

CS6043 Design and Analysis of Algorithms II

Spring Semester 2012

Lectures: Monday 6:00–8:30pm
Classroom: RH 702
Course Web site: <http://cis.poly.edu/cs604/>

Instructor: Professor Yi-Jen Chiang
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Prerequisites: CS6033 (Design and Analysis of Algorithms I) or equivalent. Familiarity with basic sorting/searching algorithms and data structures, recurrence relations, and asymptotic notation will be assumed.

Required Textbook: T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, *Introduction to Algorithms*, Third Edition, 2009, The MIT Press, ISBN-10: 0262033844, ISBN-13: 978-0262033848.

Grading Distribution: Midterm Exam: 35%, Final Exam: 35%, 4 Homework Sets: 30%.

Homework Sets: You will usually have two weeks to complete each set. You may discuss the homework problems with other students currently taking the course, BUT SOLUTIONS MUST BE WRITTEN DOWN INDIVIDUALLY AND INDEPENDENTLY, AND YOU SHOULD SHOW THAT YOU PERSONALLY UNDERSTAND EVERYTHING THAT YOU WRITE. If a key idea is obtained from another person (other than the instructor) or from another book or paper (other than the course textbook), then the source of that idea should be given.

Solutions are due at the beginning of class on the due date. Solutions handed in after the due date, but no more than a week late, will be graded at 50%. Solutions that are turned in more than a week late will NOT be accepted.

It is TO YOUR BENEFIT that you THINK HARD and TRY TO SOLVE HOMEWORK PROBLEMS ALL BY YOURSELF without discussing with others, as problem-solving is an important learning process for this course, and it also gives a good preparation practice for the midterm and final exams.

Midterm and Final Exams: In Class, Closed Book.

Tentative Schedule (subject to change):

I. Advanced Techniques and Data Structures

- 1 1/23 Amortized Analysis [Ch 17]
 - 2 1/30 Amortized Analysis [Ch 17]; Binomial Heaps [Ch 19 of the **2nd Edition**]
(HW1 given)
 - 3 2/6 Binomial Heaps [Ch 19 of the **2nd Edition**]
 - 4 2/13 Fibonacci Heaps [Ch 19]
(HW1 due)
 - 5 2/20 NO CLASS (President's Day)
 - 6 2/27 Fibonacci Heaps [Ch 19]; Data Structures for Disjoint Sets Union-Find [Ch 21]
(HW2 given)
 - 7 3/5 Data Structures for Disjoint Sets Union-Find [Ch 21]
 - 8 3/12 NO CLASS (Spring Break)
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II. NP-Completeness

- 9 3/19 NP-Complete Problems and Reduction [Ch 34]
(HW2 due)
 - 10 3/26 **Midterm Exam**
 - 11 4/2 NP-Complete Problems and Reduction [Ch 34]
(HW3 given)
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III. Selected Advanced Techniques and Data Structures

- 12 4/9 Randomized Algorithms and Data Structures [Lecture Notes]
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IV. Graph Algorithms

- 13 4/16 Maximum Flow and Matching [Ch 26]
(HW3 due)
 - 14 4/23 Maximum Flow and Matching [Ch 26]
(HW4 given)
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V. Approximation Algorithms

- 15 4/30 Approximation Algorithms for Optimization Problems [Ch 35]
 - 16 5/7 Approximation Algorithms for Optimization Problems [Ch 35]
(HW4 due)
 - 17 5/14 **Final Exam**
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Note: You can print out Ch 19 of the 2nd Edition by going on-line to the NYU-Poly Library, Books24x7, at

<http://library.books24x7.com/databases.poly.edu/toc.asp?bookid=3444>.

Departmental Policy on Cheating (Same Policy Applies to Non-Programming Homeworks):

see <http://cis.poly.edu/policies/>.

NYU-Poly Syllabus Addendum: see

http://www.poly.edu/sites/polyproto.poly.edu/files/NYU-Poly_Syllabus_Addendum.pdf.