CS201 Data Structures and Algorithms

Syllabus

Instructor

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Catalog Statement

Provides an introduction to formal techniques for analyzing the complexity of algorithms. The course surveys important classes of algorithms used in computer science and engineering.

Data structures including balanced search trees, heaps, hash tables, and graphs. Algorithm design techniques including divide-and-conquer, greedy method, and dynamic programming. Emphasis on problem solving, design, analysis, and reasoning about data structures and algorithms.

Implementing the Catalog Statement

You will be required to demonstrate your proficiency with implementing algorithms through three programming assignments. The C programming language will be the language used for the three projects.

You will also be tested on your knowledge of algorithms through two concept exams and a final exam.

Prerequisites

CS 101, MATH 301, MATH 302 (with concurrency)
There will be an exam on prerequisite material.

Textbook

*Introduction to Algorithms*, Third Edition
Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
ISBN-10: 0-262-033844

Topics

The following sections, chapters and topics from the text will be covered:

- **Section III: Data Structures** — Chapters 10...12
- **Section II: Sorting** — Chapters 6...8
- **Section II: Order Statistics** — Chapter 9
- **Section I: Foundations** — Chapters 1...4
- **Section III: Data Structures** — Chapter 13
- **Section IV: Advanced Design and Analysis Techniques** — Chapters 15,17
- **Section V: Advanced Data Structures** — Chapters 19,21
- **Section VI: Graph Algorithms** — Chapters 22,23
- **Section VII: Selected Topics** — Chapter 34
Grading
Grades will be determined by the following percentages:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Exam Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>Prereq Exam (click here for a practice exam)</td>
</tr>
<tr>
<td>20%</td>
<td>First Concept Exam</td>
</tr>
<tr>
<td>20%</td>
<td>Second Concept Exam</td>
</tr>
<tr>
<td>20%</td>
<td>Final Exam</td>
</tr>
<tr>
<td>30%</td>
<td>Three programming assignments (mandatory)</td>
</tr>
</tbody>
</table>

Grading Methodology
Submissions that fail to compile cleanly will be given no credit. Deductions are assessed for lapses in programming style, program organization, and test coverage.

Grading is straight scale with the following cut-offs: 90% and above is an A, 80% and above is a B, 70% and above is a C, 65% and above is a D, and anything lower than 65% is an F. These cut-offs are strict. For example, 79.99999% is a C. Pluses and minuses are awarded to the upper and lower percentages of a grade (2% window).

Being caught using a device for non-class activities will result in a one point deduction from your final percentage for each infraction.

Other Details
The following conventions will be followed in CS201. Please make sure that you fully understand each of the items listed below.

- Attendance is not required.
- There are no make-up exams (unless you have a written, university-authorized excuse). If you miss an exam, a zero will be recorded for your score.
- Please be in your seat by the beginning of class. There is to be no food or drink in the classroom. Sleep is allowed only in the event of a stultifyingly boring lecture. Being caught using an device for purposes other than the class will result in a one point deduction in your final percentage.
- Signing up for and keeping current with the CS201 Forum at http://beastie.cs.ua.edu/forums is mandatory. Schedule changes, assignment clarifications, and such will be announced via the forum. Failure to sign up for the forum by 7 days after the last day to add class will result in a 1 point deduction from your final percentage.
- Programming assignments are to be submitted electronically by 4:59:59 p.m. on the day they are due. For the major programming projects, there is a grace period: late projects will be accepted up to 72 hours after the due date with no penalty. Each on-time submission that grades at least a B will be rewarded with a 0.5 point boost to your final percentage. Please do not ask for an extension as I will most assuredly say no and then we’ll both end up feeling bad.
- Each assignment is to be done individually. There can be no sharing of code or solutions.
- Each programming assignment must be submitted. Failure to submit an assignment will result in a final grade of F, regardless of your other grades in the class.
- The University of Alabama Code of Academic Conduct will be rigorously enforced. Please review the code at http://www.studenthandbook.ua.edu/academicintegritypolicies.html and be sure to follow this Code in all activities associated with CS 100. Any violations of this code will be handled as an Academic Misconduct case. The minimum punishment requested for plagiarism, or any other academic misconduct, is dismissal from the class with a failing grade. You are required to protect your work from plagiarism. If your work is plagiarized, it will be assumed that you were a willing participant in the plagiarism and you will receive the same punishment as the plagiarist, absent extraordinary evidence to the contrary.