

CS 561, Lecture 0

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Today's Outline

- About Class
- Prereq Material

About Me

- Grew up in Georgia, USA; Lived in Palo Alto, Kyoto, and Seattle.
- Work in theoretical computer science: provable security for distributed algorithms
- Graduated dozens of PhD students, many recruited from this class. They have found industry positions at Amazon, Facebook, Google, and postdocs/academic positions at Yale, U. Virginia, Drexel, MSU, Loughborough.
- **Hearing: I am completely deaf in high frequency ranges**
 - If I mishear you, please **rephrase** your question/comment.
 - I often depend on lip-reading so may have a hard time with masks, I will ask you to write your question on paper. I definitely want to respond to your questions!
 - I will not hear a high-pitched alarm.

About Class

- Topics covered: Randomized Algorithms and Data Structures; Induction and Recurrences; Dynamic Programming and Greedy Algorithms; Graph Algorithms; NP-Hardness and Approximation Algorithms; Linear Programming and Gradient Descent
- This class assume knowledge of proofs (direct proof, proof by induction, contradiction, case analysis), asymptotic notation and recurrence relations, basic algorithms (such as sorting and search) and data structures (such as binary trees).
- You are **wasting your time here** if you haven't had the prereq material. Like sitting in on a Japanese III class if you haven't taken Japanese I and II.

Math and Proofs

- Class uses a mathematical methodology (theorems and proofs)
- This class is challenging, especially if you haven't done proofs before.
- Best way to study is to **solve problems, and re-derive proofs**
- This mathematical methodology is an **extremely** important tool in computer science
- We'll mostly be covering material that has only been discovered in the last several decades - and near the end of the class, in the last decade. I'm an expert in this area, and even I get stuck and make mistakes.

Administrivia

- Web page
- Syllabus
- Piazza (todo: sign up)
- There will be a 1 hour quiz on Tuesday. It will cover pre-req material including material in Pre-lecture 1 and 2, and Appendices of our textbook. Studying for it will help you recall pre-req material and determine if you're ready to take this class.

Homeworks

- You may work with others on hw problems, but **must write up solutions individually**. Wait at least 30 minutes after group discussions before writing up your solutions
- I will **not be** handing out solutions to problems. I am happy to help you if you are stuck via Piazza, office hours or lecture.
- *“The point of homework is not to solve that particular homework problem, but to practice solving a type of problem and get honest feedback on your progress. I’ve found that when solutions are available, my own students are much more likely to rely on them, rather than trying to figure out the problems themselves, which means they get both less practice and less honest feedback, which means they do worse on exams and in the course overall. And while I firmly believe that each student is ultimately responsible for their own learning, I also believe that it’s my responsibility as an instructor to help them. Putting dessert on the table does not help anyone eat their vegetables. - Jeff Erickson”*

Homeworks and Pedagogy

- For every 5 hours of work you do, you should ping me via Piazza or office hours.
- Ping can be a question, comment or your partial solution to a problem. Please do not struggle fruitlessly for hours and hours on homeworks without reaching out for feedback.
- I rely heavily on *worked examples* and *faded worked examples* in lectures and office hours. For math and physics, evidence shows it is one of the more effective teaching techniques.
- You will need to balance working hard on homeworks/exercises yourself with asking for help when stuck.

Todo

- Sign up for Piazza; review syllabus
- Study for quiz: Review Pre-req slides and Appendices carefully, solve problems.

This Week's Outline

- Pre-Req Material Lightning Review
- Randomized Algorithms and Data Structures