CSCI 311 - S24:
Exam 2 Study Guide

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Learning Goals

This is an outline of the things you have learned so far. Problems on the exam will reference these, showing why these problems were selected to test your knowledge. This outline is not complete–at a minimum, material from quizzes, homeworks, and recitations may also appear.

1. From Exam 1:

    (a) Background & Definitions

    (b) Proof Techniques

    (c) Algorithmic Analysis

    (d) Divide & Conquer

2. Dynamic Programming

    (a) Formal Outline

    (b) Bottom-Up vs. Top-Down/Memoization

    (c) Subproblem Graphs

    (d) Requirements: Optimal Substructure, Overlapping Subproblems

    (e) Examples: Fibonacci, Rod Cutting, Matrix Chain Multiplication, Knapsack Problem

3. Greedy Algorithms

    (a) Examples: Activity Selection, Fractional Knapsack, Binary Character Encoding, Huffman Codes, Scheduling with Deadlines

    (b) Outline for Correctness Proofs

    (c) Requirements: Optimal Substructure, Greedy Choice Property

4. Data Structures

    (a) Abstract Data Types

    (b) Data Structure Definition

    (c) Trees

        i. Tree Representations
        ii. Binary Search Trees