CSE 331 Data Structures and Algorithms

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What we’ve covered this semester

Covered in Recitation 1
• Asymptotic Analysis
• Insertion Sort
• Merge Sort
• Master Theorem
• Heap
• BST
• AVL-Tree

Covered in Recitation 2
• Hashing
• Graph
  • BFS (Breadth First Search)
  • DFS (Depth First Search)
  • Topological sort

Covered in Recitation 3
• MST (Minimum spanning tree)
• 0/1 Knapsack Problem
• Dynamic Programming
• Activity Selection Problem
• Dijkstra’s Algorithm
• Bellman-Ford Algorithm

Covered in Recitation 4
• Approximation Algorithms
  • TSP (Traveling Salesman Problem)
Study Suggestions

1. Go back through Midterm and Homework and redo the problems: Skip over problems you know how to do well, but redo the problems you have issues with. Use the solutions and notes to guide your understanding of the topics the problems cover.

2. If you have time: do a running time analysis for the algorithms and operations on the data structures we’ve covered. Ask yourself if you understand what the algorithm or operation is doing at each of its steps.
Example Running Time Analysis:

Insertion sort running time analysis using RAM model: 

1. For j = 2 to length[A] // where A is an array 
2. \( \text{do key} = A[j] \) // set key = element j in A 
3. // insert A[j] to sorted list A[i... j-1] 
4. \( i = j - 1 \) 
5. \( \text{While } i > 0 \text{ and } A[i] > key \) 
7. \( i = i - 1 \) 
8. \( A[i + 1] = \text{key} \)

\( \text{Cost of operation} \)
1: n
2: 1
3:
4: 1
5: up to n, best case 1
6: 1
7: 1
8: 1

Hence best case is linear \( O(n) \)
And worst case is \( O(n^2) \)