

Data Structures
2008 November
Technology BCA
Semester 3
University Exam
Mangalore University

shaalaa.com

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Credit Based Third Semester B.C.A. Degree Examination
October/November 2008

DATA STRUCTURES

Time : 3 Hours

Max. Marks : 80

Note: Answer any TEN questions from PART A and any ONE full question from each unit in PART B.

PART A

(2x10=20)

1. a) How do you calculate the address of an one dimensional array element. Give example.
- b) What is the difference between stack and queue?
- c) Evaluate $AB-CD+*$. Given $A=1.0$, $B=4.0$, $C=3.0$, $D=4.0$ and also obtain the equivalent prefix form.
- d) Define the terms i) empty list ii) NULL pointer in a linked list
- e) Explain recursion.
- f) What is the advantage and disadvantage of circular linked list over singly linked list?
- g) Differentiate between terminal nodes and non terminal nodes.
- h) Write a note on complete binary tree.
- i) Write a note on digraph.
- j) What is the importance of searching and sorting?
- k) How does a sequential search differ from binary search?
- l) List the considerations to be followed while selecting a sorting technique.

PART B

UNIT-I

2. a) Write the algorithmic notation for assignment statement, input statement and output statement. Give example.
- b) Differentiate between
 - i) arrays and lists
 - ii) primitive recursive functions and non primitive recursive functions.
- c) Explain the advantage of circular queue over ordinary queue with suitable example.
- d) Write a note on priority queue. **(4+4+4+3)**

OR

3. a) Write and explain the algorithm to convert an infix to postfix expression.
- b) Explain the sub algorithm for inserting and deleting an element to/from a stack.
- c) Explain the algorithm to insert an element into a circular queue and ordinary queue. **(6+4+5)**

Contd... 2

UNIT-II

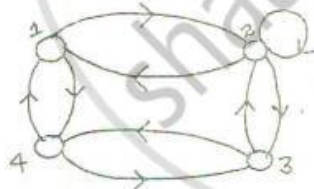
4. a) What is a singly linked list? Explain the algorithm to insert a node at the end of a list.
 b) What do you mean by traversing a list? Explain the algorithm to traverse all the nodes of a circular linked list.
 c) Write and explain the algorithm to display all the nodes of a doubly linked list. (5+5+5)

OR

5. a) Write and explain an algorithm to search for an element in a circular linked list.
 b) Explain the concept of doubly linked list with a diagram. Mention its advantages and disadvantages over other lists.
 c) Explain and write the algorithm to delete a node from a specified position in a singly linked list. (5+4+6)

UNIT-III

6. a) With an example and a neat diagram explain the linked storage representation of a binary tree.
 b) Explain the following terms on a binary tree of level 4.
 i) node ii) degree of a node iii) siblings iv) path
 c) What do you mean by adjacency matrix of a graph? Write the adjacency matrix for the following graph. (5+6+4)



OR

7. a) What do you mean by breadth first search traversal? Explain with its algorithm.
 b) Explain the different traversal operations on a binary tree with suitable example.
 c) With an example explain the powers of an adjacency matrix. (5+6+4)

UNIT-IV

8. a) Explain the bubble sort technique to sort a list of following numbers.
 22 2 74 11 12 87 34 78 24
 b) Explain the binary search with its algorithm.
 c) Explain the procedure for sorting a list of numbers using merge sort technique. Explain with an example. (5+5+5)

OR

9. a) Write and explain the algorithm of quick sort.
 b) With a suitable example explain the concept of selection sort.
 c) What is a big O notation? Write the time complexity of all the sorting technique. (7+5+3)