CS3000: Algorithms & Data
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Lecture 18:

- Review for Midterm II

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Dynamic Programming

- How to think about dynamic programming
- Writing recurrences
- Top Down Algorithms
- Bottom Up Algorithms
- Time and Space Complexity
- Adding Additional variables
- Be familiar with problems mentioned in class

Can you write the soln to an instance of your problem in terms of a soln to a smaller instance?

Assume you have an oracle for smaller problem sizes

Graphs

directed, undirected, cycle, simple, connected

- Basic Definitions
- Representations of Graphs
- Bipartite Graphs and Two Coloring
- Distance between nodes in a graph
- Breadth First Search
  - BFS Tree
- Depth First Search
  - DFS Tree
  - Types of edges (tree, forward, backward, cross)
- Topological Ordering

adjacency matrix
adjacency list

use BFS for 2-coloring

length of shortest path connecting those 2 nodes

connectivity of graph
distance between nodes

pre order vs post order