CS 624: Notes 18

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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)