UG Odd Semester (CBCS) Exam., December—2017

COMPUTER SCIENCE

(3rd Semester)

Course No. : MCSCC–303

(Data and File Structure)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* Define two-dimensional array. 2

(b) Suppose each student in a class of 25 students is given 4 tests. Assuming the students are numbered from 1 to 25, the test scores can be assigned to a 25 4 matrix SCORE. Suppose base (SCORE) = 200 and there are *W* 4 words per memory cell. Furthermore, suppose the programming language stores two-dimensional array using row-major order. Find the address of score [12, 3]. 5

(c) What is sparse array? Show the vector representation of non-zero elements of a sparse array of order 7 7. 4

(d) Write a program to find addition of 2 two-dimensional arrays. 3

2. *(a)* Define the following with an example and neat sketch : 2×4=8

(i) Linked list

(ii) Doubly linked list

(iii) Circular linked list

(iv) Two-way circular linked list

(b) Write the code to create a link list. 3

(c) What is an overflow and an underflow condition in a stack? 1½+1½=3

UNIT—II

3. *(a)* What is stack? Write an algorithm to show PUSH operation. 2+4=6

(b) What is polish notation? 2

(c) Write an algorithm to evaluate a postfix expression using stack and also show the evaluation of the following postfix expression : 6

5, 6, 2, +, , 12, 4, /, –

4. *(a)* What is a priority queue? Show the array representation of a priority queue. 2+4=6

(b) Write an algorithm to insert an element in a circular queue. 5

(c) Show how to check overflow condition and underflow condition in a queue in terms of FRONT and REAR variables. 3

UNIT—III

5. *(a)* Define the following with neat sketch : 2×5=10

(i) Tree

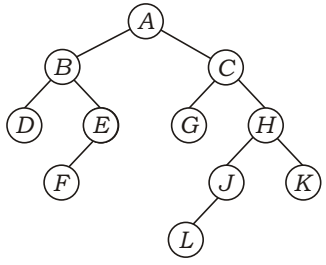
(ii) Leaf node

(iii) Depth of any node

(iv) Forest

(v) Ancestor

(b) What is inorder threading? Show one-way inorder threading of the following tree : 4



6. *(a)* Draw all the possible non-similar trees T, where—

(i) T is a binary tree with 4 nodes;

(ii) T is a 2-tree with 5 external nodes. 6

(b) Define AVL tree. Also explain RL and LL rotation with an example. 2+2+2=6

(c) Construct a 3-way search tree out of an empty search tree with following keys in order : 2

D, K, P, V, A, G

UNIT—IV

7. *(a)* Write an algorithm of insertion sort. 5

(b) Sort the given sequence

44, 30, 50, 22, 60, 55, 77

by using quick sort. 4

(c) Write an algorithm for binary search. 5

8. *(a)* What is the complexity of sequential search? Write an algorithm for sequential search. 2+4=6

(b) Using the bubble sort algorithm, find the number of comparisons and the number of interchanges which alphabetize the n 6 letter in PEOPLE. 6

(c) What is sorting and what is searching? 2

UNIT—V

9. *(a)* How can graph be represented in computer memory? Give relative merits and demerits of each representation scheme. 8

(b) What is DFS? Write the pseudocode for DFS. 2+4=6

10. *(a)* What do you mean by hashing? Explain any five popular hash functions. 2+5=7

(b) Explain linear probing and chaining method. 7

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