CMPS 101
Algorithms and Abstract Data Types
Summer 2008

Description: Studies basic algorithms and their relationships to common abstract data types. Covers the notions of abstract data types and the distinction between an abstract data type and an implementation of that data type. The complexity analysis of common algorithms using asymptotic (big O) notation is emphasized. Topics include sorting and searching techniques, basic graph algorithms, and algorithm design techniques. Abstract data types covered include priority queues, dictionaries, disjoint sets, heaps, balanced trees, and hashing. Familiarity with C, Java, and Unix is assumed.

Prerequisites: CMPS 12B or 13H; and CMPE 16 or 16H; and MATH 19B; and one of either MATH 21, 22, 23A, 24 or AMS 27.

Time and Place: TTh 10:00am – 12:30pm Engineering 2 192
Class Webpage: http://www.soe.ucsc.edu/classes/cmps101/Summer2008/

Instructor: Patrick Tantalo (http://www.cse.ucsc.edu/~ptantalo/)
Office: E2 257
Office Hours: MTWTh 12:30pm – 2:00pm, or by appointment
Email: ptantalo@soe.ucsc.edu
Phone: 831-459-3898

Teaching Assistant: Alamelu Sankaranarayanan <alamelu@soe.ucsc.edu>
Office hours TBA

Required Text: Introduction to Algorithms, second edition, by Cormen, Leiserson, Rivest, & Stein. McGraw-Hill, 2001. The following reading schedule is a rough guide to what we will discuss and when. It is subject to change. I expect that the material from appendices A.1-A.2, B.1-B.3, and C.1 is already familiar.

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<th>Week</th>
<th>Sections</th>
<th>Topics</th>
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<td>1</td>
<td>1.1-1.2, 2.1-2.3, handouts</td>
<td>Introduction, ADTs, Analysis of Algorithms</td>
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<td>2</td>
<td>3.1-3.2, handouts</td>
<td>Asymptotic Growth Rates, Induction Proofs</td>
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<td>3</td>
<td>4.1-4.3</td>
<td>Recurrences</td>
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<td>4</td>
<td>B4, 22.1, 22.5, B.5</td>
<td>Graphs, Graph Algorithms, BFS, DFS, Trees</td>
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<td>5</td>
<td>6.1-6.5, 21.1-21.3</td>
<td>Heaps, Priority Queues, Disjoint Sets</td>
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<td>6</td>
<td>23.1-23.2, 24.1, 24.3, 24.5</td>
<td>Minimum Weight Spanning Trees, SSSP Problem</td>
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<td>8</td>
<td>7.1-7.4, 8.1-8.4</td>
<td>Sorting Algorithms</td>
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Coursework and Evaluation:
Homework will consist of written assignments taken from the exercises at the end of each section, and from the end of each chapter. Homework will be graded only as to it's completion, not it's correctness. Specifically, one point will be awarded for each problem (or each part of a multi-part problem) which is seriously attempted. The main purpose of the homework is to prepare for the exams. We will have five or six Programming Assignments, due at intervals of roughly 7-10 days. The first Midterm Exam will be held Thursday July 17, and the second Midterm Exam will be held Thursday July 31. The Final Exam will be held on Thursday August 14, 10:00 am – 1:00 pm. Please make arrangements to be available at the appropriate times. Coursework will be weighted as follows:
Homework 5%
Programming Assignments 35%
Midterm Exam 1 15%
Midterm Exam 2 15%
Final Exam 30%

The grading scale for the class will be approximately: A+:97%-100%, A:93%-96%, A-:90%-92%, B+:87%-89%, B:83%-86%, B-:80%-82%, C+:76%-79%, C:70%-75%, D:60%-69%, F:0%-59%. Letter grade boundaries may be lowered at my discretion in order to eliminate some borderline cases.

Academic Honesty:
In recent years, there has been an increased number of cheating incidents in many UC campuses, and unfortunately, UCSC is no exception. The Baskin School of Engineering has a zero tolerance policy towards any incident of academic dishonesty. If cheating occurs, consequences within the context of the course may range from getting zero on a particular assignment, to failing the course. In addition to these sanctions, every case of academic dishonesty is referred to the students’ college Provost, who sets in motion an official disciplinary process. Cheating in any part of the course may lead to failing the course and suspension or dismissal from the university.

What is cheating? In short, it is presenting someone else’s work as your own. Examples include (but are not limited to) copying another student's written homework assignment, or program, allowing your own work to be copied, or in any way facilitating the cheating of others. Although you may discuss problems with fellow students, your collaboration must be at the level of ideas only. Legitimate collaboration ends when you "lend", "borrow", or "trade" written solutions to problems, or in any way share in the act of writing your answers. You may freely give and receive help with the computer facilities, editors, the UNIX operating system, and the proper use and syntax of the C and Java programming languages; but you may not copy, paste, email, or in any way share source code. If you do collaborate (legitimately) or receive any form of help from anyone, you must credit them by placing their name(s) at the top of your paper, or in the case of programming assignments, in your README file.

Please go to http://www.ucsc.edu/academics/academic_integrity/ to see the full text of the University's policy on Academic Integrity.