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Total No. of Questions—12]

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[3962]-212

S.E. (I.T.) (First Semester) EXAMINATION, 2011

FUNDAMENTAL OF DATA STRUCTURE

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answers to the two Sections should be written in separate answer-books.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Assume suitable data, if necessary.

SECTION I

1. (a) Explain arrays with example. [6]
- (b) Explain if and switch-case decision control structure. [6]
- (c) Write a C program to swap two nos. using call by reference. [4]

Or

2. (a) What is macro ? Explain its use with example. State its advantages. [6]
- (b) Describe logical operators in C language. Explain short circuit evaluation. [6]
- (c) Compare structure and union. [4]

P.T.O.

3. (a) Explain call by value and call by reference with example. [8]
- (b) Write C code for the following operations on strings : [8]
- (i) Concatenation of two strings
 - (ii) Reversing a string in place.

Or

4. (a) What is pointer to pointer ? Discuss its use in parameter passing with example. [6]
- (b) What is recursion ? Explain with example. [6]
- (c) Describe the following declarations : [4]
- (i) `char s[10];`
 - (ii) `int ** ptr;`
 - (iii) `int *p[10];`
 - (iv) `void (*p) (intx)`

5. (a) Explain non-linear data structures with example. [6]
- (b) Write C functions for the following on a list of n nos. stored in array : [12]
- (i) Find sum of all elements
 - (ii) Find maximum no.
 - (iii) Print reverse recursively.

Or

6. (a) Explain big-oh, omega and theta notations with example. [6]
(b) Define time and space complexity of an algorithm. Write C code for bubble sort and analyze its time complexity using big-oh notation. [12]

SECTION II

7. (a) Sort the following data using merge sort. Show all passes : [6]
25, 3, 55, 2, 60, 10, 50, 14, 36, 18
(b) Write pseudo C code for selection sort. Analyze its time complexity. Compare selection and bubble sort. [10]

Or

8. (a) Explain linear and binary search techniques with examples. [10]
(b) What are advantages of sorting data ? Explain insertion sort with example. [6]
9. (a) Give representation for a sparse matrix and write pseudo C code to obtain transpose of sparse matrix using fast transpose algorithm. Write its time complexity. [12]
(b) Explain row major representation of a matrix. Show address calculation. [6]

Or

10. (a) Discuss representation of polynomial using array. Write pseudo C algorithm to add two ordered polynomials. Analyze time complexity. [12]
- (b) Explain sequential memory organization. State its advantages. [6]
11. (a) Write a C program to create singly linked list of integers, display the same and count no. of even elements in the list (use functions). [10]
- (b) Write data structure to represent the following generalized lists using linked list and represent them : [6]
- (i) $(a, (b, c), d)$
- (ii) $(p, q, (r, s, (t, u), v))$

Or

12. (a) What is circular linked list ? What are its advantages over linear linked list ? [4]
- (b) Explain importance of header node in a linked list. [4]
- (c) Explain role of stack in recursion and implement the following using a recursive functions : [8]
- (i) Display singly linked list reverse
- (ii) Count no. of nodes in singly linked list.