Total number of printed pages:5 **D/4th/DCSE401**

2021

DATA STRUCTURE USING C

Full Marks: 60

Time: 2 hours

The figures in the margin indicate full marks for the questions.

A. Multiple Choice Questions 1 x 20=20

1. Which data structure allows deleting data elements from front and inserting at rear?

   a. Stacks

   b. Queues

   c. Deques

   d. Binary Search Tree

2. Which of the following data structure is non-linear type?

   a. Strings

   b. Lists

   c. Stacks

   d. None of the above

3. The depth of a complete binary tree is given by

   a. nlog2n

   b. nlog2n + 1

   c. log2n

d. log2n + 1

4. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

   a. ABFCDE
   b. ADBFEC
   c. ABDEC
   d. ABDCEF

5. Which of the following sorting algorithms is of divide-and-conquer type?

   a. Bubble sort
   b. Insertion sort
   c. Quick sort
   d. All of the above

6. The inorder traversal of tree will yield a sorted listing of elements of tree in

   a. Binary trees
   b. Binary search trees
   c. Heaps
   d. None of the above

7. In a Heap tree

   a. Values in a node is greater than every value in left subtree and smaller than right subtree

   b. Values in a node is greater than every value in children of it

   c. Both of above conditions applies
   d. None of above conditions applies

8. In a graph if e=[u, v], then u and v are called

   a. Endpoints of e

b. adjacent nodes

c. neighbors

d. all of above

9. Two main measures for the efficiency of an algorithm are

a. Processor and memory

b. Complexity and capacity

c. Time and space

d. Data and space

10. The worst case occur in linear search algorithm when

a. Item is somewhere in the middle of the array

b. Item is not in the array at all

c. Item is the last element in the array

d. Item is the last element in the array or is not there at all

11. The complexity of Bubble sort algorithm is

a. O(n)

b. O(log n)

c. O(n^2)

d. O(nlog n)

12. What do you call the selected keys in the quick sort method?

a. Outer key

b. Inner Key

c. Partition Key

d. Pivot Key

13. If the array is already sorted, which of these algorithms will exhibit the best performance

a. Merge Sort

b. Insertion Sort

c. Quick Sort

d. Heap Sort

14. What are the disadvantages of arrays?

a. Data structure like queue or stack cannot be implemented

b. There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size

c. Index value of an array can be negative

d. Elements are sequentially accessed

15. Process of removing an element from stack is called

a. Create

b. Push

c. Evaluation

d. Pop

16. A binary tree is balanced if the difference between left and right subtree of every node is not more than ____

a. 1

b. 3

c. 2

d. 0

17. The number of edges from the root to the node is called _____ of the tree

a. Height

b. Depth

c. Length

d. Width

18. What is a full binary tree?

a. Each node has exactly zero or two children

b. Each node has exactly two children

c. All the leaves are at the same level

d. Each node has exactly one or two children

19. A procedure that calls itself is called

a. illegal call

b. reverse polish

c. recursive call

d. function call

20 In a stack, if a user tries to remove an element from an empty stack it is called

a. Underflow

b. Empty collection

c. Overflow

d. Garbage Collection

B. Very Short Question 2*6=12

1. What do you mean by the term data structure?
2. Give examples of primitive and non-primitive data structure.
3. Write integer and absolute values of -8.5
4. Define binary search tree.
5. What do you mean by height and depth of a tree?
6. Define circular linked list.

C Short Question 4*7=28

1. Write an algorithm/function to push an element into a stack.
2. Write the differences between the data structures stack and queue.
3. Sort the following numbers using quick sort algorithm (show the steps):

   5 3 8 1 4 6 2 7
4. Explain in-order traversal of a tree with a suitable example.
5. Write an algorithm/function to delete an element from a linear array.
6. Explain breadth first search with a suitable example.
7. Write the advantages and disadvantages of linked lists.

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