2019/TDC/EVEN/CSCHC–202T/045

TDC (CBCS) Even Semester Exam., 2019

COMPUTER SCIENCE

(2nd Semester)

Course No. : CSCHCC–202T

(Data Structure)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions (any *ten*) :

   (a) What is a sparse matrix? Explain with an example.　　　　　　　　1

   (b) Distinguish between a linear and a non-linear data structure.　　　1

   (c) List out any two differences between doubly linked list and singly linked list.　　1

   (d) How is de-queue different from a normal queue?　　　　　　　　1

   (e) Define depth and height of a tree.　　1

(2)

(f) What is meant by an AVL tree? 1

(g) Which data structure is used for performing recursion? Why? 1

(h) Write the average case and worst case time complexity of linear search. 1

(i) What do you mean by hash function? 1

(j) Define stacks and queues with an example. 1

(k) List out two applications of tree. 1

(l) List out one merit and demerit of sequential allocation. 1

(m) What is the difference between hashing and indexing? 1

(n) When is a binary search best applied? 1

UNIT—I

2. (a) Write down the procedure for insertion of new element and deletion of an element from stack. 4

(b) Evaluate the following postfix expression :

$abc + * de / -$ where $a = 5$, $b = 6$, $c = 2$, $d = 12$, $e = 4$ 4

(3)

OR

3. (a) What are the applications of stack? Explain any one application in detail. 1+3=4

(b) Convert the given infix expression to postfix form and also show the stack implementation : 4

$$P = A((B + C) + (D + E) * F) / G$$

UNIT—II

4. (a) Write an algorithm demonstrating the various stack operations. 4

(b) Write an algorithm for insertion of a node at specified position in a singly linked list. 4

OR

5. (a) Write an algorithm for deletion of a node at the end in a doubly linked list. 4

(b) Write a function for single linked list with integer data to search an element in the list that is unsorted. 4
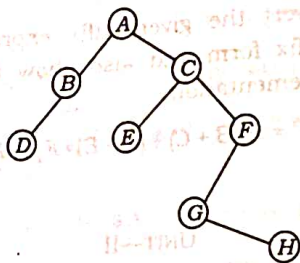
(4)

UNIT—III

6. (a) Traverse the given tree using in-order and post-order transversals. Given tree : 2+2=4

(b) Write a recursive function that calculates the fibonacci series. List out the advantages and limitations of recursion. 2+2=4

OR

7. (a) The in-order and pre-order transversal of a tree are given below :

In-order : Q A Y P Z C B X

Pre-order : Z A Q P Y X C B

(i) Construct the corresponding binary tree.

(ii) Determine the post-order transversal of the tree drawn. 3+1=4

(5)

(b) Make a binary tree from the following elements :

14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5

Discuss about threaded binary trees in brief. 2+2=4

UNIT—IV

8. (a) Apply insertion sort, showing the various passes to sort the array A where A = [77, 33, 44, 11, 88, 22, 65, 55]. 4

(b) Explain linear search with the help of suitable example. 4

OR

9. (a) What is searching? Discuss the difference between binary search and linear search. 1+3=4

(b) Perform selection sort operation on the given numbers below. Give all steps in clear way : 4

A = {66, 35, 48, 55, 62, 77, 25, 38, 18, 40, 30, 20}

UNIT—V

10. (a) What is meant by rehashing? Explain how you resolve hash clashes by open addressing method. 1+3=4

    (b) Explain in detail the Hash Tab Recording technique. 4

OR

11. (a) Explain two hashing functions in detail with an example. 2+2=4

    (b) What is collision resolution technique in hashing? Explain. 4

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