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Total No. of Questions—12]

[Total No. of Printed Pages—4+2

Seat No.	
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[4262]-212

S.E. (I.T.) (First Semester) EXAMINATION, 2012

FUNDAMENTAL OF DATA STRUCTURE

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answer *three* questions from Section I and *three* questions from Section II.

(ii) Answers to the two Sections should be written in separate answer-books.

(iii) Figures to the right of

(iv) Assume suitable data, if necessary.

SECTION I

1. (a) Differentiate between structure and union. [4]
- (b) Explain while and for loop in C language with example. [6]
- (c) Explain different bitwise operators in C. [6]

Or

2. (a) Write a C function to concatenate two strings without using library function. [5]
- (b) State different logical operators in C. Explain short circuit evaluation. [6]

P.T.O.

(c) Describe the following declarations : [5]

(i) `int *a[10];`

(ii) `int (*p)[2];`

(iii) `char s[100][65][80];`

(iv) `float **y;`

(v) `enum x {A, B, C};`

3. (a) Explain any *four* functions used for file handling. [6]

(b) What are different methods for passing parameters to function ?

Write how array can be efficiently passed to a function with example code. [6]

(c) Write output of the following code : [4]

```
void main(void)
```

```
{
```

```
    int A[4][3] = {{1, 0, 3},
```

```
                  {6, 8, 5},
```

```
                  {3, 5, 9}};
```

```
    printf("%d %d %d %d", **A, A[2][2], A[1][2], A[3][10]);
```

```
}
```


Or

4. (a) Write a C function to compare two strings without using library functions. [4]
- (b) Write a program to represent a list of student's records and find topper among them. [6]
- (c) What is recursion ? Write and explain recursive function to find factorial of a number. [6]
5. (a) What do mean by asymptotic notations ? Explain with examples. [6]
- (b) Classify data structures and give example of each type. [6]
- (c) What is frequency count of a statement ? Explain its use in algorithm analysis. [6]

Or

6. (a) Analyze time complexity of the following code : [6]
- (i)

```
for (i=0; i<m; i++)  
    for(j=0; j<n; j++)  
        sum=sum+A[i][j];
```
- (ii)

```
int display (int n)  
{  
    int i=1;  
    while(i<=n)  
        printf("%d", i);  
}
```


- (b) Write a short note on space complexity of a program. [6]
- (c) Define the following terms : [6]
- (i) Data object
 - (ii) Data type
 - (iii) Abstract data structure.

SECTION II

7. (a) Write pseudo C code for bubble sort. Show output of each pass to arrange the following numbers in ascending order : [10]
- 11, 7, 14, 8, 6, 70, 28, 21, 2, 9, -5
- (b) Write non-recursive pseudo C code for binary search and explain search operation with example. [8]

Or

8. (a) Write pseudo C code to merge two sorted lists of integers stored in arrays to form a third sorted list. Analyze time complexity of this code. [10]
- (b) Write and explain worst case input for quick sort to sort list of numbers in ascending order. State worst case time complexity. [8]

9. (a) Represent a sparse matrix using suitable data structure and write pseudo C code to add two sparse matrices. Analyze its time complexity. [10]
- (b) Explain sequential memory organization using suitable data structure. [6]

Or

10. (a) Write data structure to represent polynomial in two variables. Represent the following polynomials using the declared data structure in graphical form : [6]
- (i) $3 + 2x + 9xy^3$
- (ii) $x^3 + y^4 + 2x^3y^4$.
- (b) Derive formula to calculate address of any location in two-dimensional arrays. [4]
- (c) Compare sequential and linked memory organization. [6]
11. (a) Write data structure to represent a node of a generalized linked list. Represent the following lists : [6]
- (i) $(a, b, c (d, e, f), g, h)$
- (ii) $(p (q, r) s (t, u), v)$.

(b) Write node structure to represent Circular SLL of integers.

Write a program with the following options : [10]

(i) Create list

(ii) Display list

(iii) Delete a specified value

(iv) Insert a value after a given item.

Or

12. (a) Give node structure to represent a list names using DLL and write C functions for the following : [8]

(i) Display list forward

(ii) Display list reverse

(iii) Display names starting with letter S or s.

(b) Compare SLL and DLL. [4]

(c) Explain importance of header node in a linked list. [4]