Computer Science 124

• Algorithms and Data Structures
  – The CORE for all other classes.
• Question: How do we solve problems efficiently?
  – What does efficient even mean?
  – What resources are important?
• Connecting theory and practice.
  – What can we prove, mathematically, about performance?
  – How does this translate – or not – into reality?
    • Problem sets AND programming assignments.
  – What can we do with problems that are too hard to prove anything useful about?
Computer Science 124 : Topics

• An Algorithmic Toolkit
  – Graph Algorithms
  – Greedy Algorithms
  – Divide and Conquer
  – Dynamic Programming
  – Linear Programming
  – Modeling
  – Reductions!
Computer Science 124 : New Ideas

• Using randomization
  – Flipping coins can help you solve problems.

• Approximation algorithms
  – You don’t always need to get the right answer.

• Heuristic algorithms
  – Good ideas we can’t prove much about.
Computer Science 124: Who Should Take It

• CS 124 is all about developing techniques for solving problems.
• This is what CS is all about!
  – Take a problem.
  – Model it.
  – See if a solution already exists.
  – Or if a solution for a similar problem can be tweaked.
  – Or if some general technique applies.
  – Or….
• Everyone who wants to use computers to solve problems should take the course!
  – Good preparation for job interviews – or graduate school!
• I hope to see you there!