

Final Exam Review

Final Exam Duration: 2.15 HRS

Portion: Chapter 11-17

Thursday: 9.45 AM – 12.15 PM

Excluded Chapter 13: 2-4 Trees (not in the exam)

It Consists of the following,

- True or False, give your answer why it is true or false
- Multiple choice questions
- Brief answers
- Able to trace manually the working principles learned.

Note: You will get the True/False and MCQs only from Lesson-16 & 17. Not from other lessons.

Prepare yourself in the following areas,

1. Dictionary ADT

- Hash Table pseudo code (find, insert and deletion) for linear probing and its runtime analysis.
- Able to know how hash table works and its Collision strategies such as Separate chaining and open addressing (Linear probing, Quadratic probing and Double hashing).
- Initial table will be given with some inputs. Able to insert two or three inputs in the table by applying the required collision strategy specified in the problem.

2. Balanced Trees:

- Partial BST tree will be given. You have to perform one or two deletions from BST.
- Partial AVL tree will be given. You have to insert two elements in the given tree by following its rotations or convert the unbalanced BST to AVL Balanced Tree.
- Partial Red black tree will be given. You have to insert two elements in the given tree by following its rules of 4a and 4b.

3. Graphs

- **Undirected Graph:** Able to write the Pseudo code for DFS and BFS. Able to manually trace-out DFS and BFS steps for the given graph to retrieve the spanning tree. Able to analyse the performance of BFS and DFS algorithm.
- **Greedy Technique:**
 - What is Greedy approach and example problems.
 - Explain in detail of how Fractional Knapsack problem applying Greedy approach. Able to analyse its time complexity?
 - Explain in detail of how Dijkstra's algorithm uses the Greedy approach to find the shortest path. What is its time complexity?
- **Minimum Spanning Tree:**
 - About Cycle property.
 - Generic MST Algorithm template.
 - Able to work with Prim's algorithm step by step.
 - Kruskal's Pseudo code(Slide-33)and its step by step working procedure.
 - Runtime analysis of Prim's and Kruskal's.