

R15

Code No: 123BP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

DATA STRUCTURES

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- 1.a) What is linked list? Write advantages of doubly linked list over singly linked list. [2]
- b) What is recursion? Give the properties of a recursive definition of an algorithm. [3]
- c) What is a stack? List the applications of stack. [2]
- d) Show the detailed contents of stack to evaluate the given postfix expression. [3]
{ 1 2 3 + * 3 2 1 - + * }
- e) Define a graph. List different graph traversal techniques. [2]
- f) What are binary trees? Mention different types of binary trees with example. [3]
- g) What is hashing? [2]
- h) What is sorting? What is searching? [3]
- i) Define AVL tree? Give example. [2]
- j) What is B-tree of order m? Draw a B-tree of order 3. [3]

PART-B

(50 Marks)

- 2.a) What is amortized complexity? Explain different methods to arrive at amortized costs for operations.
- b) Write a C program to implement insertion to the immediate left of the K^{th} node in singly linked list. [5+5]

OR

- 3.1) Given an ordered linked list whose node is represented by 'key' as information and 'next' as link field. Write a C program to implement deleting number of nodes (consecutive) whose 'key' values are greater than or equal to ' K_{min} ' and less than ' K_{max} '. [10]

- 4.a) Write a C program to implement multiple stacks using single array.
- b) Convert the infix expression $a / b - c + d * e - a * c$ into postfix expression and trace that postfix expression for given data $a = 6, b = 3, c = 1, d = 2, e = 4$. [5+5]

OR

5. What is a circular queue? Implement insert and delete operations. [10]

6.a) Construct a binary tree having the following traversal sequences:

Preorder traversal: A B C D E F G H I

Inorder traversal: B C A E D G H F I

b) Implement Depth First Search (DFS) algorithm.

[5+5]

OR

7.a) Define a Max Heap. Construct a max heap for the following:

{12, 15, 9, 8, 10, 18, 7, 20, 25}

b) What is a graph? Explain various representations of graphs.

[5+5]

8.a) Write an algorithm for Heap sort.

b) Apply selection sort on the following elements:

{21, 11, 5, 78, 49, 54, 72, 88}

[5+5]

OR

9. What is collision? Explain different collision resolution techniques with examples

[10]

10.a) Build an AVL tree with the following values.

{15, 20, 24, 10, 13, 7, 30, 36, 25, 42, 29}

b) Write Knuth-Morris-Pratt pattern matching algorithm.

[5+5]

OR

11. Write short notes on:

a) Red-Black trees b) splay trees c) b-trees.

[3+3+4]

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