CSCI 310 : Advanced Algorithms

Kris Ghosh
Fall 2018

College of Charleston

Who am I?

1. I am Kris Ghosh (rhymes with "Bose")
2. Ph.D in Computer Science from University of Cincinnati.
3. Research in Software Verification and Cybersecurity.
4. Courses: CS1, Algorithms, Software Engineering and Data Sciences.
5. Office: 315 HWE.
6. Email: ghoshk@cofc.edu
7. Office Hours: 1:30-2:30 MW and 1-2pm TR or by appointment.

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Why learn about Algorithms

- Computer Scientists
  - Foundational theory for the field
- Computer Engineers/Developers
  - Significant impact on application performance and correctness.
- Logistical planning in general
  - Scheduling? Sorting? Routing? Puzzles and games?

You need to understand

- Discrete Math and Logic
- Proof Techniques.
- Programming.

Most Importantly- Think Precisely to Find a Correct and Efficient Solution for a Given Problem!!

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Learning Outcomes of the course

- analyze the running time of algorithms for classic problems in various domains;
- apply algorithmic technique such as divide and conquer, dynamic programming, greedy techniques, backtracking, branch and bound, approximation techniques to solve problems
- identify algorithmic techniques appropriate to new problems
- analyze the complexity of problems
- distinguish tractable, intractable and unsolvable problems (P, NP, NP-Complete)

Course Materials

Knowledge about

- Assignments/Slides will be available on OAKS.
- Textbook-Anany Levitin, Design and Analysis of Algorithms, 3rd edition.

Grading

- Grade Distribution
  Midterm Exam (2 Exams) 40%
  Final Exam (Comprehensive) 25%
  Homework Assignments 30%
  Quizzes (Pop/Announced) 5%
- Top 70% of the Quizzes will be taken into consideration for final grade.
- To pass the course, students must earn a passing grade (70% or greater) on portions of the course: tests, final exam, assignments
- *You get the grade that you earn, so be sure that you earn a grade you like.*

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Quizzes

- Quizzes may be announced/pop.
- Assessment for you- How well you are understanding the concepts?
- Assessment for myself- How effective I am teaching?

Course Expectation

- Assignment may often require several hours for a perfect solution.
- At least 9 hours of study time a week is expected in this course.
- It will be a rewarding experience with the completion of the semester.
- Typically, emails are replied within 2-3 hours during the weekdays beginning from 8am-11pm.

Algorithm

An *algorithm* is a sequence of unambiguous instructions for solving a problem. i.e for obtaining a required output for any legitimate input in a finite amount of time.

Greatest Common Divisor

Problem: Find $gcd(m, n)$, the greatest common divisor of two nonnegative, not both zero integers m and n.
Example:
gcd(60,24) = gcd(100,80) = gcd(47,0) =

Assignment-1 Get-To-Know-You

It is uploaded on OAKS.

Before Next Class

Read Chapter 1 and Chapter 2.1