BCS304 SIMP Questions -22SCHEME

BY TIE REVIEW TEAM

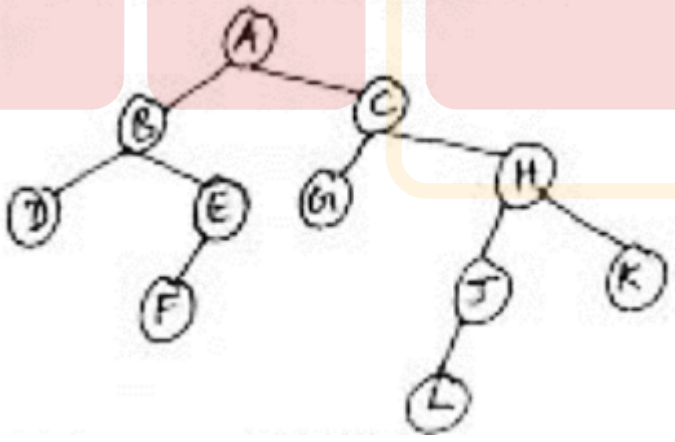
Module-1 to 5 SIMP

1. **What is Data Structures? Classify and Explain them briefly. Also explain the basic operations that can be performed on data structures. List out the applications.**
2. **Define Pointers. Give advantages and disadvantages of pointers.**
   How do you declare and initialize the pointer? How do you access the value pointed to by a pointer?
3. **Differentiate between static and dynamic memory allocations, What are the different types of memory Allocation? Explain the Different functions that supports Dynamic Memory Allocation - 3+7M**
4. **Explain Traversing, inserting, deleting, searching, and sorting operations with a programming example or an algorithm in an array**
5. Define Arrays. Explain different types of arrays. How can a one-dimensional array be initialized? Explain with example
6. **Define structure and different type of structures,Explain how a structure can be represented in C and also define union**
7. What is a sparse matrix? Briefly explain it with an example.
8. **Explain String function with an example.**
9. **Define stack and its application and List and implement pop, push, isempty, isfull operations in stack using C, briefly explain how array can be implemented in a stack -12M**
10. **What is recursion? Give two conditions to be followed for successive working of recursive programs. Write a 'c' recursive program to solve the tower of Hanoi problem.**
11. **Write a function to evaluate the postfix expression. Illustrate the same for the given postfix expressionPQR-*+" assuming P=5, Q=3, and R=2..**

12. **Differentiate between Circular queue, Linear queue and Priority queue**
    With a c program representing different functions(Insert,delete.display-Write syntax only), advantages and its working -12M
13. Explain how to implement a queue using dynamically allocated array(Take circular queue as example)
14. **Give differences between SLL and DLL. How are they represented (Order), Explain different functions of SLL and DLL using syntax of a programming example**
15. **Distinguish arrays and linked lists Explain advantages of circular lists with respect to other lists.**
16. **Explain how queue and stack are represented using SLL**

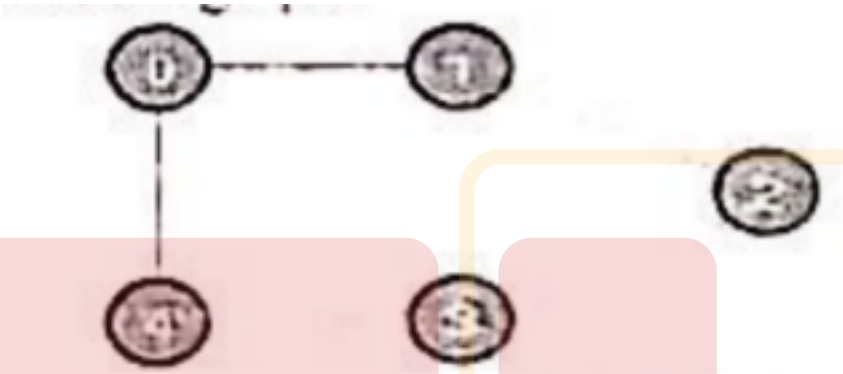
17. **Explain how a chain can be used to implement a queue. Write the functions to insert and delete elements from such a queue.**
18. **Write a C function to multiply two polynomials. Show the linked representation of the below two polynomials and their multiplication using a circular singly linked list:**
    P1: 3x^2 + 2x + 5 P2: 4x^3 + 6x^2 + 2x
    Output: Multiply the above two polynomials and represent them using the linked list..
19. **Write a function to display nodes of a DLL in reverse order. Write a function to delete all nodes in SLL and DLL.**

20. **Describe DLL with advantages and disadvantages. Write C function to delete a node from DLL, ptr is a pointer which points to the node to be deleted. Assume that there are nodes on either side of the node to be deleted.**
21. **Explain how a node is inserted at the beginning and end of a DLL, also explain how a DLL can be reversed**
22. **Define the following: i) Skewed binary tree ii) Complete BT iii) Strictly binary tree iv) Binary Search Tree v) Depth of a tree vi) Sibling vii) Degree viii) Internal Node ix) Ancestors x) Leaf Node**
23. What is a tree, explain different types and applications of trees
24. What is a binary tree, what are the different ways of representing a Binary tree? Explain with an example. Give the structure declaration of a node in a binary tree.
25. **Construct a binary tree from the given preorder and inorder sequence:**
    Preorder: ABDG CHIEF Inorder: D G B A H E I C F
    Inorder: 4-8-2-5-1-6-3-7 Postorder: 8-4-5-2-6-7-3-1
26. **Find the Inorder, Preorder and Postorder traversal for the following:**

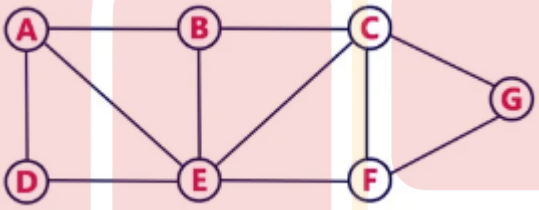


27. **With an example describe Binary Tree Level order traversal. Write the C function to perform Binary Tree Level order traversal.**
28. **Define a threaded binary tree. What are the advantages of threaded binary tree over binary trees?**

29. **Write recursive functions for the following operations on BST:**
    i) Insert_key() ii) Delete_key() iii) Search_key()
30. **Construct BST for the following: 22, 28, 20, 25, 22, 15, 18, 10, 14**
31. How do you create a note and delete it in BST, State the rules and also design a C program to create a Binary Search Tree of N Integers.
32. **Define the Graph, for the given graph show the adjacency matrix and adjacency linked list representation of the graph**



33. **Obtain DFS and BFS traversals for the given graph.**



34. **Explain the following terminologies with respect to a graph?**
    • Degree of a node * Weighted graph * Adjacency matrix • Connected graph * Complete graph * Directed Graph • Subgraph * Multigraph
35. **What is the Spanning tree of a graph? Explain with an example how a spanning tree is constructed using DFS traversal.**
36. **What is hashing? What are the key components of hashing? List the different types of hashing functions. Briefly explain each of them.**
37. **What is a priority queue? How can a priority queue be implemented? How do you decrease the priority at any point, Explain?**
38. **What is an Optimal Binary Search Tree (OBST)?Explain the concept of "search cost" in the context of Optimal Binary Search Trees, How is the cost calculated**
39. **What is the time complexity for constructing an Optimal Binary Search Tree using dynamic programming?**
40. **Explain Static and Dynamic Search keys in OBST**