Design and Analysis of Algorithms CS161
Website: https://panageas.github.io/algo2022/

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Required Textbook*: Algorithm Design and Applications, by M. T. Goodrich and R. Tamassia.
Recommended Textbook: Introduction to Algorithms,
by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein.

***The book is available in hard copy from the usual sources. It is also available online at a much cheaper rate.

Piazza: https://piazza.com/uci/spring2022/compsci161

Please note that although posters can hide their identity from other students, the instructor and the teaching assistants are able to determine the identity of posters. Piazza is intended as an open and respectful forum for the exchange of questions and answers about the class and the course material. Inappropriate, insulting, or offensive posts will not be tolerated. Such posts will be deleted, and may result in the suspension or termination of access to the forum. In extreme cases, offensive posts may be referred to other University entities for appropriate disciplinary action.

Grading Policy:

- **4 Homeworks (20%)**: Four homeworks will be given, including written and programming assignments. If you use Latex for **all** your written hwks, you get 5% bonus (105 maximum). Each student has to work individually. See schedule when homeworks are due.
- **2 Midterm Exams (40%)**: Will be given on Thursday of Weeks 5 and 9. Please note all exams will be held synchronously in class hours. The full 1 hour and 20 minutes will be permitted, although this will include administrative duties.
- **Final Exam (40%)**

Missed Exam Policy: If you need to miss an exam, or you take an alternate exam, for any reason, and this is for reasons the instructor accepts, then we may reconsider how to calculate your grade. For reasons the student could have known about in advance, it is expected that the student contacts the instructor as soon as possible after the conflict is known. If the conflict could have been known before the exam, the instructor will not provide any relief if informed after the exam unless it would have been unreasonable to do so prior to the exam. If you need to miss an exam, or if you do miss an exam, you must email the instructor as soon as possible upon knowing this.

Schedule of classes (tentative):

Week	Topic	Reading [GT]
1	Introduction, course expectations and syllabus	Sections 1.1, 1.2, 1.3
2	Review of basic data structures. Binary search. Sorting: introduction, comparison-based sorting. Insertion sort. Selection sort.	Chapter 2, Section 3.1, Section 5.2.2
3	Divide and Conquer recurrence equations. The simplified method. The master method. Divide and conquer algorithms: binary search, mergesort and quicksort; integer multiplication; matrix multiplication and Strassen's algorithm.	Sections 11.1, 11.2, 11.3. Homework 1 due Friday 15th of April
4	Mergesort, counting line intersections, counting inversions. Priority queues and heaps. HeapSort. Summary of comparison-based sorting.	Chapter 5, Sections 8.1, 8.3. Homework 2 due Friday 20th of May
5	Greedy Algorithms: Introduction. Fractional knapsack problem. Task scheduling.	Chapter 10. Midterm 1 on Thursday 28th of April
6	Graphs: basic concepts. Depth-first search, breadth-first search. Biconnected components. Strong connectivity. Topological sorting.	Sections 13.1, 13.2, 13.3, 13.4.1, 13.4.4, 13.5
7	Weighted graphs. Shortest paths, Dijkstra's algorithm. Minimum spanning trees, the Prim algorith, Kruskal's algorithm.	Sections 14.1, 14.2, 15.1, 15.2, 15.3. Homework 3 due Friday 20th of May
8, 9	Dynamic Programming: Introduction. The Weighted Interval Scheduling Problem. The Truck Loading and 0/1 Knapsack problems. Longest Common Subsequence. Optimal matrix chain multiplication. Bellman-Ford and Floyd-Warshall Algorithms	Sections 12.1, 12.2, 12.3, 12.6, 14.3, 13.4.2 Midterm 2 on Thursday 26th of May
10	NP-complete problems. Reductions.	Chapter 17. Homework 4 due Friday 3th of June

Academic Dishonesty: Academic dishonesty (cheating) is a serious offense in the eyes of the instructor, the instructional assistants, ICS, and the university. Incidents of academic dishonesty will usually result in your receiving a grade of F in the course and not being allowed to drop the

course. Additional consequences may occur at the academic unit or campus level. Examples of academic dishonesty include, but are not limited to:

- Copying from others during an examination
- Using unauthorized materials during an examination.
- Sharing answers or allowing another student to copy off your work during an examination.
- Tampering with an examination after it has been corrected, then returning it for more credit.
- Intentionally disrupting the educational process in any way.

For more complete information about academic honesty policies and procedures, consult the following resources:

1. `https://www.ics.uci.edu/ugrad/policies/index.php?policy=cheating`
2. `https://aisc.uci.edu/students/academic-integrity/index.php`
3. `https://aisc.uci.edu/policies/academic-integrity/AcademicIntegrityPolicyApproved-04.23.15.pdf`