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[4857]-1084

S.E. (I.T.) (First Semester) EXAMINATION, 2015

FUNDAMENTALS OF DATA STRUCTURES

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Assume suitable data, if necessary.

1. (a) What is the purpose of structure in 'C' ? Can we define the structure into the structure ? Give suitable example. [6]
- (b) Write a pseudo code to find out length of string without using library function. [4]
- (c) Explain pointer variable with example. [2]

Or

2. (a) Given the following declarations :

`int m = 50, n = 50;`

`int *p1 = & m, *p2 = & n;`

What is the value of each of the following expressions ? [4]

(i) `(*p1)++ ;`

(ii) `-- (*p2);`

(iii) `*p1+ (*p2) --;`

(iv) `++(*p2) - *p1;`

P.T.O.

- (b) Explain how an array is passed to a function as a pointer with example. [4]
- (c) Explain any *four* file operations. [4]
3. (a) What is time complexity of an algorithm ? Explain its importance with suitable example. [3]
- (b) Explain linear and non-linear data structures with suitable examples. [3]
- (c) Show the output of each pass using insertion sort to arrange the following numbers in ascending order : [6]
- 150, 350, 100, 250, 200, 50, 300.
- Or*
4. (a) Explain the importance of searching and sorting techniques in computer science field. What is sort stability ? [4]
- (b) With respect to algorithm analysis, explain the following terms : [6]
- (i) Big Oh notation
- (ii) Omega notation
- (iii) Theta notation
- (c) What is the importance of pivot element in the quick sort method. [2]
5. (a) What is sparse matrix ? What are its applications ? [5]
- (b) Explain row major and column major representation of arrays. [4]
- (c) Represent the following polynomials using arrays : [4]
- (i) $5x^2 - 10xy + y^2 - 20$
- (ii) $x^4 + 59x + 10$

Or

- 6.** (a) What is sequential memory organization ? List the advantages and disadvantages of sequential memory organization. [5]
- (b) Write a pseudo code for the following stack operations : [4]
- (i) push operation
- (ii) pop operation
- (c) Explain the address calculation of element in arrays in row major and column major Representation. [4]
- 7.** (a) Compare linked list with arrays with reference to the following aspects : [6]
- (i) Accessing any element randomly
- (ii) Insertion and deletion of an element
- (iii) Utilization of computer memory
- (b) Write a pseudo code to delete a node from singly linked list. [7]

Or

- 8.** (a) Explain GLL. Represent the following polynomial using GLL. [6]
- $(p, q, (r, s, (t, u, v), w), x, u).$
- (b) Write a pseudo code to insert a node at start and at end in DLL. [7]