

END SEMESTER EXAMINATION, MAY/JUNE - 2019

BCA SECOND SEMESTER

COURSE CODE:BCA110

COURSE TITLE: DATA STRUCTURES

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)Q.1. Attempt all questions.

(2 x 10 = 20)

- What is tree traversing?
- Compare and contrast between binary tree and binary search tree.
- What are the limitations of array?
- Write a postfix form of a following expression:

$$(A * B^C) + D/E$$
- Define the term height or depth of a tree.
- What are the basic operations performed on a stack?
- What is deque? Explain its two variants.
- A node with no children is called a _____
- A node of a linked list is allocated space from _____ memory.
- When do you say stack is full and stack is empty?

Section (B)Q.2. Attempt any 5 questions.

(7 x 5 = 35)

- Construct a binary search tree

25, 23, 6, 9, 2, 11, 15, 22, 26, 16

Then show the various trees obtained after insertion of (i) node 12 (ii) node 66 (iii) Give also, its preorder and inorder traversals.

- Use linked list to represent addition of following two polynomials

$$P = 3x^2 + 2x + 7$$

$$Q = 5x^3 + 2x^2 + x$$

- Explain Selection sort with an example.
- Differentiate between singly link list and doubly link list.
- Discuss the similarities and differences of different operations which can be performed on linear array and linked lists?
- Compare and contrast between the node structure of a linked list and tree in C.
- Convert this expression in postfix expression using stack – $A \&\& B \parallel C \parallel ! (C > F)$

Section (C)Attempt any 3 questions.

(15 x 3 = 45)

- Write an algorithm for deleting a node from the specific location of a singly linked list.
- What is recursion? Write its necessary condition and explain its types.

8

7

- Explain quick sort algorithm and sort the following element using quick sort

34, 22, 2, 8, 12, 3, 55, 44, 65, 10, 39, 97, 16, 13

8

- An array A [5][5] is stored in the memory with each element occupying 4 bytes of space. Assuming the base address of A is 1000, Compute the address of A [2][4] when array is stored :-

(i) Row wise

(ii) Column wise.

7

Q.5. a. Define stack. Also write the algorithms of push and pop operations. **8**
b. What is garbage collection? How is it achieved? **7**

Q.6. a. What is extended binary tree? How it is different from binary search? Draw extended binary tree for given list of elements: **5**

40, 80, 35, 90, 45, 50, 70

b. Write an algorithm to traverse tree in inorder and post form. Traverse the following tree postorder and inorder. **10**

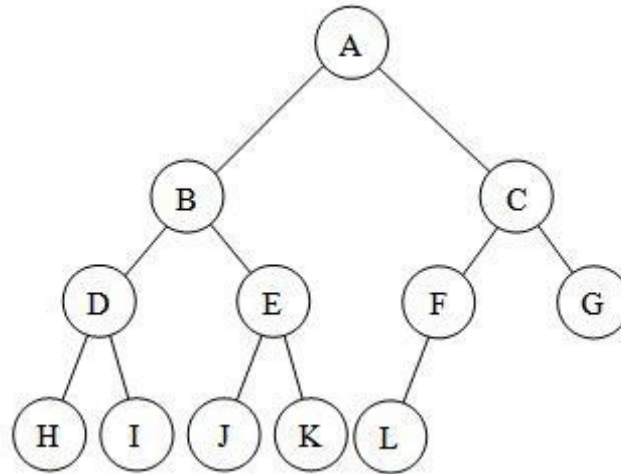


Figure 1

Q.7. Write short notes on (Any three) **3*5**
(i) Priority queue
(ii) Threaded Binary Tree
(iii) Space & Time Complexity
(iv) Sparse Matrix Representation

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