2017

MCA

2nd Semester Examination

DATA STRUCTURE

PAPER—MCA-201

Full Marks : 70

Time : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer any *five* questions.

1. (a) Define stack with an example.

(b) Write an algorithm to insert an element into the stack (push operation) and delete an element form the stack (pop operation). 2+(6+6)

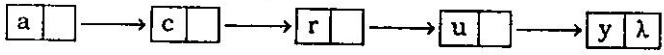
2. (a) Write an algorithm to check whether a matrix is upper triangular or not.

(b) Write down the general formula for representing location of a m×n matrix in row major form and column major form. Also imagine that the index is starting form 1.

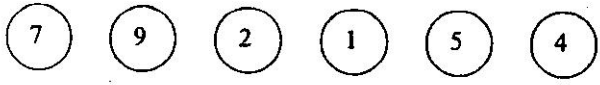
(c) Compute the computational complexity of the equation.

$3x^3 + 2x + 9$ and show that it will bi Big Oh of x^3. 6+(2+2)+4

3. (a) Write an algorithm to insert a character 'p' into a single linked list in its proper position. The list is alphabetically arranged. For example, the list may be–



(b) Explain bubble sorting with following example— 6+8



4. (a) Write an algorithm to add two polynomials, eg.,

$$x^5 + 4x^3 + 3x^2 + x + 7$$

and $$x^7 + 4x^5 + 9x^2 + 11x + 21$$

using array.

(b) What is max-heap and min-heap

(c) Define sparse matrix with example. 7+4+3

5. (a) Consider the following past-order and In-order traversals of a binary tree :

Post-Order : H D I E B J F K L G C A

In-Order : H D B I E A F J C K G L

Construct the tree (binary tree) and also find the Pre-order traversal.

(b) Compare and contrast BFS and DFS with an example.

(c) What mention its advantage tureaded being tree?

7+4+(2+1)

6. (a) Construct an AVL search tree with the following elements

63, 9, 19, 27, 18, 108, 99, 81.

(b) What is collision? How it can be resolved?

(c) Define B-tree.

(d) What is the difference between complete Binary tree and Full Binary tree. 6+(1+3)+2+2

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