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S.E. (AI&ML)

DATA STRUCTURES & ALGORITHMS

(2019 Pattern) (Semester - III) (218542)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*

2) *Figures to the right indicate full marks.*

Q1) a) Enlist applications of stack data structure & Define it as an ADT.   **[6]**

b) Write sudo code for insert & delete operations of linear queue, if implemented using sequential organization.   **[8]**

c) What is the time complexity of push and pop operations for worst cases.?   **[4]**

OR

Q2) a) Convert the following infix expressions to prefix and clearly indicate the content of the stack.   **[8]**

i)   (A+B) $*$ C – D $*$ F$C

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

($ for power operation)

b) Write sudo code for underflow and overflow conditions for a circular queue implement with sequential organization, using rear and front only.   **[8]**

c) Enlist applications of priority queue.   **[2]**

Q3) a) Construct a binary tree using the following tree traversals.   **[8]**

Pre order $*$ + a – bc / – de – + fgh

Inorder   a + b – c $*$ d – e/f + g – h

b) Discuss the importance of inorder threaded binary tree with the help of example.   **[8]**

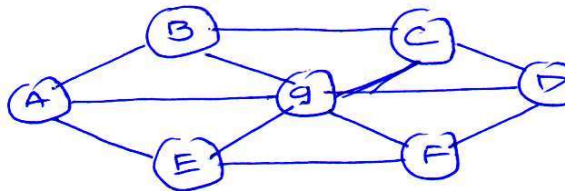c) Discuss the worst-case time complexity of deleting a node from binary seach tree.   **[2]**

OR

Q4) a) Contrast between general tree & binary tree convert the given general tree to binary tree. **[9]**
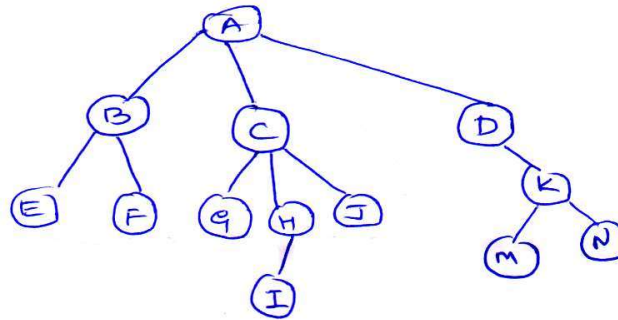
b) Discuss all the scenariors of deleting a node from BST with examples for each. **[9]**

Q5) a) Enlist applications of graphs and find BFS & DFS stepwise. **[8]**
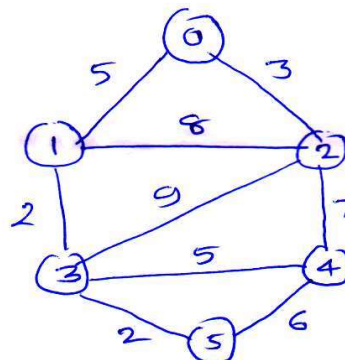

b) Construct an AVL for the following data, show balance factor of each node & type of rotation. **[9]**

58 69 73 18 12 35 24 45

OR

Q6) a) Write sudo code Kruskal's algorithm & find MST using the same for the following graph. **[9]**

b) Discuss the following data structures using examples. **[8]**

i) AVL trees

ii) Heap

Q7) a) Create hash table & solve collision using linear probing with replacement. Table size = 10 hash fn = key % 10

9 45 13 58 13 76 89 15 107 49 **[8]**

b) Write sudo code to perform following operations on index sequential file. **[9]**

i) create records

ii) delete record

iii) display records

OR

Q8) a) Enlist various hashing functions used to create hash table. Discuss any three with examples. **[8]**

b) Contrast between logical & physical deletion of records and illustrate it with the help of example. **[9]**

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