

Total No. of Questions—12]

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Seat No.	
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[4757]-196

S.E. (Information Technology) (Second Semester)

EXAMINATION, 2015

DATA STRUCTURES AND FILES

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

- N.B. :—** (i) Answer question Nos. 1 or 2, 3 or 4 and 5 or 6 from Section I and question Nos. 7 or 8, 9 or 10 and 11 or 12 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) Assume suitable data if necessary.

SECTION I

1. (a) Explain various file opening modes with respect to text and binary files. [6]
- (b) Explain the features of a sequential file. Write a 'C' program to copy contents of one file to another file using command line arguments. [6]
- (c) Write an algorithm for linear probing without replacement strategy. [6]

P.T.O.

Or

2. (a) State advantages and disadvantages of sequential file and index sequential file. [6]
- (b) Explain the features of a direct file. Write a 'C' program to find the sum of the numbers passed as command line arguments. [6]
- (c) What are the characteristics of good hash function ? How can collision be resolved in a hash table. [6]
3. (a) What is stack ? Write an algorithm to implement stack using linked list. [8]
- (b) Transform each of the following infix expression to postfix form using stack. Show clearly the contents of stack : [8]
- (i) $D - B + C$
- (ii) $A * B + C * D$
- (iii) $(A + B) * C - D * F + C$
- (iv) $(A - C) * (B + C - D * E) * F$.

Or

4. (a) Define implicit and explicit stack. What is the importance of stack in recursion ? Explain with suitable example. [8]

- (b) Clearly indicate the contents of stack for evaluating the following postfix expressions. [8]

Assume :

$$A = 8, B = 6, C = 10, D = 5, E = 7$$

$$AB - CD/* E +.$$

5. (a) What are the disadvantages of linear queue. Write a 'C' program to implement linear queue using linked organization. [8]
- (b) Write a pseudo C code for implementation of circular queue using array. [8]

Or

6. (a) Write a 'C' program to implement deque using linked organization. [8]
- (b) Write a pseudo C code for implementation of priority queue. [8]

SECTION II

7. (a) Define the following with respect to trees with examples : [8]
- (i) Complete binary tree
 - (ii) Predecessor and successor
 - (iii) Height of tree
 - (iv) Skewed binary tree.
- (b) Write functions for non-recursive inorder and preorder traversals for binary trees. [8]

Or

8. (a) Construct a binary tree from the given traversals : [8]
Preorder : * + a - bc/-de - + f g h
Inorder : a + b - c * d - e/f + g - h.
- (b) Write non-recursive preorder traversal algorithm for inorder threaded binary tree. [8]
9. (a) Write an algorithm to perform DFS traversal for a graph. Perform the same for the given graph (Refer Fig. 1) : [8]

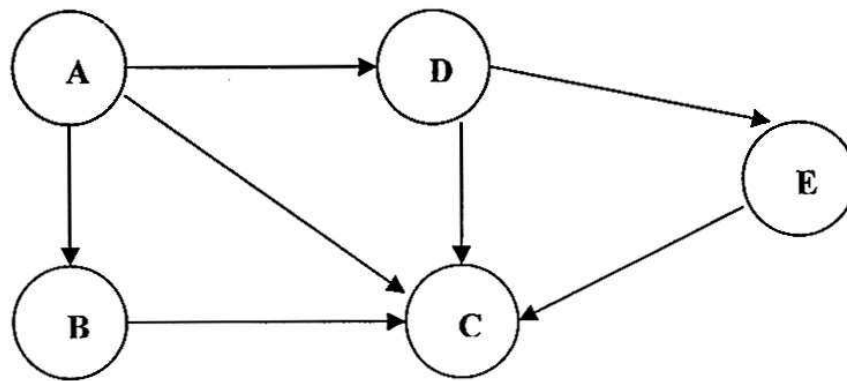


Fig. 1

- (b) Define the following with respect to graph with examples : [8]
- (i) Degree of node
 - (ii) Isolated node
 - (iii) Path
 - (iv) Cycle.

Or

10. (a) For the graph given below find minimum spanning tree using Prim's algorithm. Show stepwise representation (Refer Fig. 2) : [8]

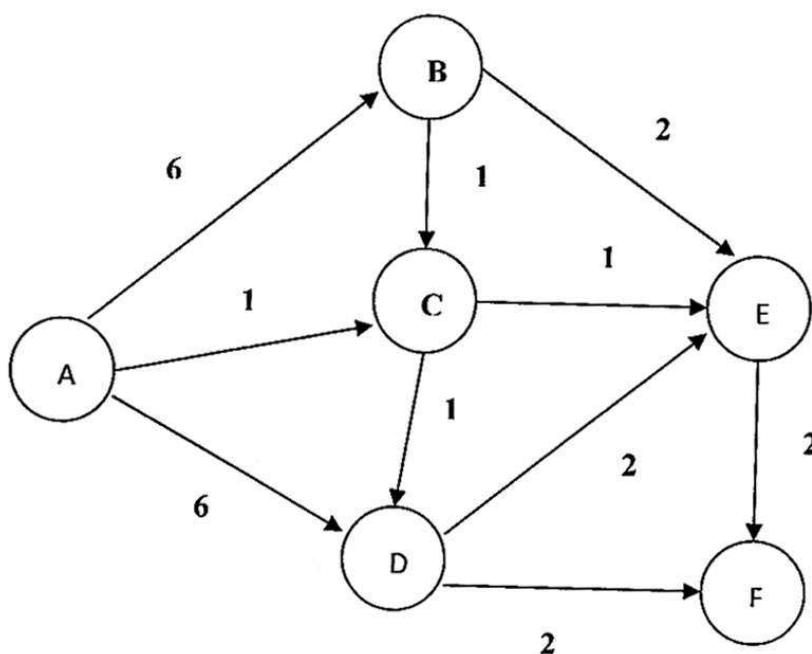


Fig. 2

- (b) Define a graph. For the given adjacency matrix draw the graph and its adjacency list : [8]

	A	B	C	D	E	F	G	H
A	0	1	1	0	0	0	0	0
B	1	0	0	0	1	0	0	0

C	1	0	0	1	0	1	0	0
D	0	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1	0
F	0	0	1	0	0	0	1	1
G	0	0	0	1	0	1	0	0
H	0	0	0	1	0	1	0	0

11. (a) Define AVL tree. For the given data, build an AVL tree and show the balance factor and type of rotation at each step. [10]

64, 1, 44, 26, 13, 110, 98, 85.

- (b) For the data given below build a Huffman tree and find code of each symbol : [8]

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

Or

- 12.** (a) Sort the following numbers in ascending order using heap sort.

Show the sorting stepwise : [10]

77, 62, 14, 9, 30, 21, 80, 25, 70, 55.

- (b) Distingusih between Huffman's tree, OBST and AVL in terms of their definition and application. [8]