Course Information

Aug 28, 2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Instructor</th>
<th>TAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>David Stephens</td>
<td>Jordan Degner</td>
</tr>
<tr>
<td>Phone</td>
<td>472-5793</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td>ylu at cse.unl.edu</td>
<td>davidstephens92 at gmail.com</td>
</tr>
<tr>
<td>Email</td>
<td></td>
<td>jdegner0129 at gmail.com</td>
</tr>
<tr>
<td>Venue</td>
<td>Kauffman 112</td>
<td></td>
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<tr>
<td>Time</td>
<td>TuTh 1:30pm-3:20pm</td>
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URL: [http://www.cse.unl.edu/~ylu/raik283/](http://www.cse.unl.edu/~ylu/raik283/)

Textbook


Prerequisites

CSCE/RAIK184H

Course Overview

Relevance and Broad description.

An algorithm is a set of instructions that, when followed, solves a specific computational problem. Programs are implementations of algorithms that are executed by computers. A data structure is a way of storing data in a computer so that it can be retrieved efficiently when required. Algorithms for problems such as sorting and graph reachability are at the heart of many real-life computer applications. The efficiency/correctness of these algorithms directly influence the efficiency/correctness of the applications. Often a well-designed data structure is critical for designing ultra-fast algorithms.

Learning Goals and Methods

The goals of this course are to study classic data structures and algorithms that solve common problems and to 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. A broader set of objectives for this course is to teach critical thinking, how to learn, and how to communicate technical concepts. These objectives will be met through lectures, challenging assignments, regular quizzes, and a final examination.

Topics to be Covered

- The basics of algorithm analysis including asymptotic notation, complexity classes, discrete mathematics, recursion and induction (proofs), creating and solving recurrence relations.
- Algorithmic techniques, including, brute force, divide-and-conquer, decrease-and-conquer, transform-and-conquer, space and time tradeoffs, dynamic programming, and greedy techniques.
- Theory of computing, including, finite state machines, the halting problem, tractable and in-tractable problems, complexity classes like P, NP, and NP-Complete.
- We will also cover some advanced topics like linear programming.

Textbook and Course Materials
Most of the lectures will be based on the text book Introduction to the Design and Analysis of Algorithms, Third Edition, by Anany Levitin, Addison Wesley. This is a required text book for the course. We will also cover essential topics from discrete mathematics as needed. The text book Discrete Mathematics and Its Applications, Sixth Edition, by Kenneth H. Rosen, McGraw-Hill (or any other standard text book on discrete mathematics) will be useful for this part.

Testing and Grading
This section describes grading guidelines. The instructor retains the authority to make changes if necessary. Your grades will be based on 4 homework assignments, several in-class quizzes, and a final comprehensive examination. Following table gives a guideline for evaluating your final marks.

<table>
<thead>
<tr>
<th>Class Participation</th>
<th>6%</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>50%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>24%</td>
</tr>
<tr>
<td>Progress Assessment Test (PAT)</td>
<td>2%</td>
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<tr>
<td>Final Exam</td>
<td>18%</td>
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Marks to Letter Grade Conversion
Following table gives the tentative conversion of marks to letter grades. It may be modified if necessary.

<table>
<thead>
<tr>
<th>A’ ≥ 97</th>
<th>B’ ≥ 87</th>
<th>C’ ≥ 77</th>
<th>D’ ≥ 67</th>
<th>F &lt; 60</th>
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<tbody>
<tr>
<td>A ≥ 93</td>
<td>B ≥ 83</td>
<td>C ≥ 73</td>
<td>D ≥ 63</td>
<td></td>
</tr>
<tr>
<td>A’ ≥ 90</td>
<td>B’ ≥ 80</td>
<td>C’ ≥ 70</td>
<td>D’ ≥ 60</td>
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Class Participation
Requirements include class attendance, active participation in discussions and in-class problem solving. During the lecture, please do not use laptop, iphone, or any device that pull your attention away from the class!

It is CSE Department policy that all students in CSE courses are expected to regularly check their email so they do not miss important announcements.

Homework Assignments
Homework will have two parts; a programming part and an analytical part (pencil and paper problem solving). There will be 4 homework assignments. You may expect one assignment every three weeks. Assignments are due at the beginning of the class on the given due date. A late homework assignment will be accepted without penalty if the total “lateness” of all homework assignments received to date (including the current assignment) does not exceed 3 days. Otherwise, late assignments will lose 25% of total points per day and hence you will not get any points for an assignment handed in 4 days late. Clarity and legibility of presentation of your submission are as important as your answers to problems. If the TA cannot easily read your writings, you may not be awarded full points even if you claim your answers are correct. You are very strongly advised to typeset your solution using some document processing systems.

Examination
There will be a comprehensive final examination scheduled during 1:00-3:00pm, Thursday, December 13.
Quizzes
There will be in-class quizzes approximately every two weeks. In these quizzes you will be asked problems based on the materials covered in the immediate past.

Progress Assessment Test (PAT)
As part of CSE's assessment of its academic programs, every student in this course must take a Progress Assessment Test (PAT) at the end of the semester. Some time between Wednesday of the fourteenth week of classes [November 28, 2012] and Wednesday of the fifteenth week of classes [December 5, 2012], you will take the PAT via a web browser in Blackboard. The PAT consists of 30-40 multiple choice questions based on content of this course. This exam will count towards 2% of your final grade, in a participatory fashion (you will get full credit for taking it).

Academic Dishonesty
All homework assignments, quizzes, exams, etc. must be your own work. No direct collaboration with fellow students, past or current, is allowed unless otherwise stated. The Computer Science & Engineering department has an Academic Integrity Policy. All students enrolled in any computer science course are bound by this policy. You are expected to read, understand, and follow this policy. Violations will be dealt with on a case by case basis and may result in a failing assignment or a failing grade for the course itself.

Special Needs
Any student in this course who has a disability that necessitates accommodation should contact the instructor as soon as possible to discuss the appropriate accommodations necessary to complete the course requirements.

Suggestion
I strongly encourage you to submit suggestions and/or comments that you may have regarding any aspect of the course by emailing me or the TAs.

The CSE Department has an anonymous suggestion box that you may use to voice your concerns about any problems in the course or department if you do not wish to be identified.

Other Supporting Resource
Student Resource Center in Avery 13A: http://cse.unl.edu/src