

S-3108/1001

M.C.A. EXAMINATION

Oct 2001

(Batch 1998)

(Second Semester)

DATA STRUCTURE AND ALGORITHMS

MCA-201

3 Hours

Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *two* questions from each Unit. All questions carry equal marks.

Unit I

- (a) Distinguish between Data structure and Storage structure. Explain two types of storage structures for two dimensional arrays. 8
 - (b) Write and explain with the help of suitable examples any three applications of a stack. 8
 - (c) Write the underflow and overflow conditions for a linked stack. 4
2. (a) A double ended queue is implemented as an array. The queue implements the circular logic. Write the four algorithms to delete and insert

$$(174) \quad 3108/1001 = \frac{1}{4}$$

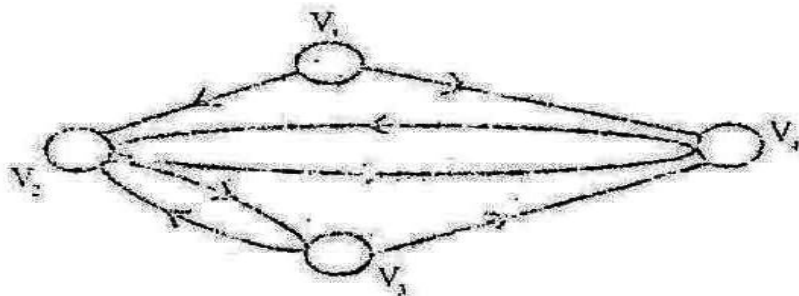
at both ends of the double ended queue. Explain conditions of underflow and overflow in each case. 16

(b) Define priority queue. Give and explain one application of priority queue in computer systems. 4

3. (a) Assuming that a polynomial in three variables is represented by a linked list. Write an algorithm which traverses the linked list and evaluates the polynomial for given values of x, y, z . 6

(b) What is a Binary Search Tree? Write an algorithm to delete a node from binary search tree. Write two applications of binary search tree. 14

(a) Write an adjacency matrix A of the graph given below:



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- b Show the linked representation of the graph given in part (a). 5
- (c) Give two situations in problem solving where you will use graph as data structure. 5
- (d) Compare graph with binary tree. Is a binary tree a graph? Can vice-versa be true? 5

Unit II

- 5 (a) Take the following data:

15 21 32 47 54 60

Show how many comparison would be required to search 15 using binary search. Discuss the complexity of binary search. 8

- (b) Explain how data is sorted using merge sort? Discuss the complexity of merge sort. 12

- 6 Explain the following:

(a) Fixed Block Storage Allocation

(b) Garbage Collection

(c) Compaction: 20

7. What is External Sorting? Explain the following external sorting techniques:

$$(176) \quad 3108/1001 = 3/4$$

- (a) Run Lists
 - (b) Polyphase Sorting. 20
8. What is Hashing? What is a collision in hashing? Write and explain the collision resolution techniques in hashing. 20

$$(17) \quad 3108/1001 = \frac{2}{1}$$