CS38: Introduction to Algorithms

course information and tentative schedule

Catalog description: This course introduces techniques for the design and analysis of efficient algorithms. Major design techniques (the greedy approach, divide and conquer, dynamic programming, linear programming) will be introduced through a variety of algebraic, graph, and optimization problems. Methods for identifying intractability (via NP-completeness) will be discussed.

Course Information:

- Instructor: Chris Umans (`umans@cs.caltech.edu`)
- TAs:
  - Udaya Ghai (`udayaghai@gmail.com`)
  - Zeyu Guo (`zguo@caltech.edu`)
  - Albert Gural (`2012agural@gmail.com`)
  - Kenneth Hung (`khung@caltech.edu`)
  - Chung Eun Kim (`ckkim@caltech.edu`)
  - Nicholas Schiefer (`nschiefer@caltech.edu`)
  - Paul Zhang (`pzhang@caltech.edu`)
  - Xander Zheng (`tzheng@caltech.edu`)
- Lectures: Tuesdays and Thursday 10:30 - 11:55 in Annenberg 105
- Office hours: TBD (2-3 on Sunday nights, 5-6 on Monday nights)
- Recommended text: *Introduction to Algorithms – 3rd Edition* by Cormen, Leiserson, Rivest, and Stein ("CLRS"). I will strive to make the lectures self-contained, and this book is large and expensive, so it is not designated as required.
- Webpage: `http://www.cs.caltech.edu/~umans/cs38/`

Homework: The homework is extremely important – for this material, the best way to learn is by doing. I strongly encourage you to work in groups of two or three on the homework. However, you must each turn in your own write-up and note with whom you worked. The rules on homework are:

- There are 7 problem sets. They are handed out at the end of the Tuesday lecture, and they are due at the beginning of the following Tuesday lecture.
- The quality (clarity, conciseness, neatness) of your write-up counts.
- You may elect to take a extension (until 5pm Thursday) on *one* problem set without penalty. Other problem sets turned in late, but before 5pm Thursday, receive half credit. Late problem sets should be turned in by putting them into my mailbox on the 3rd floor of Annenberg. **There is no need to notify anyone that you are taking the free extension**; it will be applied automatically when grades are computed.

Exams: There will be a midterm and final exam. They will be indistinguishable from the problem sets, except that they will be cumulative, and you may not work with others on the exams. The homework rules apply to exams as well. There are no extensions for the exams, and no partial credit for exams that are turned in late.

Honor code: For homework and exams, you may consult *only* the following material: (1) lecture slides and problem sets posted on the class webpage, (2) solution sets for problem sets you have already turned in, (3) course notes you or others took during lecture, and (4) the recommended text (CLRS). **I am well aware that there is material relevant to solving problems on the homework and exams that is readily available (online and elsewhere). You may not seek out, study from, or otherwise consult this material during the term, starting now (April 1, 2014).** Please feel free to ask me for clarification if any of these guidelines are unclear.

Reading: The webpage will list reading in CLRS (3rd edition) that parallels the lectures (when applicable). This is mainly for reference; the lectures are designed to be self-contained.

Feedback: If you have any comments or concerns on issues like: the pace of the lectures, the difficulty of the material, time spent on problem sets, or anything else, please let me know! You can tell me or the TAs directly, or you can talk to the course ombudsperson (we will select someone for this role after the first couple of lectures).

Evaluation and Grades: Your grade will be based on the following (weighted) components:

Homework 60%; Participation 10%; Midterm 15%; Final 15%.

Each of the 7 problem sets contributes equally to the Homework portion of the grade (i.e., each problem set is worth 8.57...% of your overall grade).

If you earn 90% of the available (weighted) points you are guaranteed at least an A of some form, 80% guarantees at least a B of some form, 70% guarantees at least a C of some form, etc... *If you are taking the course pass/fail, you need to earn a C- or higher to pass.*

Tentative lecture schedule:

#	Date	Subject	Assignments	Reading
1	April 1	Introduction; basic graph algorithms		
2	April 3	basic graph algorithms		
3	April 8	Greedy algorithms	HW1	
4	April 10	Greedy algorithms		
5	April 15	Divide and conquer	HW2	
6	April 17	Divide and conquer		
7	April 22	Dynamic programming	HW3	
8	April 24	Dynamic programming		
9	April 29	Matchings, flows and cuts	Midterm	
10	May 1	Matchings, flows and cuts		
11	May 6	Linear programming	HW4	
12	May 8	Linear programming		
13	May 13	Randomized algorithms	HW5	
14	May 15	Randomized algorithms		
15	May 20	[Drop Day May 21] NP-completeness and approximation algorithms	HW6	
16	May 22	NP-completeness and approximation algorithms		
17	May 27	Advanced topics / catch up	HW7	
18	May 29	Advanced topics / catch up		
19	June 3	Advanced topics / catch up		
20	June 5	Advanced topics / catch up	Final	
-	June 12		Final due	

Lecture slides will be posted on the course webpage after each class.