CSCE 311 - S24:
Exam 3 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 Exams 1 & 2:

    (a) Background & Definitions

    (b) Proof Techniques

    (c) Algorithmic Analysis

    (d) Recursive Optimization Paradigms:

         i. Divide & Conquer

         ii. Dynamic Programming

         iii. Greedy Algorithms

2. Data Structures

    (a) Abstract Data Types

    (b) Data Structure Definition

    (c) Trees

         i. Tree Representations

         ii. Binary Search Trees

         iii. Red-Black Tree Overview

         iv. B-Trees

    (d) Disjoint Sets

3. Amortized Analysis

    (a) Usage

    (b) Methods of Amortized Analysis:

         i. Aggregate

         ii. Accounting

         iii. Potential

    (c) Examples: Queue from Two Stacks, Stack with Multipop, k-Bit Binary Counter, Dynamic Table, Disjoint Sets

4. Graphs

    (a) Representation: Dynamic, Adjacency List, Adjacency Matrix

    (b) Searching: BFS, DFS

    (c) Applications of DFS: Topological Sort, Strongly Connected Components