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[5057]-265**S.E. (I.T.) (Second Semester) EXAMINATION, 2016****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) Clearly indicate the contents of stack during conversion of given infix expression to postfix expression. Consider ^ as exponent operator : [6]

$$A*(B - C)/E^F + G$$

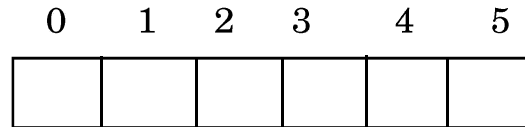
- (b) Explain the concept of multiqueue, Double Ended Queue and Priority queue. [6]

Or

2. (a) Implement stack as an ADT using sequential organization. [6]

P.T.O.

- (b) Consider the following circular multiqueue of integers and size 6. [6]



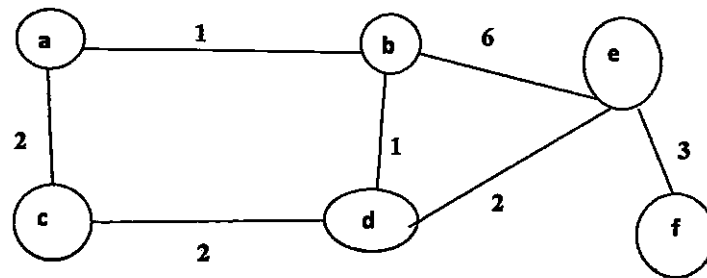
Front of Q1 = -1 Rear of Q1 = -1 Q1 starts at 0

Front of Q2 = -1 Rear of Q2 = -1 Q2 starts at 3

Show the circular queue contents as per the following operations at every step :

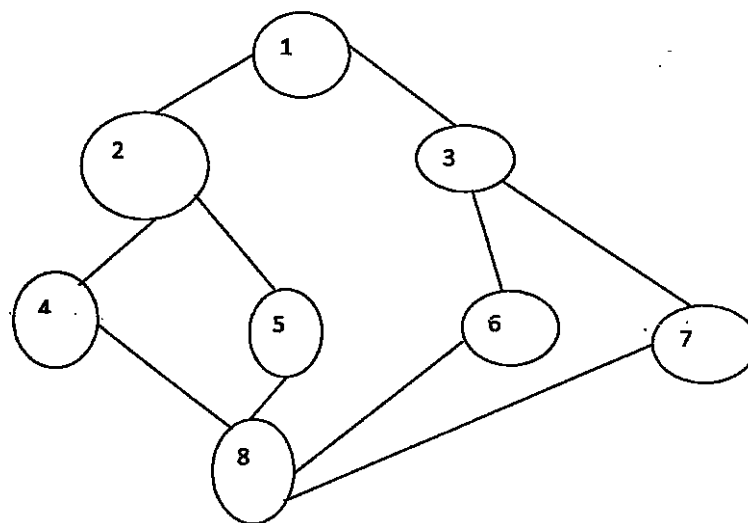
- (i) Insert 21 in Q1
- (ii) Insert 23 in Q1
- (iii) Insert 9 in Q2
- (iv) Insert 8 in Q1
- (v) Insert 10 in Q2
- (vi) Insert 11 in Q2
- (vii) Delete Q1
- (viii) Insert 81 in Q2
- (ix) Delete Q1
- (x) Insert 25 in Q2
- (xi) Insert 100 in Q1
- (xii) Delete Q2

3. (a) Write an algorithm for the inorder traversal of a Threaded Binary Tree. [6]
- (b) Write the pseudo code for Kruskal's algorithm and find minimum spanning tree for the following graph : [6]



Or

4. (a) Construct binary tree using tree traversals : [4]
 Inorder : H, D, I, B, E, A, J, F, K, C, G
 Postorder : H, I, D, E, B, J, K, F, G, C, A,
- (b) Explain with topological sorting using example. [4]
- (c) Give a graph, perform DFS and BFS. Assume starting vertex 1. [4]



5. (a) How many Binary Search Trees (BSTs) can be constructed for the given 'n' identifiers ? Construct all possible BSTs for the following identifier set. Compute the cost of each BST. Which BST is an optimal binary search tree ? The identifier set $a[] = (a_1, a_2, a_3) = (\text{do}, \text{if}, \text{while})$ with the successful and unsuccessful probabilities. [10]

$P[] = (0.5, 0.1, 0.05)$

$Q[] = (0.15, 0.1, 0.05, 0.05)$

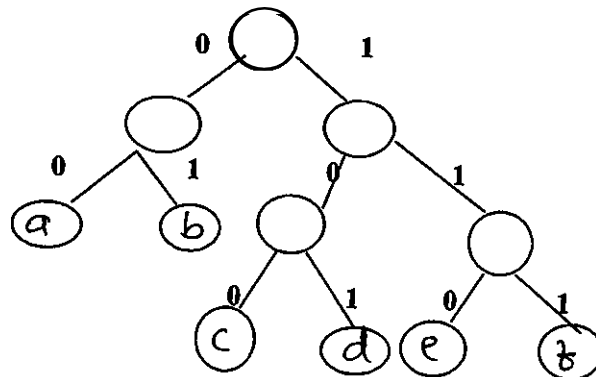
- (b) Write a note on rehashing. [4]

Or

6. (a) Construct an AVL for the following data set : [10]

30, 5, 3, 18, 19, 4, 6, 35, 33, 15

- (b) Huffman encoding and decoding : [4]



Encode :

(i) addef

(ii) deaf

Decode :

(i) 0010000111

(ii) 11100101110

7. (a) Write the pseudo code for search and insert operations in indexed sequential file. [6]
- (b) Compare binary file with text file. [6]

Or

8. (a) What is file ? Explain different types of file organizations. [6]
- (b) Explain : [6]
- (i) Primary index
 - (ii) Secondary index
 - (iii) Cluster index.

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