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Seat  
No.

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S.E. (Information Technology) (I Semester) EXAMINATION, 2013

### FUNDAMENTAL OF DATA STRUCTURE

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

N.B. :—

(i) Answer question No. 1 or 2, 3 or 4, and 5 or 6 from

Section I and question No. 7 or 8, 9 or 10, and

11 or 12 from Section II.

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

(iii) Neat diagrams must be drawn wherever necessary.

(iv) Figures to the right indicate full marks.

(v) Assume suitable data, if necessary.

#### SECTION I

1. (a) What do you mean by typedef and enumerated ? Explain with suitable example. [6]

(b) What is pointer to pointer ? Discuss its use in parameter passing with an example. [6]

P.T.O.

(c) Select the choice for the correct answer and write that

choice :

[4]

(i) #include<stdio.h>

#define x 20

main()

{

int x=50;

printf("%d\n",x);

}

The above code snippet will print :

(1) 20

(2) 50

(3) Compile error

(4) None of the above

(ii) int main(void)

{

int x=1;

if(!x)

printf("Hello\n");

else

{

x=0;

printf("Bye\n");

}

return 0;

}

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The above code snippet will print :

- (1) Bye
- (2) Hello
- (3) Hello (infinitely....)
- (4) Bye (infinitely....)

Or

2. (a) Explain if and switch-case decision control structure. [6]  
(b) What is meant by the following terms : [6]

- (i) Nested structure
- (ii) Array of structure.

Give a typical example of use of each of them.

- (c) What are advantages and disadvantages of macro over function ? [4]

3. (a) Write a 'C' program to concatenate the string without using library functions using pointers. [6]

- (b) Explain pass by value and pass by reference method of parameter passing with suitable example. [6]

- (c) What is recursion ? Explain with an example. [4]

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P.T.O.

Or

4. (a) Write a 'C' program to perform multiplication of two  $4 \times 4$  matrices using function. [6]

- (b) What is file handling ? Explain any four functions in file handling with their syntax. [6]

- (c) What are the benefits of the use of pointers in the program ? Explain with example. [4]

5. (a) What are different types of searching ? Differentiate among them in terms of time complexity. [6]

- (b) Define and explain the following terms : [8]

- (i) Data type
- (ii) Data object
- (iii) Data structure
- (iv) Algorithm.

- (c) What is ADT ? Write and explain ADT for Array. [4]

Or

6. (a) Define time complexity and space complexity. Also explain asymptotic notations. [6]

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- (b) Explain primitive and non-primitive, linear and non-linear, static and dynamic, persistent and ephemeral data structure. [8]
- (c) For the following code calculate time complexity using frequency count : [4]

```

i=1;
sum=0;
while(i<=n) {
    j=1;
    while(j<=n) {
        sum=sum + i;
        j=j+1;
    }
    i=i+1;
}

```

## SECTION II

7. (a) Sort numbers : 10, 22, 04, 09, -39, 01 in ascending order using insertion sort and selection sort. State the time complexity for both the sorts for the same example. [8]
- (b) Write a 'C' program for binary search and explain it using example. [8]

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P.T.O.

Or

8. (a) Write a 'C' program for Merge sort and explain it using example. [8]
- (b) What is the need of sorting ? Explain *three* sorting techniques. [8]

9. (a) Explain the concept of linear Data structure with an example. [6]
- (b) Write a 'C' program for Fast and Simple Transpose. [10]

Or

10. (a) Represent the following polynomials using arrays : [6]
- (i)  $x^4 - 75x^3y^2 + 2y - x$
- (ii)  $2x^6 + 10x^4y^2 - 3x^3y^2 + 10x$
- (iii)  $-3x^5y^7 + 7y^3 - 2.$

- (b) Write a 'C' program for addition of two sparse matrices. Also explain time complexity. [10]

11. (a) What is GLL ? Give C structure for the polynomial using GLL. Represent the following polynomial using GLL : [10]
- $$5x^9y^4z^2 + 5x^8y^3z^2 + x^5y^3z + 10x^3y^2z + 2yz.$$

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6

- (b) Write a 'C' program to print sum of even numbers from the Singly Linked List of integers. [8]

*Or*

12. (a) Write a 'C' program for polynomial addition and evaluation, where polynomials are represented using linked list. [10]
- (b) Explain the different types of linked lists with their diagrammatical representation. [8]