CSE 2320-501: ALGORITHMS & DATA STRUCTURES

Fall 2002, T R 5:30-6:50, Science Hall 125

Instructor: Bob Weems, Associate Professor
Office: 344 Nedderman Hall (weems@uta.edu, http://reptar.uta.edu)
Hours: T R 3:30-5:00

GTA 1: ???
Office: ??? (????@cse.uta.edu)
Hours: ???

GTA 2: ???
Office: ??? (????@cse.uta.edu)
Hours: ???

Prerequisites: C programming
CSE 2315

Objectives: Introduction to algorithm design, emphasizing the application of data structures. Introduction to techniques for analyzing asymptotic complexity of algorithms and problems.

Goals:
1. Understanding of classic approaches to algorithm design.
2. Understanding of particular algorithms and data structures that have wide applicabilty.
3. Understanding of basic algorithm analysis techniques by applying math skills to asymptotic complexity.
4. Improved programming skills - especially data structures and graphs.

Textbook: Cormen, Leiserson, Rivest, Stein *Introduction to Algorithms, 2nd ed.*, MIT Press, 2001.

References: S. Baase, Computer Algorithms: *Introduction to Design and Analysis, 3rd ed.*, Addison-Wesley, 2000.

G.H. Gonnet and R. Baeza-Yates, *Handbook of Algorithms and Data Structures, 2nd ed.*, Addison-Wesley, 1991.

R. Sedgewick, *Algorithms, 2nd ed.*, Addison-Wesley, 1988.

Readings: Indicated on calendar later in syllabus.

Homeworks: 3 homeworks assigned with at least two weeks to do. These will not be graded.

Grade: Based on the following weights:

Exams: 80% divided evenly among 3 exams. Exam 3: Tues., Dec. 10, 5:30-8:00
Programs: 20% divided evenly among 4 assignments.

Policies:

1. Regular attendance is expected. You are expected to know lecture contents and announcements. I reserve the right to have surprise quizzes, each quiz being 2% of the semester grade taken from the 80% allocated to exams.

2. If you miss class or lose a handout, check the web page or come by during office hours.

3. You are expected to have read the assigned readings by the specified date. Lectures will review and augment the material, but will also consider exercises from the book.

4. CHEATING - YOU ARE EXPECTED TO KNOW UNIVERSITY POLICIES. If you are suspected of cheating, the matter must go through university channels outside of the CSE Department.

   a. **Academic Integrity Policy:** It is the policy of the University of Texas at Arlington to uphold and support standards of personal honesty and integrity for all students consistent with the goals of a community of scholars and students seeking knowledge and truth. Furthermore, it is the policy of the University to enforce these standards through fair and objective procedures governing instances of alleged dishonesty, cheating, and other academic/non-academic misconduct.

      You can assume responsibility in two ways. **First**, if you choose to take the risk associated with scholastic dishonesty and any other violation of the Code of Student Conduct and Discipline, you must assume responsibility for your behaviors and accept the consequences. In an academic community, the standards for integrity are high. **Second**, if you are aware of scholastic dishonesty and any other conduct violations on the part of others, you have the responsibility to report it to the professor or assistant dean of students/director of student judicial affairs. The decision to do so is another moral dilemna to be faced as you define who you are. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced.

   b. **Statement on Ethics, Professionalism, and Conduct of Engineering Students**: The statement is attached. Failure to sign the statement will result in 1) programming assignments to not be accepted, i.e. late penalty and 2) failure on exams.

5. Any request for special consideration must be appropriately documented in advance. (Special consideration does not include giving a higher grade than has been earned.)

6. Late programs are penalized according to the following schedule. LABS ARE DUE AT THE BEGINNING OF CLASS, NOT MIDNIGHT. After the due date, assistance will not be provided.

Degree of lateness	Penalty
Up to 4:45 next business day	10 pts
Up to 4:45 two business days	30 pts
Up to 4:45 three business days	60 pts

   Late labs are to be submitted to the CSE Dept. receptionist, who will timestamp the submission.

7. Each student will have available *one* 2-business-day (e.g. Friday to Monday is one day) no-penalty extension that may be applied to *one* of the lab assignments. To use your extension you must send an email to the grader ***before*** the due time.

   LABS MUST BE SUBMITTED AS HARDCOPY. NO EMAIL ATTACHMENTS!!!

   RESUBMISSIONS SUBMITTED BEFORE THE DUE TIME ARE PENALIZED 10 POINTS EACH. NO RESUBMISSIONS AFTER THE DUE TIME.

8. Each lab is graded as follows:

Output/Code	60%
Internal Comments	6%
Modularity	6%
Structure	6%
Variable Names	6%
Spacing	6%
Generality	10%

   If your program is not working correctly, you should show what portions of your program do work. All programs must execute on OMEGA and be written in C (or C++). You may develop your code on another system, but you must port it to OMEGA. Details for program submission will be included with each assignment.

9. Phone calls. I will not answer my phone during office hours if someone else is in my office. After the third ring the call is switched to the CSE office, so please leave a message with the secretary.

10. GTA duties:

    a. Provide first-level of assistance for homeworks and labs.
    b. Grade programs and short-answer test problems.
    c. Provide homework solutions.

11. Instructor duties:

    a. Lecture.
    b. Guidance
    c. Tests - preparation and grading long-answer test problems.
    d. Special consideration.
    e. Design homework and programming assignments.

12. Please email the following information to ?????? by Tuesday, September 3:

    a. Name.
    b. Last four digits of UTA student id.
    c. Additional email addresses.
    d. Special circumstances affecting your performance.
    e. (Optional) What do you hope to gain from this course?

Course Content (in chronological order)

1. Algorithmic Concepts (Chap. 1 & 2)
2. Growth of Functions (Chap. 3)
3. Summations (Appendix A)
4. Recurrences (4.1, 4.2)
5. Heapsort/Priority Queues (Chap. 6)
6. Quicksort (7.1, 7.2)
   Lower Bounds (8.1)
   Counting & Radix Sorts (8.2, 8.3)

Test 1: Items 1.-6.

7. Stacks/Queues (10.1)
8. Linked Lists (10.2, 10.3)
   Rooted Trees (10.4)
9. Binary Search Trees (12.1-12.3)
10. Red-Black Trees (13.1-13.4)
11. Hashing (11.1-11.4)

Test 2: Items 7.-11.

12. Graph Representations (22.1)
    Search (22.2, 22.3)
    Search-Based Algorithms (22.4-22.5)
13. Minimum Spanning Trees (23.1, 23.2 - omit Kruskal's algorithm)
14. Shortest Paths (24.3, 25.2)
15. Network Flows and Bipartite Matching (26.1-26.3)
16. Dynamic Programming (Chap. 15)
17. Greedy Algorithms (16.1-16.3)
18. KMP String Search (32.4)

Test 3: Items 12.-18.

Calendar - with subject numbers from course content

August/September				October			
27	Syllabus	29	1.	1	Test 1	3	8.
3	2.	5	3.	8	9.	10	10.
10	4.	12		15		17	
17	5.	19	6.	22	11.	24	12.
24		26	7.	29	Test 2	31	

November				December			
5	13.	7	14.	3	18.	5	
12		14	15.	10	Test 3		
19		21	16.				
26	17.	28	HOLIDAY				

November 15 is the last day to withdraw for both undergraduate and graduate students.