Nov- Dec- 2011

Total No. of Questions-12]

[Total No. of Printed Pages-4+1 [40621-212

S.E. (IT) (I Sem.) EXAMINATION, 2011 FUNDAMENTAL OF DATA STRUCTURE (2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

N.B. := (i) Answer any three questions from each Section.

- (*ii*) Answers to the two Sections should be written in separate answer-books.
- (iii) Figures to the right indicate full marks.
- (iv) Assume suitable data, if necessary.

SECTION I

1.	(<i>a</i>)	Explain logical operators in C with example.	[6]
	(<i>b</i>)	Differentiate between union and structure.	[4]
	(c)	Define the following terms :	[6]

- (i) Constant
- (*ii*) Variable
- (iii) Precedence of operator.

Or

2.	<i>(a)</i>	Write pseudo C algorithm to find length of a string.	[4]
	<i>(b)</i>	Explain enumeration with example.	[4]
	(c)	Describe auto, static, register and extern storage classes.	[8]
		P.	Т.О.

3.	(<i>a</i>)	Explain linear and non-linear data structures.	[6]
	<i>(b)</i>	Write characteristics of an algorithm.	[4]
15%	(c)	What is time complexity ? How is time complexity of an algo	
	PRARCE ;	computed ?	[6]

4.

(a) Explain Big-oh, omega, and theta notations. [6]
(b) What is frequency count of a statement ? Analyze time complexity

[6]

- of the following code :
- (*i*) for(i = 1; i <= n; i++) for(j = 1; j <= m; j++)
 - for(k = 1; k <= p; k++)
 - sum = sum + i;

i = n;(ii)

while $(i \ge 1)$

{i--;}

- (c) Differentiate between primitive and non-primitive data structures. [4]
- 5. (a) Explain call by value and call by reference with suitable example. [8]

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- (b) Write recursive functions for the following :
 - (i) To find factorial of a given positive no.
 - (ii) To find sum of digits of given positive no.

- (a) What is pointer ? Explain pointer to a function. [6]
 (b) Passing a structure to a function by reference is more efficient than passing it by value. Justify. [4]
 - (c) Is it legal to return a point to local auto variable ? Explain your answer with suitable example. [6]

SECTION II

7. (a) Write pseudo C algorithm for linear and binary search. [8]
(b) Write pseudo C code to sort a list of integers using bubble sort. Show output of each pass for the following list :

10, 5, 4, 18, 17, 1, 2. [8]

Or

- 8. (a) Sort the following nos. using insertion sort. Show all passes :
 - 50, 10, 78, 40, 30, 02, 04, 15. [4]

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6.

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P.T.O. .

[8]

- (b) Sort the following elements in ascending order using bucket sort. Show all passes :
 - 121, 235, 55, 973, 327, 179. [6]
- (c) Write pseudo C algorithm for selection sort. [6]
- 9. (a) Explain sequential and linked memory organization. [6]
 - (b) Write pseudo C algorithm to find transpose of a sparse matrix using fast transpose algorithm. Analyze its time complexity. [10]

10. (a) Explain row and column major representation of a matrix. [4]

- (b) Write data structure to represent sparse matrix. Write C function to add two sparse matrices. [8]
- (c) Represent the following polynomial using two-dimensional array : [4]
 - (*i*) $x^2 + xy + 2x^2y$
 - (*ii*) $3x^3 + 2y^2x + 5y^3x^3$.

11. (a) What are advantages of linked list over array? [4]
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- (b) Define node structure for SLL and perform the following operation on a SLL without header node (write C functions) : [14]
 - (i) Delete first node
 - (ii) Delete last node
 - (*iii*) Delete a node with a specified data value which is between the two nodes
 - (iv) Find sum of elements in the list
 - (v) Print list reverse recursively.

- 12. (a) Write pseudo C code to add two ordered polynomials in a single variable represented by SLL. [8]
 - (b) What is generalized linked list ? Write its applications. [4]

[6]

(c) Write a C function to reverse SLL.