CSCE 310J  
Data Structures & Algorithms

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http://www.cse.unl.edu/~goddard/Courses/CSCE310J

Textbook


Course Overview

- An algorithm is a set of instructions that, when followed, solve a specific problem. Programs are implementations of algorithms that are executed by computers.  
- The computer science goals of this course are
  1. Study classic data structures and algorithms that solve common problems.  
  2. Learn standard approaches to solving new problems.  
- A rigorous approach to the analysis and comparison of algorithms will be followed that includes asymptotic notation and proofs of correctness.  
- Discrete mathematics, which forms the foundation for rigorous analysis, will be covered as needed. The course will involve substantial programming and written assignments.

Broader Objectives

- Learn critical thinking  
- Learn how to learn (on your own)  
- Learn how to communicate technical concepts  
- These objectives will be met through
  - interactive classroom discussions,  
  - challenging team assignments,  
  - written reports,  
  - regular quizzes, and  
  - a final examination.

Topics Covered

- The basics of algorithm analysis  
- Algorithmic techniques
  - Brute Force  
  - Divide-and-Conquer (Decrease-and-Conquer, and Transform-and-Conquer)  
  - Space and Time Tradeoffs  
  - Dynamic Programming  
  - Greedy Techniques  
  - Distributed Algorithms  
- An overview of the theory of computing
Prerequisites:
155 and 156

- **Mastery** of data structures including list, stacks, and queues.
- **Familiarity** with recursion.
- **Exposure** to complexity analysis.

Grading

- Assignments 30%.
- Class participation, peer and instructor evaluation 5%.
- Programming project 15%.
- Bi-weekly (15-20 minute) Quizzes 25%, and
- Final examination 25%.
- Note: There will be no midterm!

Grading

- A minimum grade of C is required for the course to count toward a CS/CE major or minor.
- A grade of C- does NOT count toward a CS/CE major or minor.
- No incompletes (I) will be given.
- Letter grades will be assigned at the end of the semester, using the percentage of possible points, as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>93-100</td>
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<td>60-62</td>
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<td>F</td>
<td>0-59</td>
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</tbody>
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Assignments

- Homework will be assigned approximately on a bi-weekly basis.
- Assignments will be a mix of individual and team assignments, which will include programming exercises and analytical (pen and paper) problems.
- Teams will be randomly selected for team assignments.
- All assignments will be due at 9pm on the day on which they are due.
- Assignments will be submitted via the Web-handin program.

Programming

- Computing platform: Linux
- Computing language: C++
- All programming must follow the IDE Coding Standard (see the course Web page).
- Program correctness is assumed
  - Less than 50% of the grade
  - Program design, style, analysis, documentation, and conformance to specifications account for a majority of the grade!

Quizzes

- Quizzes, given approximately every two weeks, will take the place of a midterm exam.
- 15-20 minutes in length.
- Format:
  - Brief explanation of concepts based on the reading assignment for pending lecture
  - At least one open question on material already discussed in class.
Late Homework

- Late homework is “OK” but...
  - Only if it’s not too late
  - You don’t miss class to get it done
  - You’re not late too often

Late Homework Details

- All homework submitted after its deadline is considered late.
- Assignments that are submitted within 24 hours after the original deadline are considered to be “one day late,” within 48 hours, “two days late,” etc.
- A late homework assignment will be accepted without penalty if the following conditions are met:
  - the total “lateness” of all homework assignments received to date (including the current assignment) does not exceed 3 days.
  - the student does not miss class on the day the assignment is due or on the day after the assignment is due.
  - Exceptions to this requirement must be approved by the instructor in advance.
- The penalty for late assignments is 25% per day they are late.
- Weekends count in evaluating the lateness of an assignment.

How to get an “A” in CSCE 310J

- Attend class regularly
  - Ask questions!
- Read the book
- Do the homework
- Study!

How to get a “D” in CSCE 310J

- Do not read the text and lecture notes in advance
- Assume getting copies of handouts is sufficient
- Don’t take notes in class
- Miss class
- Waste time playing on the Web

Course Conduct

- You may work in groups in understanding assignments.
- Developing approaches and strategies
- Learning to use the UNIX/Linux tools
- You may not
  - Develop joint solutions with other teams
  - Share code between teams
  - Copy anything
- All assignment solutions must be authored in full by your team!
- Individual assignments constitute a team of size one!

Summary

- We will
  - Study classic data structures and algorithms that solve common problems, and
  - Learn standard approaches to solving new problems.
- Assignments will involve team work, programming, analysis, critical thinking, and writing.
- Assignments will be based on business problems and integrated with your business class.
- This course will be a lot of work.
- Hopefully, it will also be fun!