Total No. of printed pages = 4

19/5th Sem/UCSE504

2021

DATA STRUCTURE AND ALGORITHM

Full Marks – 100

Time – Three hours

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

Answer question no 1 and any *four* from the rest.

1. Answer the following questions : 10×2=20

   (a) Describe the time complexity of an algorithm.

   (b) Arrange the time complexity in increasing order : O(n), O(1), O(logn)

   (c) What is a data structure ?

   (d) Define ADT (Abstract Data Type).

   (e) What is linear data structure ?

   (f) What is structure ?

   (g) Convert the infix into postfix : (a+b)*(c+d)/f.

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(h) Define hash function.

(i) What is the criteria for binary search ?

(j) What is the difference between graph and tree ?

2. (a) Define array. Write the advantages and disadvantages of an array. 2+4=6

(b) Consider that array : int a[10];

The base address of the array is 1000 then what is the address of the 5th element of the array ? 6

(c) What is the suitable data structure to represent a matrix ? Explain with an example ? 8

3. (a) Define the linked list. What are the advantages of a linked list ? 5+5=10

(b) Describe the insertion operation in a linked list. What is a circular linked list ? 8+2=10

4. (a) Consider a stack with the elements 1, 2, 3, and 3 as the top element.

What is the content of the stack after the following operations :

Pop (), Pop (), Push (5), Pop (), Push (2), Push (3) 5

(b) Describe the queue. Describe the enqueuer () and dequeue () operation on queue. 8

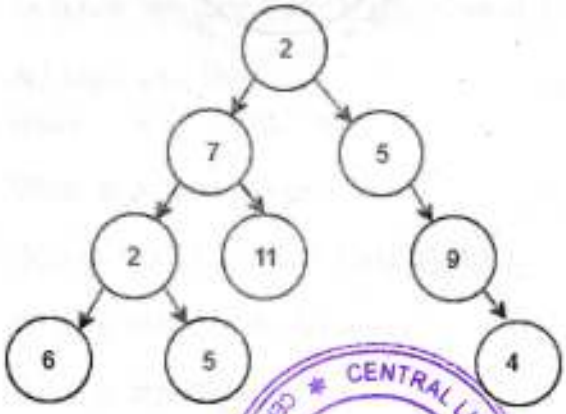
(c) Describe the use of stack and queue. 7

5. (a) Describe the searching an element from an array. What is the time complexity of that searching ? 4+2=6

(b) Write an algorithm of Bubble sort. What is the time complexity of the Bubble sort ? 10+4=14

6. (a) Give the definition of binary tree. Define complete binary tree. 2+2=4

(b) Describe the preorder traversal and do the preorder traversal of the following tree : 8



(c) Describe the DFS and do DFS of the given graph. 8