FYUG Even Semester Exam., 2024

COMPUTER APPLICATION

(2nd Semester)

Course No. : CADSC–151T

(Data Structure)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* of the following questions : 2×10=20

1. Define single-dimensional array with example.

2. What is sparse matrix?

3. What is recursion? What are the properties of recursion?

4. What is skip list?

5. Define doubly linked list with example.

6. What do you mean by input restricted and output restricted deque? Give examples.

7. What are the different types of traversals in a binary tree?

8. What is complete binary tree? If n be the total number of nodes in complete binary tree, what will be the height of the tree?

9. What is a heap tree? Give example.

10. What is bubble sort? What is the time complexity of bubble sort?

11. Write down the difference between linear searching and binary search algorithms.

12. Write the drawbacks of selection sort.

13. What is a hash table?

14. Define folding method with example.

15. What is collision in hashing?

SECTION—B

Answer any *five* of the following questions : 10×5=50

16. What is stack? What are the different types of operations that are performed on a stack? Write down the algorithm of those stack operations.

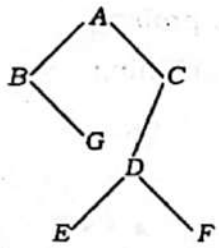
17. Write down the algorithm to evaluate postfix expression. Convert the following infix expression into postfix using stack.

$$A+(B*C-(D/E\uparrow F)*G)*H$$

18. Write an algorithm to insert and delete an element in a singly linked list.

19. What are the different operations that can be performed on queue? Explain with algorithm.

20. How are binary tree represented in memory? Explain. Find the pre-order, inorder and postorder traversal of the following binary tree :



21. Construct a binary search tree from the following node value :

40, 20, 60, 30, 10, 80, 50, 45, 55, 30

What is threaded binary tree? Write down its advantages and disadvantages.

22. Write the algorithm for binary search. Let data be the following sorted 10 element array :

Data : 11, 22, 30, 33, 40, 44, 55, 69, 66, 77

Apply the binary search technique to search elements 44 and 68.

23. Explain quick sort algorithm with suitable example.

24. What is a hash function? What are the characteristics of good hash function? Consider a hash table of size 10, using linear probing, insert the keys 72, 27, 36, 24, 63, 81 and 92.

25. Define the following :

(a) Linear probing

(b) Quadratic probing

(c) Separate chaining

(d) Double hashing

(e) Hash key

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