

2124
B.E. (Electronics and Communication Engineering)
Fifth Semester
EC-507: Data Structure and Algorithms

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. Answer the following:

- a) What are the key differences between a graph and a tree?
- b) Differentiate between Traversing and Searching.
- c) Differentiate between Stacks and Queues.
- d) Differentiate between Merging and Concatenation.
- e) Construct a binary tree for the following expression
 $(6x-5y+10)(8z-3+4t)$

(05x2=10)

Section A:

2. a) Simulate the Bubble Sort algorithm to sort the letters in 'ISTANBUL' (N = 8). Determine the number of comparisons (C) and interchanges (D) required during the sorting process.
b) Explain Deques and Priority Queues?
(07+03)
3. a) Explain different types of data structures with examples.
b) Assume a linear arrays SSS (6:60), TTT (-10:10) and UUU (20)
i) Find count of elements in each above linear arrays.
ii) Suppose Base (SSS) = 400, and w = 6 words per memory cell for SSS. Find the address of SSS [30], SSS [65] and SSS [45].
(07+03)
4. a) What is meant by computational complexity of an algorithm? What are the different notations used for complexity analysis of an algorithm.
b) Using the infix and postfix expressions given below trace the corresponding expression tree:
Infix: $A+B*C/F^H$, Postfix : $ABC*FH^/+$
(Where ^ means exponential, / means division, * means multiplication).
(05+05)

Section B:

5. a) Define a hash function. Discuss using suitable examples some methods of obtaining hash function.
b) Explain linked representation of graphs. State its pros and cons.
(05+05)
6. a) How do various sorting techniques differ? Explain how can they be compared based on their time and space complexity?
b) Discuss different tree traversal algorithms. Construct a binary search tree T with numbers 38, 14, 45, 8, 23, 18, 70, 56, 82 entered in order to empty binary search tree and find preorder traversal.
(05+05)
7. a) Why retrieval operation in a binary search tree is more efficient than sequential retrieval? Explain with an example.
b) Discuss advantages and disadvantages of using AVL trees.
(06+04)

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