1 Administrative

- Midterm Exam 2: Wednesday, November 23
  If you will be out of town
  - contact me, if you have not already done so
  - you must take it afterwards (11/28)
- Homework 04
  - Posted before exam, due after exam.
  - Examples of questions related to recent topics.

2 Midterm Exam 2 Topics

Topics:

- using the algorithms and data structures covered previously
  - heaps, sorting, etc
- binary search trees (BST)
  - BST definitions, invariants
  - the algorithms that implement BST operations
  - using BST operations
- dynamic programming
  - properties of problems that allow DP
    * optimal substructure
    * overlapping subproblems
  - examples of DP problems and solutions: LCS, change-making, optimal BST, etc
– top-down vs bottom-up
– analysis of run time, space
• greedy algorithms
  – properties of problems that allow greedy solution
    * optimal substructure
    * “greedy choice” property
  – examples of greedy algorithm problems and solutions: Huffman codes, change-making (sometimes), activity selection (count)
  – analysis of run time, space
• amortized analysis
  – variants: aggregate vs accounting vs potential
  – examples of amortized analysis binary counter, dynamic tables (growable arrays),
• graph walks
  – definitions of graphs, trees, paths, cycles, etc
  – algorithms: BFS, DFS, SCC
  – ...
Not covered:
• graph flow algorithms (next week)
Not directly covered:
• topics from the previous midterm
  But new questions may rely on the foundations of old material.

3 Graphs

3.1 Depth-First Search
(slides)