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[5668]-204

S.E. (I.T.) (sem-III. EXAMINATION, 2019
FUNDAMENTALS OF DATA STRUCTURES
(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and
Q. 7 or Q. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right side indicate full marks.

(iv) Assume suitable data, if necessary.

1. (a) What are advantages of using structures ? Give the difference between structure and union. [6]
- (b) Explain call by value and call by reference with suitable examples. [6]

Or

2. (a) Describe the following declarations in C : [6]
- (i) `int * p[10];`
- (ii) `int **q;`
- (iii) `int *q[5];`
- (iv) `char s[50] [50] [50];`
- (b) What are the control structures in C language ? Write the difference between for loop and while loop. [6]

P.T.O.

3. (a) Define the following : [6]
- (i) Data and Data objects
 - (ii) Data structures
 - (iii) Abstract data types.
- (b) Write an algorithm to sort the given list of integers using bubble sort. Show output of each pass for the following list : 10, 5, 4, 18, 17, 1, 2. [6]

Or

4. (a) Differentiate between the following : [6]
- (1) Internal sorting and external sorting
 - (2) Linear search and binary search.
- (b) Explain Big "oh" (O), Omega (Ω) and Theta (Θ) notations with an example. [6]
5. (a) Describe stack and queue with example. What is the use of stack in recursion. [7]
- (b) Explain [6]
- (1) Difference between array and ordered list
 - (2) Multidimensional array and their address calculation with an example.

Or

6. (a) What is sparse matrix ? Write and explain an algorithm for fast transpose of sparse matrix. [7]
- (b) Represent the following polynomials using arrays : [6]
- (1) $x^4 - 75x^3y^2 + 2y - x$
 - (2) $2x^6 + 10x^4y^2 - 3xy^2 + 10x$
 - (3) $-3x^5y^7 + 7y^3 - 2.$

7. (a) Specify a suitable data structure to store polynomials in 4 variables x , y , z and μ . With the help of a diagram show the representation of the following polynomial in the GLL [7]
- $$23x^2y^5z^8\mu^2 - x^8y^4z^2u^4 + 34x^2y^5z^{10}u^6$$
- (b) Write pseudo C function to insert a node before and after any node in doubly linked list. [6]

Or

8. (a) Write a pseudo C routine to revert a singly linked list without creating new node and without swapping the data, assume that list contains numbers. [7]
- (b) Compare linked list with arrays with reference to the following aspects : [6]
- (i) Accessing any element randomly
 - (ii) Insertion and deletion of an element
 - (iii) Utilization of computer memory.