15:750
Graduate Algorithms

Instructors:
Anupam Gupta and Rashmi Vinayak

Lecture 1
Today

- Introduction
- Course overview
- Logistics
- Start with the topics
Course Staff

Instructors:
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TAs:
Michael Rudow
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Instructors

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Algorithms
   Approximation Algorithms
   Online and Stochastic Algorithms
   Graph and Network Algorithms

Metric Spaces and Embeddings
   Dimensionality and Dimension Reduction
Instructors

Rashmi Vinayak
http://www.cs.cmu.edu/~rvinayak/

TheSys Lab
Research in both Theory and Systems areas
Both theory and systems research

Using insights & tools from theory to build better systems

- Information & Coding Theory
- Probability and statistics
Both theory and systems research

Using insights & tools from theory to build better systems

Theory for systems

Systems inspired by theory

Formulate & solve theory problems based on real-world system challenges

Reliability and predictable (tail) performance:

- Distributed storage & Caching systems
- Machine learning systems
- Content delivery networks
- Live streaming communication
Course content overview
Learning goals

Cover algorithms and tools that give students the ability to

• recognize which tool or method to apply to problems,
• to become reasonably proficient at using these tools, and
• to be able to reason about the correctness and performance of the resulting algorithms
Switch to course schedule …
Required preliminaries

Basic linear algebra and probability
  - E.g., matrix/vector operations, conditional probability

Basic algorithms
  - Any undergraduate level algorithms course

Course website has some resources

HW0 is out – tests prerequisites
Course logistics
Course materials

• No mandatory textbook
• We will provide lecture notes / reading from books / slides
• Course website lists some good books that you can use as reference
Evaluation

32% each for midterm (March 16)
32% for finals (date TBD)
32% for homeworks (~6 HWs including HW0, dates on schedule)
4% for attendance/class participation in lecture or Piazza
Homework policy

• Groups of 2-3. Discuss with others *after trying by yourself*
• Need to write own solutions. Cite all collaborators and sources!
• Submissions on Gradescope

• For each homework, there will be a two-day (48 hours) no-questions-asked extension.
  • Can use this extension for any valid reason *without having to ask the instructors*.
  • Additional extensions only for exceptional circumstances
Communication

Piazza: all course related communication

- All technical questions should be discussed via Piazza
- Let’s not use private messages—if you have a question it is very likely other students have it too! (You can be anonymous to other students, of course.)

To contact the course staff for any private issues:

- Use the email list 15750-spring21-instructors@lists.andrew.cmu.edu
- Try not to use individual email unless necessary: ensures faster and coordinated responses.
Questions?