CIS 502 Algorithms: Fall 2015

General

See the webpage `www.seas.upenn.edu/~cis502` for the most recent information about office hours etc. We will be using Canvas `http://canvas.upenn.edu/` for grades, and handouts.

Grading

- Two Midterms (in class, 1:30-3pm, tentative dates Oct 7th and Nov 4rd) with 25% and 30% respectively

- Final (check the Registrar's schedule, but likely to be 3 hours instead of the slot of 2 hours, starting 30 minutes earlier and ending 30 minutes later than the schedule) 45%.

- Policies:

  - *There will be no additional/extra-credit work to improve grades, etc.* Extra work that allows some students to improve their grades but not everyone, is unfair.
  - Midterms are open "any handwritten material". If you want to use the handouts given in class you can copy them – hopefully it would convince you that understanding something is the easiest means of carrying "it" around.
  - The final exam is closed book, closed notes.
  - You cannot use any electronic devices in any of the exams.
  - Makeup exams will only be given for (A) a doctor's note verifying that you are unable to take the exam – the fact that you visited a health care provider's office is not enough, (B) representing UPenn (conferences, academic or athletic meets which are sponsored/supported by Penn Faculty), or (C) interviews with a formal invitation letter **and** prior permission of instructor.

Homeworks

Homeworks will be provided on a weekly basis. The solutions to the homeworks will be provided after a week. I would expect the students to do the homeworks. The exams will involve that the students solve similar problems in the allotted time – and practicing the homework problems (as well as the problems at the back of each chapter in the textbook) is very helpful for practice.

Homeworks will be collected via Canvas. If five of you collaborate toward solving a prioblem then please submit **one** copy to keep the workload manageable for the TAs.

You are welcome and strongly encouraged to discuss the homeworks with your peer group. But remember, technical writing and expressing yourself clearly is a skill that you cannot learn from just discussions. You are welcome to show your homework attempt to the instructor and the TAs during the office hours and ask for feedback. Often this is helpful if you are trying to figure out if a particular style of expression has sufficient technical details.

Academic Integrity Policy

Given the current setup of the course, this policy is unlikely to be relevant. However if there is a plausible violation of academic integrity during the exams then the Office of Student Conduct, OSC, *will* be consulted. The student or students will be informed only after the case is forwarded to the OSC.

Textbook, Syllabus and Plan

The textbook for the class is Algorithm Design by J. Kleinberg and E. Tardos, Addison Wesley.

1. Chapters 1–4, Review material. You are expected to know enough previous background to be able to follow this material on your own. We will review pieces of these chapters briefly. We will cover Chapters 4.3, 4.4, 4.8, 4.9 later in the course.

2. Chapters 5–6: We will cover almost all of the material. We will cover 4.8 along with 6.4 and 4.4 along with 6.8.

3. We will cover Sections 7.1–7.2, 7.5, 7.7, 7.3 and 7.4. We will then discuss amortized analysis of union find algorithms and 4.9.

4. We will cover 7.7 and 7.13. Sections 7.8–7.12 contain illuminating examples of the application of flows and are a recommended read, but they will not be covered in class.

5. We will then cover Linear Programming (Simplex Method and proof of Complementary Slackness conditions). Material will be provided.

6. We will cover Section 8 and Sections 11.1–11.3.

7. We will cover Primal-Dual Algorithms for solving linear programs approximately. Material will be provided.

8. We will cover Primal-Dual Approximation Algorithms and sections 11.4–11.8.

9. We will cover 13.1–13.8. We will cover 4.3 in conjunction with 13.8.

10. If time permits (with probability close to zero, but non-negative) we will cover special topics such as Streaming Algorithms and Computational Geometry.

Other Books: The following books may be handy if you feel you need more material beyond the class and the text. Do **not** feel compelled to get them.

1. Introduction to algorithms, 2nd ed., Cormen, Leiserson, Rivest, Stein.

2. Algorithms, by Dasgupta, Papadimitriou, and Vazirani.