

**UNIVERSITY OF PUNE**  
**[4362]-222**  
**S. E. (Semester - I) Examination -2013**  
**S.E (IT)**  
**Fundamental of Data Structure**  
**(2008 Pattern)**

**[Total No. of Questions:12]**  
**[Time : 3 Hours]**

**[Total No. Printed Pages:3]**  
**[Max. Marks : 100]**

**Instructions :**

- 1) *Answers to the two sections should be written in separate answer-books.*
  - 2) *Black figures to the right indicate full marks.*
  - 3) *Assume suitable data, if necessary.*
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**Section I**

- Q.1 a) Write C function to interchange two variables without using their variable. [6]
- b) Explain various operators in 'c'. [4]
- c) What is structure in C? Give its applications. [6]

**OR**

- Q.2 a) Explain use of "break" and "continue" keywords in "C" with suitable example. [6]
- b) What do you mean by precedence and associativity of operators? Explain with suitable example. [6]
- c) Determine value of each of the logical expression. Assume (x=5,y=10 and z=6). [4]
- i)  $x = z \parallel y > x$
- ii)  $x < y \&\& x > y$
- Q.3 a) Explain any four functions used for file handling. [8]
- b) Write a C function using pointer to add two matrices and return the resultant matrix to calling function. [8]
- c) Differentiate between pass by reference and pass by value. [2]

**OR**

- Q.4 a) Write a C function to add and multiply two matrices. [8]  
b) Write a C function to reverse a string without using library functions. [6]  
c) Describe the following declarations: [4]  
i) int A [10];  
ii) float \*\*ptr;  
iii) int \*p[10];  
iv) void (\*p)(float x);
- Q.5 a) Explain linear and non- linear data structures. [6]  
b) Determine the frequency counts for all the statements in the following [6]  
program segment-  
i = 10;  
for (i=10; i<=n;i++)  
for (j = 1; j<i; j++)  
x = x+1;  
c) What is an abstract data type? Explain with example. [4]

**OR**

- Q6. a) What is frequency count of a statement? Explain its use in algorithm [6]  
analysis.  
b) Write an algorithm to find smallest element in a array of integers and [8]  
analyze its time complexity.  
c) What is persistent data structure? [2]

**SECTION -II**

- Q.7a) Write a pseudo C function for Binary search and comment on time and [8]  
complexity in best, average and worst cases.  
b) Consider following numbers. Sort them using “ insertion sort” Comment [8]  
on time and space complexity in best, average and worst cases. Show  
output after each pass. 54,23,76,45,32,0,-24,30,-12

**OR**

- Q.8. a) Compare Merge sort and quick sort. Comment on time and space [8]  
complexity in best, average and worst cases for both.  
b) Consider following numbers. Sort them using “Merge sort”. Show output [8]  
after each pass 54,14,88,56,25,11,45,91,30,12,4
- Q.9 a) Explain the two dimensional arrays in details with column and row major [6]  
implementation and address calculation in both the cases.

- b) Write an algorithm for multiplication of sparse matrix. Compare simple and fast transpose. Comment on Time and space complexity for both. [10]

**OR**

- Q.10 a) Write ADT for array. Explain the concept of polynomial representation using link list with suitable example. [6]

- b) Write a pseudo C code for addition of two polynomials and comment on time complexity of them assuming n terms in first polynomial and m terms in other. [10]

- Q.11 a) Compare array and link list. [6]

- b) Write pseudo C code to delete a node from doubly link list. [6]

- c) Represent following GLL. [6]

- 1) ((a,b) , c, (d,e))
- 2) (p,q(r,(t,u,s),v,w))

**OR**

- Q.12 a) Compare Single Link List and Doubly Link List. [6]

- b) Write pseudo C code to add a node in singly circular link list with integer data. [6]

- c) Write pseudo C function to display the singly circular link list storing character data in the reverse manner and comment on time and space complexity of your function. [6]