CMPS 101
Algorithms and Abstract Data Types
Fall 2012

Course 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 course from the following: MATH 21, 22, 23A, 24 or AMS 27.

Time and Place: TTh 12:00-1:45 Thimann Lecture 001
Class Webpage: http://ic.ucsc.edu/~ptantalo/cmps101/Fall12/

Instructor: Patrick Tantalo http://users.soe.ucsc.edu/~ptantalo/
Office: E2 257
Office Hours: MWF 10:00-12:00, or by appointment
Email: ptantalo@soe.ucsc.edu
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Teaching Assistant: Jennifer Parrish   jlparris@ucsc.edu
Course Tutor: TBA
MSI Tutor: Andrew Ringer   ajringer@ucsc.edu

Lab Sections: A schedule of lab sections will be posted on the webpage.

Required Text: *Introduction to* Algorithms (2nd or 3rd edition) by Cormen, Leiserson, Rivest and Stein. McGraw-Hill 2001 (ISBN 9780262033848). The following reading schedule is a rough guide to what we will discuss and when. Section numbers are from the 3rd edition. I expect that the material from appendices A.1-A.2, B.1-B.3, and C.1-C.2 is already familiar.

Week	Sections	Topics
1	1.1-1.2, handouts	ADTs, Analysis of Algorithms
2	2.1-2.3, 3.1-3.2, handouts	Asymptotic Growth Rates
3	4.3-4.5, handouts	Induction Proofs, Recurrences
4	B4, B.5 handouts	Graphs, Trees
5	22,1-22,5	Graph Representations, BFS, DFS
6	6.1-6.5	Heaps, Heapsort, Priority Queues
7	21.1-21.3, 23.1-23.2	Disjoint Sets, Minimum Weight Spanning Trees
8	24.1, 24.3	SSSP Problem, Bellman-Ford and Dijkstra's Algorithms
9	12.1-12.3, 13.1-13.4	Binary Search Trees, Red-Black Trees
10	7.1-7.4, 8.1-8.4	Sorting Algorithms

Coursework and Evaluation:
Homework: Will consist of written assignments taken from the exercises in the text.
Programming Assignments: There will be five programming projects, two in Java, three in C.
Midterm Exam 1: Will be held **Tuesday October 23**
Midterm Exam 2: Will be held **Tuesday November 20**
Final Exam: Will be held on **Thursday December 13, 12:00-3:00pm**

Coursework will be weighted as follows:

Written 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.

Accommodations for Students with Disabilities
If you qualify for classroom accommodations because of a disability, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me during my office hours or by appointment, preferably within the first week of the quarter. For more information contact DRC by phone at 831-459-2089, or by email drc@ucsc.edu, or on the web at http://drc.ucsc.edu/.

Academic Honesty:
The Baskin School of Engineering has a zero tolerance policy for any incident of academic dishonesty. If cheating occurs, consequences may range from getting zero on a particular assignment to failing the course. In addition 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, suspension or dismissal from the Baskin School of Engineering, or from UCSC.

What is cheating? In short, it is presenting someone else's work as your own. Examples would include copying another student's written homework assignment, or allowing your own work to be copied. You may discuss homework problems with fellow students, but 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*, *transfer* or in any way share *source code*. If you do collaborate (legitimately) or receive help from anyone, you must credit them by placing their name(s) at the top of your paper. Please go to http://www.ucsc.edu/academics/academic_integrity/ to see the full text of the University's policy on Academic Integrity.