

Total No. of Questions—12]

[Total No. of Printed Pages—7

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[4162]-215

S.E. (I.T.) (Second Semester) 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) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
 - (vi) Assume suitable data, if necessary.

SECTION I

1. (a) What is static and dynamic hashing ? Show that the hash function $h(k) = k \% 17$ does not satisfy the one way property, weak collision resistance or strong collision resistance. [8]
- (b) Differentiate between sequential and index sequential file. Write a pseudocode to read and write contents using index sequential file. [8]

P.T.O.

Or

2. (a) Assume a hash table of size 15 and hash function $H(X) = X \text{ Mod } 15$ performs linear probing with and without replacement for the given set of values. [8]

0, 1, 2, 4, 72, 65, 85, 87, 90, 58, 52, 53, 42, 44, 91.

- (b) Write a program in 'C' for sequential file and perform the following operations : [8]

- (i) Copying all data from one file to another
- (ii) Count number of characters in a file
- (iii) Count number of words in file
- (iv) Search a particular word in a file.

3. (a) What is stack ? Give application of stack in computer organization. [4]

- (b) Imagine we have two empty stacks of integers, S1 and S2. Draw a picture of each stack after the following operations : [6]

Pushstack(S1, 3);

Pushstack(S1, 5);

Pushstack(S1, 7);

Pushstack(S1, 9);

Pushstack(S1, 11);

Pushstack(S1, 13);

While(!emptystack(S1))

{

Popstack(S1, x);

Popstack(S1, x);

Pushstack(S2, x);

}

- (c) Change the following infix expression to postfix using stack. Clearly indicate the content of stack.

(i) $D-B+C$

(ii) $A*B+C*D$

(iii) $(A+B)*C-D*F+C$

(iv) $(A-2)*(B+C-D*E)*F$

[8]

Or

4. (a) What is importance of stack in recursion. Explain with suitable example. [4]

- (b) Implement stack as an ADT using linked organization. [6]

- (c) If the values of A, B, C and D are 2, 3, 4 and 5 respectively.

Calculate the value of the following prefix expressions and clearly indicate the content of stack. [8]

(i) $+ - * ABCD$

(ii) $- * A + BCD$

(iii) $+ - / ABCD$

(iv) $- + / ABCD$

5. (a) Write an ADT for Queue and write pseudocode for circular queue using array organization. [8]

- (b) Write a pseudocode for simple queue using linked organization and represent each pseudocode step diagrammatically. [8]

Or

6. (a) What is application of Queue in computers ? Explain the concept of multi-queue and d -queue with example. [8]

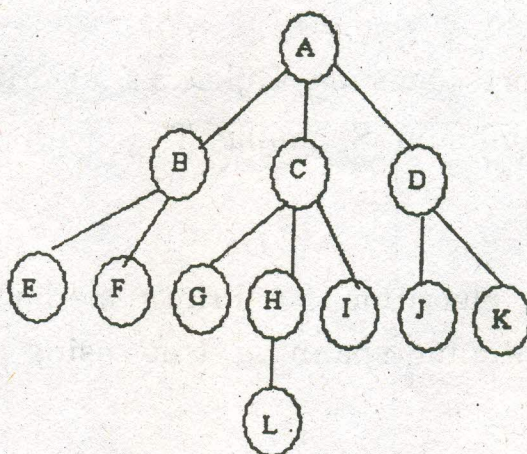
- (b) Write a pseudocode for priority queue using sequential organization and represent each pseudocode step diagrammatically. [8]

SECTION II

7. (a) Define the following with examples : [8]

- (i) Complete Binary Tree
- (ii) Predecessor and Successor
- (iii) Graph
- (iv) OBST.

(b) 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. [8]



Or

8. (a) Write functions for non-recursive pre-order and in-order traversal algorithms for a in-order threaded binary tree. [8]

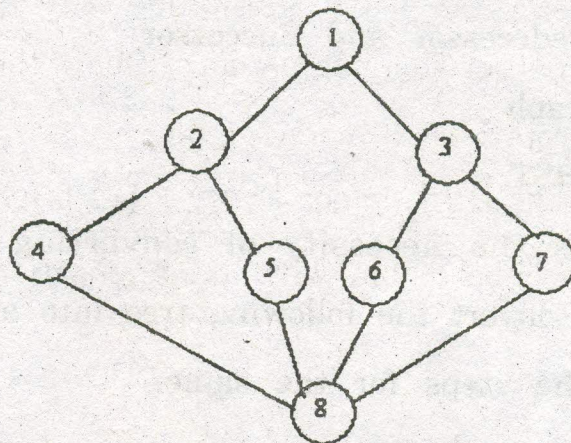
(b) Construct a binary tree from the given traversals : [4]

Pre-order : * + a - b c / - d e - + f g h

In-order : a + b - c * d - e / f + g - h

(c) Write a function for creating binary search tree. [4]

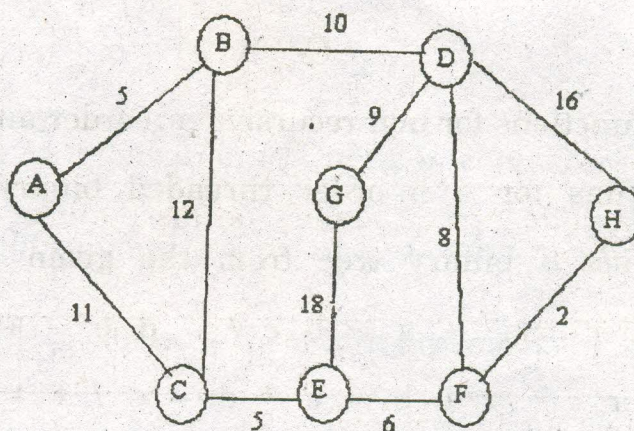
9. (a) Write an algorithm to perform DFS traversal for a graph.
Perform DFS & BFS for the following graph : [10]



- (b) Write short notes on Dijkstra's algorithm. [4]
(c) Define Minimum Spanning Tree with an example. [2]

Or

10. (a) Write an algorithm for Prim's method.
Find minimum spanning tree using Prim's and Krushal's method. [10]



- (b) Describe the different ways of graph storage structure with an example. [6]

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 : [12]

148	153	158	1000	112	145	120	149	128	146
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- (b) Explain symbol table with its applications. [6]

Or

12. (a) Draw a Huffman tree for the given data set and find the corresponding Huffman codes : [8]

Character	Weight	Character	Weight
A	10	M	3
C	3	N	6
D	4	O	8
D	15	R	7
G	2	S	5
I	4	T	12
K	2	U	5

- (b) Sort the following numbers in ascending order using heap sort :

77	62	14	9	30	21	80	25	70	55.
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Show the sorting stepwise.

[10]