Algorithm Design and Analysis (CS3383), Winter 2019
Faculty of Computer Science, University of New Brunswick

Instructor: Rasoul Shahsavarifar
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Office hours: W 11:00 -12:00, GE107
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Lectures: MWF 13:30-14:20, ITC317
Tutorials: W 9:30-10:20, HC9

Overview

In this course, the basics of asymptotic analysis will be reviewed. A variety of different algorithm design techniques, including divide and conquer, greedy, dynamic programming, and backtracking will be introduced and compared. Randomized algorithms, multithreaded algorithms, NP-Complete problems and some reduction techniques will also be introduced. By the end of the course, students should be able to analyze the time complexity of different algorithms. They should also be able to recognize common and new problems, and design the related algorithms to tackle such problems. Finally, students will be expected to know NP-Complete problems, and apply some well-known reduction techniques where needed.

Prerequisites

- CS2333, (CS2383 or CS3323), and a course in Statistics (e.g. STAT2593 or STAT3083).

Text and Reference Material

- The primary textbook is: Algorithms by Dasgupta, Papidimitriou and Vazirani.
- A secondary reference is the lecture notes by Jeff Erickson: http://www.cs.uiuc.edu/~jeffe/teaching/algorithms/
- A good reference on algorithms is: Introduction to Algorithms by Cormen, Leiserson, Rivest and Stein. The UNB library has unlimited access to this as an eBook.

Component Percent and Evaluation

- Assignments 25 (10 assignments)
- Midterm 20 (Scheduled for Feb/25, unless subsequently changed)
- Quiz 5 (Scheduled for Mar/20, unless subsequently changed)
- Final 50 (Will be scheduled by registrar office)
- Note that you must pass the final exam to get more than a D in the course.

Course Content

- All course contents including lectures, notes, assignments, sample questions for the midterm and final exam, and ... will be posted on D2L.

Important Notes

- All tests and exams will be closed book, and no calculators or other aids will be permitted.
- Some material presented in class may not be in the textbook. All presented or assigned materials are testable.
- Assignment solutions (except the implementations if requested) may be either word processed or handwritten neatly. Points may be deducted if your work is sloppy or difficult to understand. Implementation questions can be completed in Java, C++, Python, or Racket. For implementations, what is to be handed in will be stated in the assignment question.
- Hand in all assignments in the CS3383 bin for your section on E level of Gillin Hall, before the tutorials on Wednesdays, 9:30 a.m.

Policy on Late and Missed Work

Assignments will not be accepted after the posted date and time. In the case of appropriately documented medical or compassionate reasons, the weight of missed tests and assignments may, at the instructors discretion, be transferred to the final exam. Nothing in this policy should be read as encouraging you come to class or use UNB labs when you are unwell. Remember that your first priority should be your health and that of your classmates. If you are going to miss a significant amount of lectures, an assignment or a test, contacting me by email beforehand will make things easier for both of us.

Technology in the Classroom

Technology like laptops and smartphones can be a useful part of the learning experience, but it can also be distracting. To help you resist the temptations of non-course related uses of your laptop, I reserve the right to observe what you are using your laptop for, and ask you to stop, or leave the class if I consider it inappropriate or distracting to other students. If you consider this draconian or an invasion of your privacy, you are welcome to leave your gadgets packed away during the lecture.

Plagiarism

- All assignments must be done and haded in individually by each student. If challenged by either the TA or the instructor, students must be able to reproduce and explain any solution they submit in an oral exam.
- Students must be familiar with UNB Regulations on plagiarism and other academic offences.
- The UNB regulations on Plagiarism and Academic offenses will be applied if needed. https://www.unb.ca/gradstudies/current/resources/regulations-and-guidelines/regulations/academic-offenses.html