

Total No. of Questions—8]

[Total No. of Printed Pages—4+2

Seat No.	
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[4757]-1086

S.E. (I.T.) (Second Semester) EXAMINATION, 2015

DATA STRUCTURES AND FILES

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer *four* questions.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Assume suitable data, if necessary.

1. (a) Change the following infix to postfix using stack. Clearly indicate the content of stack : [6]

(i) $(A + B) * C - D * F + C.$

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

(b) Explain the implementation of circular queue using sequential organization. [6]

P.T.O.

Or

2. (a) Implement Stack as an ADT using linked Organization. [6]

(b) Specify which of the following application would be suitable for a first-in-first-out queue and justify your answer : [4]

(i) A program is 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 numbers at a bakery and be served in order when their number come-up.

(c) Define Multiqueues. [2]

3. (a) Write a function for creating Binary Search Tree. [4]

- (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	1	0	0
B	1	0	0	0	1	0	0	0
C	1	0	0	1	0	0	0	0
D	0	0	1	0	0	0	0	1
E	0	1	0	0	0	0	0	1
F	1	0	0	0	0	0	1	0
G	0	0	0	0	0	1	0	1
H	0	0	0	1	1	0	1	0

Find all the nodes adjacent to node A, node F and node G.

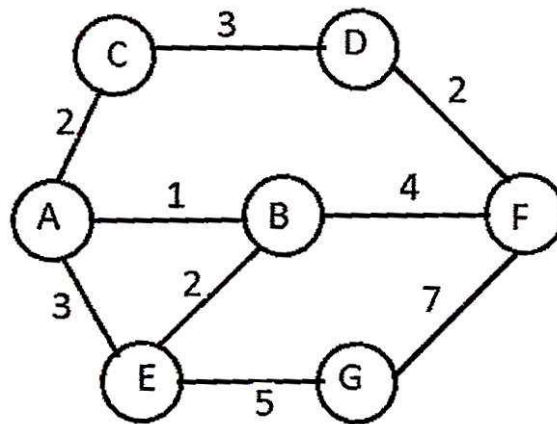
Or

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

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

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

- (b) With example define the following terms wrt graphs : [4]
- (i) Degree of node
 - (ii) Isolated node
 - (iii) Path
 - (iv) Cycle.
- (c) For the given graph show stepwise representation of MST using Kruskal's algorithm. [4]



5. (a) Create a Huffman's tree for the given data set and find the corresponding Huffman's codes : [6]

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

- (b) Create hash table and resolve collision using linear probing with replacement : [4]

Table Size = 10 Hash Function = $\text{key} \% 10$

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

- (c) Consider hash table in Q5b. After the hash table is 70% full apply rehashing and resolve collision for the same data. [4]

Or

6. (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 : [6]

55, 66, 77, 15, 11, 33, 22, 35, 25, 44, 88, 99

- (b) Write C++ program to implement priority queue using a Heap Data Structure. [8]

7. (a) Distinguish between logical and physical deletion of records and illustrate it with example. [6]

- (b) With the prototype explain the inbuilt functions in 'C' language for reading and writing character and record in a file. [6]

Or

8. (a) Explain different file opening mode with example in C++. [6]
- (b) Explain the concept of : [6]
- (i) Primary Indexes
 - (ii) Clustering Indexes
 - (iii) Secondary Indexes.