Seat No.	

[5152]-174

S.E. (I.T.) (I Sem.) EXAMINATION, 2017
FUNDAMENTALS OF DATA STRUCTURES
(2012 PATTERN)

Time : Two Hours   **Maximum Marks : 50**

N.B. :—   (i)   Answer any *four* questions.

(ii)   Neat diagrams must be drawn wherever necessary.

(iii)   Figures to the right indicate full marks.

(iv)   Assume suitable data, if necessary.

1.   (a)   Determine the output of the following 'C' statements : [6]

$a = 13$, $b = 25$, $c = 5$, $d = 4$

(1)   P = a ^ b;

(2)   Q = ++a – b;

(3)   R = b++ + c;

(4)   S = c > b ? 1 : 0;

(5)   T = sizeof(3.142);

(6)   U = d + = (d + = 3, 7, d);

(b)   Explain what is a recursive function. Write a recursive C function find the sum of digits of positive integer number.   [6]

Or

2.   (a)   Determine the output of the following 'C' statements : [6]

a = 40, b = 30, c = 80, d = –2, e = 5

(1)   I = a < b < c;

(2)   J = d >> 1;

(3)   K = 10 & 20;

(4)   L = 10/20;

(5)   M = a || b > a;

(6)   N = e ^ e;

(b)   Write a C program to copy one text file to another.   [6]

3.   (a)   Why can't we return a local variable which is non-static by reference ?   [2]

(b)   Define time complexity of an algorithm. Explain big-oh, big-omega, big-theta with example.   [4]

(c)   Using merge sort algorithm, arrange the following the data in ascending order. Show all passes :   [6]

25, 3, 55, 2, 60, 10, 50, 14, 36, 18

Or

4.   (a)   Explain sort stability.   [2]

(b)   What is frequency count ? Find the frequency count of the following code :   [4]

m = 10;

n = 12;

count = 0;

for (i = 0; i < m; ++i)

        for (j = 1; j < = n; j = j * 2)

                count++;

(c)   Consider an integer array P with following data :   [6]

2	4	7	9	13	15

Using binary search, we need to check whether number 13 is existing in the array P.

Represent this search operation step by step.

5. (*a*) Write a C program to implement simple transpose method for sparse matrix. [6]

(*b*) Define a structure to represent a polynomial having three variables. Represent the following polynomial in computer memory using structure defined by you : [4]

$$5x^3y^2z + 3x^2y^3z^2 + 6xyz^3 + 98$$

(*c*) Compare stack and queue data structures. [3]

Or

6. (*a*) Write a C program to convert conventional matrix into sparse matrix. [6]

(*b*) Consider the following C statement [4]

int A[4][5] = {0};

Assume : Each array element requires 4 bytes of memory

Address of the 1st element in A is 1000.

Find the address of the element A[3][4].

(*c*) What is ordered list ? [3]

7. (*a*) Write C function to insert a node in doubly linked list at : [6]

(1) the start of the list

(2) the end of the list

(3) after the position

(*b*) Write a node structure to represent GLL. Represent the following using GLL : [4]

(A, B, (D, E, F), (G, H, (I, J), K), L)

(*c*) Write an ADT for singly linked list. [3]

Or

8. (*a*) Write C function to delete a node in singly linked list at : [6]

     (1)   the start of the list

     (2)   the end of the list

     (3)   after the position

    (*b*) Write a node structure to represent GLL. Represent the following using GLL : [4]

     (1)   (a, (b, c), d)

     (2)   (a, b, (c, d, (h, f), k))

    (*c*) Explain advantages of linked list over array. [3]