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Seat No.	
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S.E. (Information Technology) (Semester – I) Examination, 2014
FUNDAMENTAL OF DATA STRUCTURES
(2008 Course)

Time : 3 Hours

Max. Marks : 100

- Instructions :** 1) Answers to the **two** Sections should be written in **separate** answer books.
 2) Answer **any three** questions from **each** Section.
 3) Neat diagrams must be drawn **wherever** necessary.
 4) Figures to the **right** side indicate **full** marks.
 5) Use of Calculator is **allowed**.
 6) Assume suitable data if **necessary**.

SECTION – I

1. a) Explain the types of operators with example. 4
- b) Differentiate while, do-while and for loop structures. 6
- c) Write a C program to find out length of string without using library function. 6

OR

2. a) What is output of the following C code ? Explain. 4

```
int a = 30, b = 40 y;
x = (a! = 30) && (b = 60);
printf("%d", y);
```
- b) Define pointers, How do we declare pointers ? Give its advantages. 6
- c) What is macro in C ? Explain with an example. 6
3. a) Explain pass by value method of parameter passing with suitable example. 4
- b) Write a C program to compute the sum of all elements in any array. 8
- c) What is recursion ? Explain with example. 6

OR

4. a) Write a C program to copy one file into another. 6
- b) Explain the concept of pointer to structure and pointer to function with example. 8
- c) State the difference between text file and binary files. 4

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5. a) Classify data structures and give one example of each type. 6
 b) Explain big-oh, omega and theta notations with example. 6
 c) What is best and worst case analysis of algorithm ? 4

OR

6. a) What do you mean by frequency count of a statement ? Explain its importance in analysis of algorithm with suitable examples. 6
 b) Analyze frequency count of the following code segments : 8
 i)

```
for(i = 1; i <= n; i++)
  for(j = 1; j <= m; j++)
    for(k = 1; k <= p; k++)
      x = x + 1;
```


 ii)

```
i = 1;
while (i <= n)
{
  x++;
  i++;
}
```


 c) Define Abstract Data Type. 2

SECTION – II

7. a) Explain linear and binary search techniques with examples. 10
 b) Sort the following data to ascending order using Quick sort. Show all passes with pivot. 8
 77, 8, -19, 2, 0, -15, 7, 20, 11, 25.

OR

8. a) What is Bubble sort ? Explain with example. 4
 b) Write an algorithm for bucket sorting. Assume suitable integer data to verify your algorithm and show the different passes. 8
 c) Search a given number using binary search, show all passes. Number to be searched 23. The numbers are: -1, 4, 9, -13, 23, 3, 4, 0. 6
 9. a) Explain row major representation of a matrix. Show address calculation. 6
 b) Explain different ways to store polynomial in different data structures with suitable example. 10

OR

10. a) Write an algorithm for finding fast transpose of a sparse matrix. 8
 b) Explain sequential memory organization. State its advantages. 4
 c) What is sparse matrix ? List the applications. 4



11. a) Consider the following polynomials represented using linked lists. 6
- 1) $10x^{12} + 5x^6 + 3$
- 2) $15x^{12} - 6x^8 + 10x^3$
- Show the addition process of above polynomials diagrammatically.
- b) Write recursive functions for : 6
- i) Display SLL forward
- ii) Display SLL reverse
- c) What is circular linked list ? What are its advantages over linear linked list ? 4
- OR
12. a) Write a C function to reverse a singly linked list by changing link pointers. 6
- b) Represent the following lists using generalized linked list : 6
- i) (a, b), c)
- ii) (a, b, c, (d, e))
- c) Explain the different types of linked lists. 4
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