

S.E. IT Sem-II

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Total No. of Questions—12]

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[4262]-215

S.E. (IT) (II Sem.) EXAMINATION, 2012

DATA STRUCTURES AND FILES

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

**N.B. :-** (i) Answer *three* questions from Section I and *three* questions from Section II.

(ii) Answers to the two Sections should be written in separate answer-books.

(iii) Neat diagrams must be drawn wherever necessary.

(iv) Figures to the right indicate full marks.

(v) Assume suitable data, if necessary.

### SECTION I

1. (a) Compare index sequential and direct access files. [6]

(b) Create a Hash table and resolve collisions using linear probing with and without replacement :

9, 45, 13, 59, 12, 75, 88, 11, 105, 46

Hash table size = 11 and Hash function = key mod 10. [8]

(c) Write a note on re-hashing. [4]

P.T.O.

Or

2. (a) Write pseudo-code for implementation of primitive functions of index-sequential file. [8]

(b) Write a note on characteristics of good hash function. [4]

(c) Write a 'C' program using command line arguments to perform the following operations on a file :

(i) Count number of white spaces

(ii) Count number of special characters. [6]

3. (a) Convert the given postfix expressions into infix and prefix :

AB - C + DEF -+^

ABCDE -+^\*EF\*-

Show stack contents in each case. [8]

(b) Explain the concept of multistacks. [4]

(c) Write a note on implicit and explicit stacks. [4]

Or

4. (a) Implement stack as an ADT using sequential organisation. [8]

(b) Write a 'C' code to create an expression tree and perform non-recursive in-order traversal. [8]



5. (a) Specify which of the following applications would be suitable for a FIFO queue and justify your answer :

(i) A program to keep track of patients as they check into a clinic, assigning them to doctors on a first come, first-served basis.

(ii) An inventory of parts is to be processed by part number.

(iii) A dictionary of words used by spelling checker is to be created.

(iv) Customers are to take token nos. in a bank and are to be serviced when their nos. come up. [4]

(b) Write a pseudo-code to implement queue using sequential organization. [8]

(c) List down applications of queue. [4]

Or

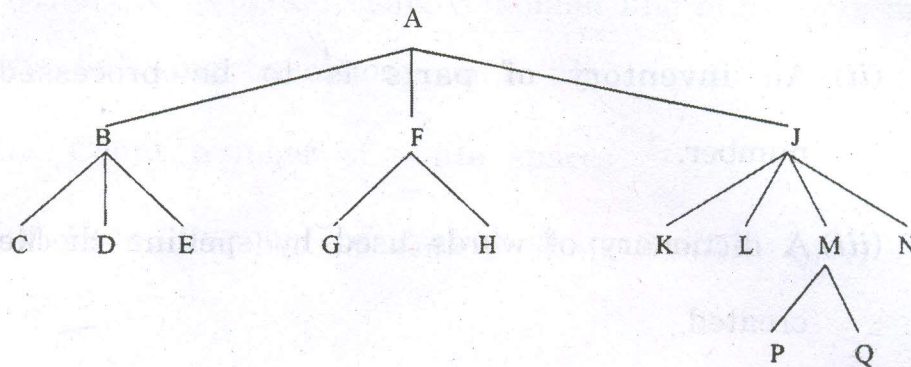
6. (a) Write a 'C' code for implementation of priority queue. [8]

(b) Compare multiqueue, double ended queue and priority queue. [8]

## SECTION II

7. (a) What is the necessity of converting a tree into binary tree ?

Convert the following tree into a binary tree and list down the steps for the same. [6]



- (b) Implement binary tree as an ADT. [8]
- (c) Write a 'C' function to implement post order traversal on threaded binary tree. [4]

Or

8. (a) Write a recursive function to find the height of a binary tree. [6]
- (b) Given the following traversals build a binary tree from them : [6]
- (i) In-order : 15, 22, 25, 30, 33, 40, 44, 50, 60, 75, 80, 90
- (ii) Pre-order : 50, 25, 22, 15, 40, 30, 33, 44, 75, 60, 90, 80.
- (c) Write a 'C' function to delete a node from a binary search tree. [6]



9. (a) For the graph given draw the adjacency list and matrix : [4]

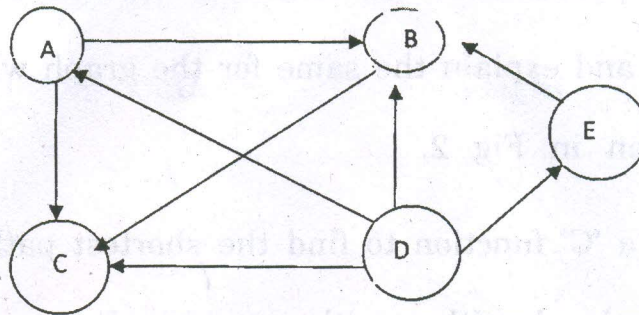


Fig. 1

- (b) Write pseudo-code for Prim's method for finding MST of graph and explain the same for the graph whose weight matrix is given : [8]

	X	Y	S	T
X	0	0	3	0
Y	5	0	1	7
S	2	0	0	4
T	0	6	8	0

Fig. 2

- (c) Define the following w.r.t. graphs with examples : [4]
- (i) Degree of node
  - (ii) Isolated node
  - (iii) Path
  - (iv) Cycle.

Or

10. (a) Write pseudo-code for Kruskal's method for finding MST of graph and explain the same for the graph whose weight matrix is given in Fig 2. [8]

(b) Write a 'C' function to find the shortest path in a graph using Dijkstra's algorithm with an example. [8]

11. (a) Construct an AVL search tree by inserting the following elements in the order of their occurrence. Show the balance factor and type of rotation at each stage : [10]

64    1    44    26    10    110    98    85    13    20

(b) Explain the mechanism to create Huffman's tree and use it for encoding and decoding. Assume suitable data. [6]

Or

12. (a) Sort the following numbers in ascending order using heap sort. Show the sorting stepwise : [8]

17    20    114    44    30    2    18    33    56    10



- (b) Create a Huffman's tree for the given data set and find the corresponding Huffman's codes : [8]

Data	Weight
A	10
B	3
C	4
D	15
E	2
F	4
G	2
H	3