

Data Structure using C (CS-301)

Q1. Write an algorithm to convert a valid arithmetic infix expression into its equivalent postfix expression. Trace your algorithm for

A-B/C+D*E+F

Q2. Use quick sort algorithm to sort 15,22,30,10,15,64,1,13,9,52. Is it a stable sorting algorithm- justify

Q3. Discuss the different cases of rotations in AVL tree.

Q4. Explain circular queue and priority queue data structure in detail?

Q5. (I) How can we represent a polynomial in a linked list? Write an algorithm to add two polynomials represented by linked list?

(II) Explain the term garbage collection compaction?

Q6. Define tree. How a tree can be stored in memory. Explain with an example?

Q7. If the inorder traversal of a binary tree is BIDACGEHF and its postorder traversal is IDBGCHFEA, determine the binary tree?

Q8. Write a program in C for binary search and what is the worst case time complexity of binary search?

Q9. Write an algorithm to insert and delete a node from a doubly linked list, illustrate with an example. Use your algorithm to develop a function in C?

Q10. (I) Obtain the minimum number of entries that can be made in a B-Tree of order m and of level l .

(II) Use merge sort algorithm to sort the following elements

15,10,5,20,25,30,40,35

Q11. Write down the algorithm for bubble sort and explain how you can sort an unsorted array of integers by using quick sort? Find out the time complexity of your algorithm?

Q12. Define Hash function. State different types of Hash function, give their algorithm and explain them by suitable diagrams?

Q13. Write the function in C to insert and delete a node in an existing binary search tree.

Q14. The preorder and inorder traversals of a binary tree are given below, construct the binary tree.

Preorder: EAFKCDHGB

Inorder: EACKFHDBG

Q15. Explain the followings

(I) Heap Sort (II) Radix Sort

Q16. Convert the following Infix expression into Postfix expression

$A*(B+D)/E-F*(G+H/K)$

Q17. What is tower of Hanoi problem ? Explain the solutions of the tower of Hanoi problem where the number of disks are 4 and number of pegs are three?

Q18. Define the recursion. Write a recursion and non-recursive program to calculate the factorial of the given number?

Q19. Write an algorithm to evaluate an expression given in postfix notation?

Q20. Explain the tree traversals and write algorithm for inorder and postorder traversal of a binary tree?

Q21. What is STACK. Write the algorithm for PUSH and POP method?

Q22. Explain the circular link list and illustrate it by writing the C code?

Q23. Explain the steps of selection sort with example? Write a C code to sort a list using selection sort?

Q24. Explain D-Queue and its types in detail?

Q25. Write a C code to delete an element from doubly link list?

Q26. Explain the following

a) Explain pointer with the help of example?

b) What is dynamic memory allocation explain it with the help of Syntax.

Q27. Explain Binary search tree and its property in detail. Also describe the functioning for inserting and deleting an element?

Q28. Explain Hash function. Explain Collision resolution strategies.

Q29. Write an algorithm to count the number of nodes between given two nodes in a linked list?

Q30.

(I) Explain the merits and demerits of static and dynamic memory allocation techniques?

(I) Define tail recursion by giving suitable example?