Welcome to CSE 521p!
Applied Algorithms
Administrivia

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• 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.
Sample topics

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

• **Lossy Compression**

• **Basics of learning theory (generalization and regularization)**

• **Linear programming**
  – Duality + applications, bit of convex optimization

• **Online learning**
  – Multiplicative weight updates, applications and extensions

• **Dealing with high-dimensional data**
  – Dimensionality reduction, low rank approximation, etc.
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)
• Some basic linear algebra
• “Mathematical maturity”
Workload

• 5-6 problem sets (60%)
• Project (40%)
  – Must work in pairs.
  – One-page pre-proposal due by February 4
  – Final (8-10 page) paper due on March 11.
  – Will be posted to class discussion page.
  – You will be commenting on each others papers
  – Each group will give a short presentation as well.
  – Read project guidelines before next class!!
Other

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

• Questions?