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[4657]-83

S.E. (I.T.) (Second Semester) EXAMINATION, 2014

DATA STRUCTURES AND FILES

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

- N.B. :—** (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4 and Q. No. 5 or Q. No. 6 from Section I and Q. No. 7 or Q. No. 8, Q. No. 9 or Q. No. 10 and Q. No. 11 or Q. No. 12 from Section II.
- (ii) Answers to the two Sections should be written in separate answer-books.
- (iii) Neat diagrams must be drawn whenever necessary.
- (iv) Assume suitable data, if necessary.

SECTION I

1. (a) Assume a hash table of size 15 and hash function $H(X) = X \bmod 50$, perform 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

P.T.O.

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

(i) Copy 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.

Or

2. (a) State advantages and disadvantages of sequential file, index sequential file and direct file. [8]

(b) Write a 'C' program to copy contents of one file to another file using command line arguments. [8]

3. (a) Write an algorithm to convert an infix expression to postfix form. [8]

(b) Transform each of the following prefix expression to infix form.

Show clearly the contents of stack : [8]

(i) $*+ a-bc/-de+ -fgh$

(ii) $- +/a \wedge bc*de*ac$

Or

4. (a) Write a 'C' program to convert decimal number to binary using stack. [8]

- (b) Clearly indicate the contents of stack for evaluating the following postfix expressions :

Assume $A = 1, B = 2, C = 3$ [8]

(i) $AB + C - BA + C$

(ii) $ABC + * CBA - + *$

5. (a) Define linear queue. What are the disadvantages of linear queue ?
Write a 'C' program to implement linear queue using linked organization. [10]

- (b) Write a pseudo C code for implementation of circular queue using array. [8]

Or

6. (a) Define deque. Write a 'C' program to implement deque using linked organization. [10]

- (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

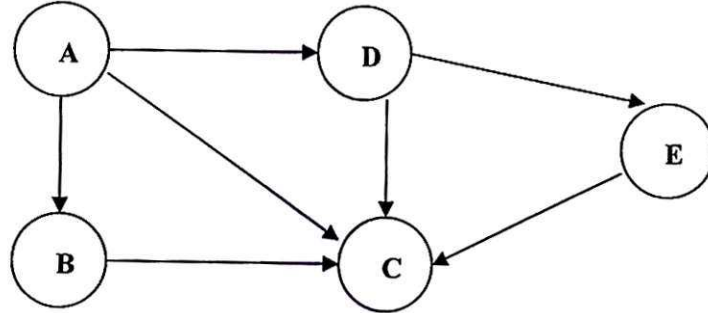
8. (a) Construct a binary tree from the given traversals : [8]

Preorder : * + a - bc/-de - + fgh

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

- (b) Write non-recursive preorder traversal algorithm for in-order threaded binary tree. [8]

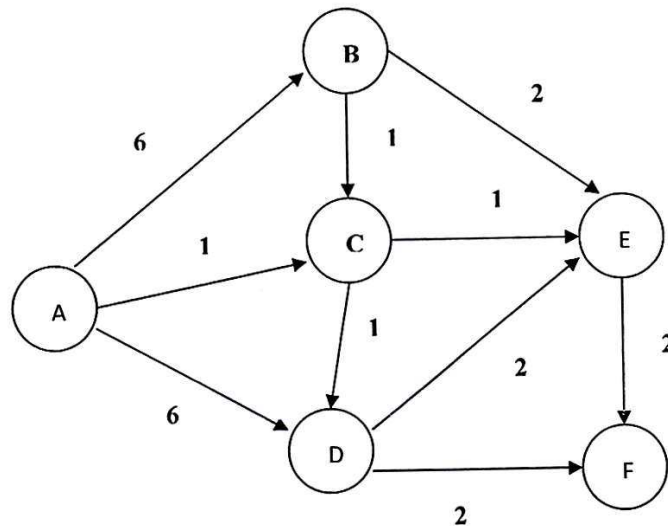
9. (a) Write an algorithm to perform DFS traversal for a graph. Perform the same for the given graph : [8]



- (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 : [8]



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