SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Advanced Data structures and Algorithms (16CS5804)

Course & Branch: M.Tech.- CSE

Year & Sem: M.Tech & I-Sem **Regulation:** R16

UNIT –I

Overview of Data Structures, Algorithm Analysis

1. A) what is stack? Explain stack ADT and implementations? 5M
   B) Explain stack applications? 5 M
2. What is LINKED LIST and explain STACKS Using LINKED LISTS? 10 M
3. A)Explain Big-O Notation? 5 M
   B) Define Space Complexity? 5 M
4. A)How can we find the time complexity of an Algorithm? Explain? 5 M
   B)Write a program for Towers of Hanoi? 5 M
5. A) What is Queue? Explain Queue operations using arrays? 2M+8M
6. A) Convert the given infix expression (A+B) ^ C^ D * E –F/G into postfix expression? 6M
   B) Write about Representation of Arrays? 4 M
7. A) Write a recursive algorithm for permutation generator? 5 M
   B) What is Apriori analysis? 5M
8. Explain about Circular Queues using arrays with examples 10 M
9. Explain different linear data structures for inserting and deleting the elements. Discuss their applications. 10 M
10. A)Write about Polynomial Vs Exponential Algorithms? 5M
    B)what is average, best and Worst Complexities? 5M

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UNIT –II

Trees and Graphs

1) A) Write about Threaded Binary Tree? 5 M

B) Explain about various Representation of Binary Tree? 5 M

2.Explain Tree Traversing Techniques With suitable examples?

3. A) Write about Expression Trees? 5 M

B) Explain different types of Binary Trees? 5 M

4.Explain the following Tree terminologies A)Root node B) Children C)Siblings 10 M
D)Level E)Ancestor F)Leaf Node G)Height of Binary tree

5. Explain various applications of Binary Trees? 10 M

6. Define DFS? Write the DFS Traversing algorithm with example? 10 M

7. Define BFS? Write the BFS Traversing algorithm with example? 10 M

8. Explain the following Graph terminologies A) Connected Graph B) Weighted Graph
C) Sub Graph D) Isomorphic Graph 10 M

9. With suitable examples explain representation of Graphs? 10M

10 A) Represent graph as adjacency list and adjacency Matrix? 5 M

B) Explain about applications of Graphs? 5 M

UNIT –III

Binary Search Trees, AVL Trees and B Trees, Red – Black Trees, Splay Trees and Hash Tables

1. What is Binary Search Tree? Explain insertion & Deletion algorithms with an examples? 10M

2. What is B-Tree? How do you construct the B-Tree? Explain with example? 10 M

3. Construct the AVL Tree given the list of elements 10M
   S={ INDIGO, GREEN, CYAN, YELLOW, RED, ORANGE, VOIOLET ,PINK} and
   DELETE YELLOW,RED ? 10 M

4. A) Define B tree and give its applications? 5M
   B) Write about Multi way search trees? 5M

5. Write and explain the various possible rotations that can be performed on height balanced binary search trees?

6. A)Explain about RED BLACK Tree & its properties? 5M
   B) Write about AVL Tree applications? 5 M

7. Explain Hashing Techniques in detail with examples? 10 M

8. Define Hashing and Write about different Hashing functions? 10 M

9. Explain Red-Black tree insertion operations with examples ? 10 M

10. What is Splay Tree? Explain operations in detail? 10 M

UNIT –IV

Divide – and – Conquer & Greedy Method

1. Write about single source shortest path by using Greedy method?	10M
2. Write Merge sort algorithm with example?	10M
3. Write Quick sort algorithm with example?	10M
4.Explain Minimum Cost Spanning Tree using Prim's Algorithm with example?	10M
5. A)Explain General Method of Divide –and – Conquer?	5M
B)Write algorithm for Binary search ?	5M
6. Explain Minimum Cost Spanning Tree using Kruskal's Algorithm with example?	10M
7. Write about Strassen's Matrix multilplication with suitable example?	10M
8. A)Explain Control abstraction for Greedy Method?	5M
B) Explain Binary search with an example?	5M
9. Write algorithm for Finding Max- Min with suitable Example?	10M
10. A) Sort the following elements using Quick sort?	6M
24 56 88 29 97 40 69 57 12 38	
B) Write short notes about Minimum cost spanning trees?	4M

UNIT –V

Dynamic Programming, Back Tracking and Branch – and – Bound

1. What is 0/1 knapsack problem? Explain example by using Dynamic programming? 10M
2. Explain about All Pairs Shortest path Problem with example? 10M
3. Write short notes on
   A)Graph coloring Problem 5M
   B)LC Search 5M
4. Explain Travelling Sales man problem in detail? 10M
5. A) Write general method of Dynamic Programming? 5M
   B) Explain how backtracking is applied for 4 Queen's Problem? 5M
6. For the following instances of Knapsack n=3 ,m=20, (p1,p2,p3) = (25,24,15) & (w1,w2,w3) = (18,15,10) find the feasible solution using dynamic knapsack? 10M
7. Write about 8 Queen's Problem using Backtracking with example? 10M
8. A)Write about Branch and Bound in detail? 5M
   B) Explain different types of searching techniques in Branch and Bound? 5M
9. Write about Branch and Bound Travelling Sales man problem in detail? 10M
10. Explain 0/1 knapsack problem using Branch and Bound with example? 10M

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