CS 330/491: Introduction to the Design and Analysis of Computer Algorithms

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Southern Illinois University Carbondale
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Lectures. Dr. Qiang (Shawn) Cheng
- MWF 10:00 - 10:50pm, EGRA422.
- Attendance is required.
- Office hours: MWF: 12:00-1:00pm, ENG 405D.
  - Other times, appointment needed.
- Email: qcheng@cs.siu.edu

TA: Mr. Wei Rang
- Office hours: TBA.
- Office: EGRA 406, Phone: TBA, Email: weirang@siu.edu
- Grades home works and/or tests, and answers questions regarding the homework and grading.
- TA is a (graduate) student who needs to study, do research and thesis...
Background and Books

Prereq. Data structure, and Programming courses, equivalent to CS220 or equivalent. Or instructor's permission (see me after class).

CS 491: For New Admits to meet prereq. requirements. NOT for Current Students.

Textbook. *The Design and Analysis of Algorithms*. Levitin, 2\textsuperscript{nd} ed., or 3\textsuperscript{rd} ed. Addison Wesley. Available at the University Bookstore.

Please notice the difference in homework problems.

Recommended books for references:
1. *Algorithm Design*, by Éva Tardos and Jon Kleinberg.
3. Introduction to Algorithms. 2\textsuperscript{nd} ed. (3\textsuperscript{rd} ed. or 4\textsuperscript{th} ed.)
   by Cormen, Leiserson, Rivest, and Stein, MIT Press, 2001
Grading.

- "Weekly" or biweekly problem sets, due Wednesday 10:00am in class. No late homework will be accepted.
- Class participation, staff discretion for borderline cases.
- Optional in-class presentation: encouraged, ~10min, on applications of problems, techniques, or results related to class materials. May lead to bonus points.
- Four quizzes (out of which, three best scores will be used)
- Three exams, one optional final (replaces the worst of the first three).
- Grade determination: tests 25%+25%+25%, HW: 15%, quizzes: 10%
- Letter grade: 1) above 90%, then definitely A;
  2) otherwise, depending on the standing in the class

Course grades.
Collaboration

Collaboration policy. (ask if unsure)
- Course materials are always permitted.
- You are encouraged to attend office hours as needed.
- No external resources, e.g., Google, Yahoo.

"Collaboration permitted" problem sets.
- Default permission level, unless otherwise stated.
- Can form study group of up to 3 students.
- Study group may work on problems jointly, but you must write up solutions individually.

"No collaboration" problem sets.
- Can always consult course staff.

You need “independently” work out problems in tests and quizzes:
- No text book or class note is permitted.
- No other book is permitted.
Overview of Contents

1. Introduction
2. Analysis of algorithm efficiency: big-Oh, big-Omega, small-Oh
3. Brute force
4. Decrease-and-conquer
5. Divide-and-conquer
6. Space and time tradeoffs
7. Dynamic Programming
8. Greedy technique
9. Iterative improvement
10. Brief introduction to limitations of algorithm power

Note: The focus will be on fundamental techniques and basic skills. Some advanced materials may be omitted (left to more advanced courses such as CS 455)...