems. I will keep track of extra credit points separately from regular points, and at the end of the term I will use them to resolve borderline grades. I therefore encourage you to work on challenge problems only after you have solved the regular problems as well as you possibly can, and if you enjoy the additional challenge. You cannot "make up" for missing regular homework by doing extra credit.

Homework Lateness Policy

Homework submitted even a minute after the deadline is considered late. Late homework has an immediate 20% penalty (unless there is a valid excuse which, except in impossible situations, you should discuss with me at least two days in advance), and 10% penalty per calendar day after that. I will not accept a homework beyond 72 hours from the deadline. In this course, if you don't do your homework on time, you will soon find yourself overwhelmed, so please be regular with your work.

Exams

There will be two midterm exams and a final exam; all are closed-book, in-class exams.

- First midterm: 6:00-9:00pm Monday, February 2; Location: To be announced
- Second midterm: 6:00:9:00pm Monday, February 23; To be announced
- Final Exam: 8.00-11.00am Saturday, March 14; Location : To be announced

Grading

- Homework: 40%
- Midterm 1: 20%
- Midterm 2: 20%
- Final: 20%

Homework/Exam Regrade

Your work is normally graded by the graduate TAs and the graders, according to a grading guide that I explain to the graders at a meeting each week. In case you have any grading questions on a homework or exam, please follow the procedure below.

- If the grader made an obvious mistake (e.g., totaling error), you can see me or any TA after a lecture or during any of our office hours, and we'll make the correction right away.

  On the other hand, if (after reading my solutions) you feel the grader did not grade your answer accurately, then you should write down which problem(s) needs regrading and why, staple this description to your homework, and submit to Srivamshi Pittala, the Head Teaching Assistant, during his office hours or after lecture. Srivamshi will make sure that the appropriate grader will look at your answer once more. After you hear the outcome on your regrade request, if you still feel the matter is not resolved satisfactorily, then you should see me. At that point, I (together with the help of the TAs) will regrade your entire homework, not just the problem you have issue with.

- You must submit your homework or exam for regrade in less than a week from when the homework/exam was returned, or March 13, whichever is earlier.

Please note that any regrade request that comes after the deadline stated above will not be considered, regardless of its merit otherwise.

Honor Code

All work submitted for credit must be your own. You may discuss the homework problems with your classmates, the TAs, or the professor, but you must write up your own solutions. For each problem, you must indicate who else you worked with or got any help from, small or big. Even if you worked with the same people on the entire assignment, be sure to write their names at the start of the solution of each problem. Any written sources used (apart from the text, your notes and any homework solutions that I distribute) must also be acknowledged; however, *you may not consult any solutions on the internet or from previous years' assignments, whether they are student- or faculty-generated*.

The rules are different for the exams. The exams are closed book and you may not discuss the problems with anyone.

You should consult a copy of Dartmouth's Sources and Citations.

Dartmouth's Academic Honor Principle applies to this course. Please be sure to read it.

Please ask me if you have any questions about the honor code as it applies to CS 30. Better safe than sorry!

Disabilities

Students with disabilities enrolled in this course and who may need disability-related accommodations are encouraged to make an appointment to see me on or before Friday, January 16. All discussions will remain confidential, although the Student Accessibility Services office may be consulted to discuss appropriate implementation of any accommodation requested.

Religious Observances

Some students may wish to take part in religious observances that occur during this acdemic term. If you have a religious observance that conflicts with your participation in the course, please meet with me on or before Friday, January 16 to discuss appropriate accommodations.

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