

G 2117

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2010

Fourth Semester

Branch : Computer Science and Engineering

DATA STRUCTURES AND PROGRAMMING METHODOLOGIES (R)

(2008 admissions—Regular—2007 admissions—Improvement/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Distinguish between Time Complexity and Space complexity in algorithm design.
2. Explain the significance of documentation.
3. What is an abstract data type ? Explain with example.
4. What is the value of the following postfix expression ?
5, 7, 9, *, +, 4, 9, 3, /, +, —.
5. Explain the sequential representation of strings.
6. What are the advantages and disadvantages of circular linked list ?
7. How would a binary tree look if the inputs were already ordered in ascending order ? Explain with an example.
8. Explain “in order” and “pre-order” traversal of a binary tree.
9. What according to you is the most efficient sorting algorithm ? Give reasons.
10. Compare selection sort and bubble sort.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. Explain scalar, primitive and enumerated data types with examples.

Or

12. Describe any *two* algorithm design techniques with examples.

Turn over

13. Develop an algorithm to add two sparse matrices. Assume that matrices are stored in Triplet form.

Or

14. Describe priority queue. Explain the manipulations on this ADT with suitable pseudocode.
15. Develop an algorithm to insert and delete elements into and from a doubly linked list.

Or

16. Write an algorithm for the implementation of linked stack and explain how insertion and deletion are done.
17. Write an algorithm for finding the shortest path between two nodes of a directed, weighted graph. What is its complexity?

Or

18. Explain the following with examples : —

- (a) Height of a binary tree.
- (b) Sibling.
- (c) Skewed binary tree.
- (d) Complete binary tree.

19. Develop an algorithm for Quick Sort. Trace it with the following data 7, 6, 2, 3, 5, 4, 9, 1. Write Best Case average case and worst case time complexity.

Or

20. Write the algorithm of merge sort. Explain it with examples.

(5 × 12 = 60 marks)