



Reg. No. :

Name :

First Semester M.Sc. Computer Science Degree Examination, July 2009
(I.D.E.)

1.5 : DATA MANAGEMENT AND FILE SYSTEMS

Time : 3 Hours

Max. Marks : 80

***Instruction :** The question paper contains **two** parts, Part–A and Part–B. Part–A carries **32** marks and Part–B carries **48** marks.*

PART – A

Answer **any eight** questions. All questions carry **equal** marks. Answer in **three** or **four** sentences. **(8×4=32 Marks)**

Explain the following :

1. Describe the similarities and the difference between stack and queues.
2. List three applications of stacks. For each give reasons why stack would be preferable to arrays.
3. Draw a directed graph. Represent the graph using a non-directory structure.
4. What do you mean by adjacency matrix ?
5. Sort the list 3, 1, 4, 7, 5, 2, 6, 9 using Bubble sort.
6. Given the following arithmetic expression in infix notation as

$$8 / (7 - 3) + 2 * (3 + 8) - 7$$

Translate this expression into postfix notation.

7. What are the typical responsibilities of a file system ?
8. Show by example the distinction between a stable sort and unstable sort.



9. Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes : $((() (()) ()))$?
10. Compare the breadth-first traversal and the depth-first traversal in a Graph.
11. Suppose that we are using a linked representation of lists which is circular, has double links, and has a sentinel node (also known as a list header). Assume that L points to the sentinel node for a list that has at least 5 elements. What effect would executing the following code have on the list being represented ?
- ```
x = L.prev.prev;
x.next.prev = x.prev;
x.prev.next = x.next;
```
12. For the following key sequences [3, 1, 4, 5, 9, 2, 6, 8, 7, 0] determine the Btree of order three obtained when the keys are inserted one-by-one in the order given into an initially empty tree.

### PART – B

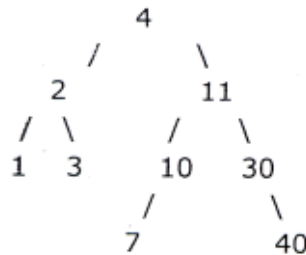
Answer **any six** questions. **All** questions carry **equal** marks. Your answer should contain the explanation regarding the concept/principle behind the question :

**(6×8=48 Marks)**

13. Explain the following :
- Linear Data Structures
  - Non Linear Data Structures.
14. With the help of suitable algorithm evaluate the postfix expression,  $123*+4-$ .
15. Consider infix to postfix conversion using stack. Suppose that after some number of operations the content of stack is as given. Now what will be the content of the stack if next symbol is a
- |                      |   |
|----------------------|---|
| i) Operand           |   |
| ii) Operator +       | * |
| iii) Closing bracket | ( |
| iv) Opening bracket  | + |



16. Here is a small binary tree :



Write the order of the nodes visited in, in-order, pre-order and in post-order traversal. And also identify which traversal method will print the values in sorted order.

17. Write an algorithm that will insert a node X in to a doubly linked list immediately before node S.
18. Explain how you would select the kind of searching to use on a particular set of records. What factors need to be considered ?
19. How the Quick Sort processes the list 42, 34, 75, 23, 18, 100, 10, 72 in order to sort it in descending order ?
20. Explain the dequeue operation on a queue implemented using an array of size 5.
21. Consider the following AVL tree. Show that AVL tree that results if we insert the keys 55, 65 and 85.

