Summer 2003 CMSC 451: Homework 4 Instructor: Ken Hennacy

Midterm 1 Study Sheet

Emphasis is towards Dynamic Programming.

1. Recurrences
    a. Psuedocode implementation (top down and bottom up).
    b. Derivation of recurrences from first principles.
    c. Application of the Master Method (provided on test).

2. T(n) [Worst or Average Case as appropriate] for various types of sorting.
    a. Insertion Sort
    b. Merge Sort
    c. Heap Sort
    d. Quick Sort
    e. Counting Sort
    f. Algorithmic Analysis in general

3. Binary Trees
    a. Definition and use
    b. Optimization utilizing dynamic programming

4. Assembly Line Problem, Matrix Multiplication

5. Memoization

Points to consider:

1. Difference between performing cost calculations of an algorithm T(n), and cost calculations associated with an algorithm (Ex: matrix mult. & opt. binary search tree).
2. Impact of Tree Structure on T(n) for various algorithms that use trees.
3. Understanding why you have to use big O notation as opposed to θ.
4. Understanding how to split a problem up into smaller subtasks that are identical to the larger task. Adding the appropriate terms to this division process to complete a recurrence.
5. For remembering T(n) dependencies, understand the algorithm's operation, i.e. is it dependent on "divide and conquer", explicit loops, or data structures? Does it involve comparisons?