Welcome to CSE 521p
Applied Algorithms

Administrivia

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  — Office hours: Monday 5:30 – 6:15pm
• Course web page:
  — http://courses.cs.washington.edu/csep521

What is this course about?

• Algorithms in the modern era
  — approximation, randomization
  — Different models for how input is received and constraints on algorithms: online, streaming, high-dimensional

• Goal: expose you to a sampling of ideas, techniques, tools and applications.

Tentative list of topics

• Hashing and related topics
  — Universal hashing, perfect hashing, load balancing, min-hashing, locality sensitive hashing, and applications to streaming

• Linear programming
  — Duality + applications, then bit of convex optimization

• Online learning
  — Multiplicative weight updates, applications and extensions

• Dealing with high-dimensional data
  — Dimensionality reduction, low rank approximation, etc.

• Sampling of other topics
  — ??

Goals

• To introduce you to some of the fundamental ideas that have become important in algorithms in the last 20 years.

• To show you how much fun, beautiful and clever these ideas are.

• To convince you that knowing more about algorithms and theory will serve you well.

• To help you develop a toolkit and a comfort level that is useful in all walks of (computer science) life.

Background expected

• Discrete math at level of CSE 311

• Introductory probability at the level of CSE 312:
  — Probability space, random variables, basic distributions, independence, conditional probability, expectation, tail bounds

• Intro algorithms and data structures (e.g., CSE 332)

• “Mathematical maturity”
Workload

- 5-6 problem sets (60%)
- Project (40%)
  - Must work in pairs.
  - One-page pre-proposal due by April 28
  - Final (10 page) paper due on June 1.
  - Will be posted to class discussion page.
  - You will be commenting on each others papers
  - Each group will give a short presentation as well.

Other

- No book, but I’ll post lots of references.

- Questions?