CSC 302.002 Introduction to Data Structures
University of Nevada, Las Vegas
Fall 05, call #: 53927
TR 5:30 pm - 6:45 pm, TBE 170

Course Objective
The choice of appropriate data structures is key in the development of efficient algorithms. In fact, it is virtually impossible to create efficient algorithms without a good understanding of a number of fundamental data structures. This course

- introduces important and fundamental data structures
- while discussing how they are used in a number of common algorithms
- and explaining how to measure algorithm efficiency.

Prerequisites
CSC 202 and MAT 181.

Professor
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Office Hours: Tuesday 4:30 pm - 5:25 pm, Wednesday 10:30 pm - 11:30 pm, Thursday 4:30 pm - 5:25 pm.

Teaching Assistant
TBA

Course Page
http://www.cs.unlv.edu/~bein/teaching/data/

Textbook

Machine Requirements
All programming assignments must run under g++ under UNIX at student.egr.unlv.edu. All class-related e-mail must be mailed from the machine student.egr.unlv.edu using your engineering account.

Summary of Selected UNLV Policies:
Students Needing Assistance Due To Documented Disability: Learning Enhancement Services (LES) houses Disability Services, Tutoring Services, and Learning Strategies. If you have a documented disability that may require assistance, you will need to contact LES for coordination in your academic accommodations. LES is located in the Reynolds Student Services Complex, Suite 137. The phone number is 895-0860 or TDD 702-895-0632. You may also visit our website at: http://www.unlv.edu/studentlife/les.

UNLV Policy on Copyright: The University requires student to familiarize themselves and to follow copyright and fair use requirements. Students are individually and solely responsible for violations of copyright and fair use laws; see http://www.unlv.edu/committees/copyright.

UNLV Policy on Religious Holidays: Students must notify the professor of anticipated absences due to religious observances by the last day of late registration to arrange the opportunity to make up missed work.

UNLV Policy on Official (UNLV) Extracurricular Activity: Students who represent UNLV at any official extracurricular activity must provide official written notification to the instructor no less than one week prior to the missed class(es) to have the opportunity to make up missed work.
Examinations and Assignments

- three problem sets, and four programming projects. (40%)
- three in-class tests (60%). (Two midterm tests totaling 35% and one final examination 25%.)

Midterms: Tuesday, October 4, 5:30 pm; Tuesday, October 25, 5:30 pm; Final Exam: Thursday, December 15, 6:00 pm

For the tests, one sheet of notes, a calculator, and the book are allowed.

Topics

Mathematical Review: Logarithms (1.2), Efficiency Measures (Big-O h etc), Basics of Non-recursive Running Time Analysis (2.1 - 2.4), Recurrence Relations (1.3), Run Time of Recursive Algorithms (Master Theorem, 10.2.1)

C++ Review (1.5 - 1.7)

Searching and Sorting: Lower Bounds (7.9), Insertion Sort (7.2), Heapsort (7.5), MergeSort (7.6), Quicksort (7.7), Bucket Sort (7.10), Selection (7.7.6, 10.2.3)

Analysis of these Algorithms.

Heaps (6.1 - 6.4)

Elementary Data Structures, The concept of Abstract Data Types (3.1,3.2, 3.3 without 3.3.3, 3.4)

Traversal of Trees, Applications of Postorder, Preorder, Inorder (4.1, 4.2), Expression Trees, Postfix, Infix Expressions (3.3.3 and 4.2.2)

Binary Trees: Binary Search Trees, including Average Case Analysis (4.3), AVL Trees (4.4), B-Trees (4.7),

Hashing: Separate Chaining (5.1, 5.2, 5.3), Open Addressing: Linear and Quadratic (5.4)

Disjoint Sets Algorithms (8.1 - 8.4)

Algorithms on Graphs: Kruskal, Prim, Dijkstra (9.3, 9.5)

Other Helpful Reading

Aho, Hopcroft, Ullman: Data Structures and Algorithms, Addison-Wesley, 1983. (This is the "original" algorithms book, it is mentioned here mostly for historical reasons.)

Cormen, Leiserson, Rivest, Stein: Introduction to Algorithms, 2nd Ed., McGraw Hill, 2001. (This a comprehensive and contemporary algorithms book; you will also find it useful for CSC 477.)

Man, Savitch: Data Structures and Other Objects using C++, 3rd Ed., Benjamin-Cummings, 2005. (This book can help help you if you still have trouble with programming and other CSC 202 material.)