

Roll No.

Total Pages : 3

301302

Dec., 2018

B.Tech., IIIrd Semester

DATA STRUCTURES & ALGORITHMS

(PCC-CS-301)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

- 1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
- 2. Answer any four questions from Part-B in detail.*
- 3. Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

- (a) What is data structure? Define its types. (1.5)

(b) What do you mean by algorithm. Explain the concept of time and space complexity. (1.5)

(c) Write down the prefix and postfix notation of following:
• $(a + (b * c)) / (d - e) * f$
• $A / (B + C) / D - E * F$ (1.5)

(d) Write the complexity of selection sort in all i.e., best, average and worst cases. (1.5)

(e) Write all applications of stacks. (1.5)

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[P.T.O.]

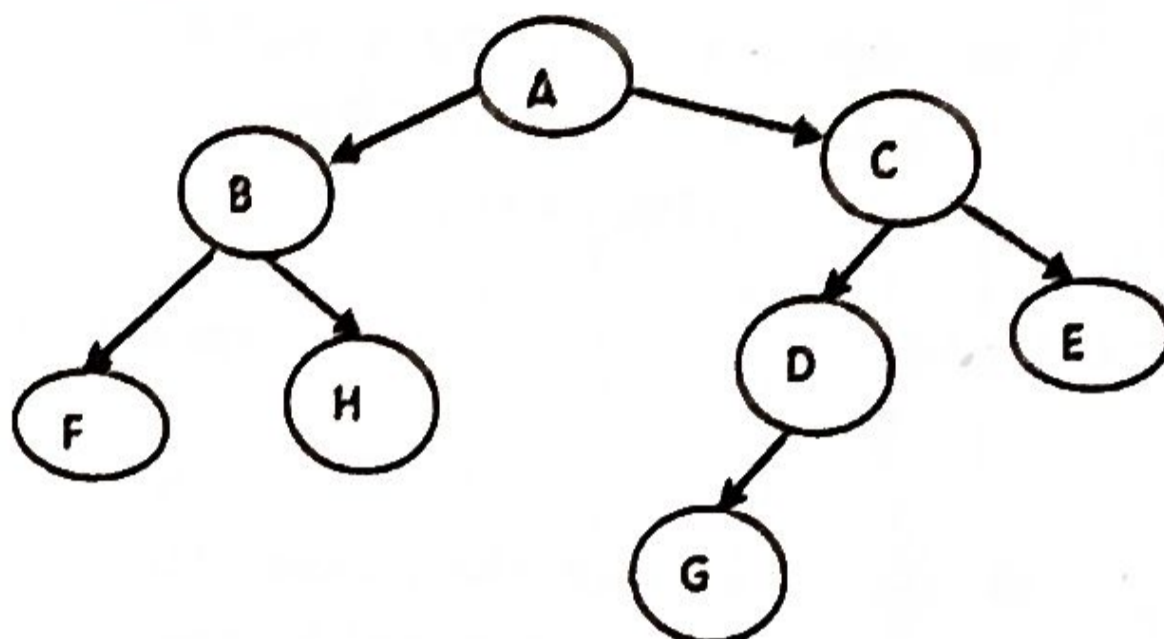
- (f) Write down the advantages of Linked list over arrays. (1.5)
- (g) Write recursive algorithm for preorder traversal in graphs. (1.5)
- (h) What do you mean by sparse matrix. Show its representation using array. (1.5)
- (i) What is the difference between simple queue and circular queues? (1.5)
- (j) Write the algorithm for inserting a node at first position in linked list. (1.5)

PART-B

2. (a) Write an algorithm to sort elements using Quick Sort. Explain it with an example and find its complexity. (10)
- (b) Write an algorithm to delete an element in circular queue using array. (5)
3. (a) Write an algorithm to insert an item at a specified location in linked list. (10)
- (b) Write an algorithm to evaluate a postfix expression using Stack. (5)
4. (a) Write an algorithm to search an element in an array using binary search. (10)
- (b) What is Hashing? What is complexity of hashing? Explain folding method with the help of an example. (5)

5. (a) What do you mean by Graph. Explain memory representation of graph. Write an algorithm to traverse graph using BFS. (10)

(b) Find preorder, postorder and inorder for the given tree : (5)



6. (a) Write an algorithm to insert an element in Binary search tree. (10)

(b) Build a B-Tree of order 4 using key values :
2, 7, 6, 5, 8, 14, 12, 18, 22, 7, 9. (5)

7. Write short note on the following :

(a) Double ended queues.

(b) Heap.

(c) Memory representation of binary trees. (15)