September 2021

DATA STRUCTURE

Time Allowed: 1.5 Hours | Full Marks: 70

Answer to Question No.1 is compulsory and Answer any two questions from the rest.

1. Answer the following questions (any twenty): 20x2

Choose the correct answer from the given alternatives:

i. Any node is the path from the root to the node is called-
   a) Ancestor node
   b) Successor node
   c) Internal node
   d) None of the above

ii. Which of the following is not the type of queue?
   a) Priority queue
   b) Circular queue
   c) Single ended queue
   d) Ordinary queue

iii. To represent hierarchical relationship between elements, which data structure is suitable?
   a) Graph
   b) Tree
   c) Dequeue
   d) Priority

iv. Which of the following data structure is linear type?
   a) Stack
   b) Graph
   c) Trees
   d) Binary tree

v. Which of the following data structure is linear type?
   a) Stack
   b) Graph
   c) Trees
   d) Binary tree

vi. The number of comparisons done by sequential search is ----------
   a) (N/2)+1
   b) (N+1)/2
   c) (N-1)/2
   d) N-2)/2

vii. _____ is not the operation that can be performed on queue.
   a. Traversal
   b. Insertion
   c. Deletion
   d. Retrieval

viii. Which is/are the application(s) of stack?
a. Function calls
b. Large number Arithmetic
c. Evaluation of arithmetic expressions
d. All of the above

ix. Which of the following data structure store the homogeneous data elements?
a. Lists
b. Pointers
c. Records
d. Array

x. The in order traversal of tree will yield a sorted listing of elements of tree in....
a. Merging
b. AVL Trees
c. Binary trees
d. Binary search tree

xi. A binary tree whose every node has either zero or two children is called.....
a. Extended binary tree
b. Complete binary tree
c. Binary Search tree
d. Disjoint tree

xii. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal:
a. ABFCDE
b. ADBFEC
c. ABDECF
d. ABDCE

xiii. A technique for direct search is-
a. Hashing
b. Tree Search
c. Binary Search
d. Linear Search

xiv. If a node having two children is deleted from a binary tree, it is replaced by its
a. Preorder predecessor
b. Inorder predecessor
c. Inorder successor
d. Preorder successor

xv. A linear collection of data elements where the linear node is given by means of pointer is called-
a. linked list
b. node list
c. primitive list
d. None of these

xvi. Representation of data structure in memory is known as-
a. storage structure
b. file structure
c. abstract data type
d. None of the above

xvii. Which data structure allows deleting data elements from and inserting at rear?
a. Stacks
b. Queues
c. Dequeues
d. Binary search tree

xviii. Which of the following data structure is non linear type?
a. Graph
b. Stacks
c. Lists
d. None of the above

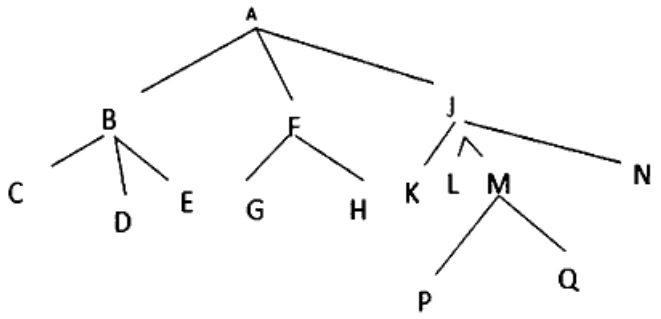
xix. Stack is also called as-
a) First in first out
b) First in last out
c) Last in last out
d) Last in first out

Fill in the blanks:

xx. _____is the method used by card sorter.
xxi. _____is not the type of queue.
xxii. Binary trees with threads are called as_____.
xxiii. In Binary trees nodes with no successor are called as_____.
xxiv. _____sorting methods would be most suitable for sorting a list which is almost sorted.

2. Define Binary Search Tree with example. Create a Binary Search Tree with the input given below:
98,2,48,12,56,32,4,67,23,87,55,46
Insert 21,39,45,54, and 63 into this Tree. 5+10=15

3. Define Tree. Explain basic differences between Trees with Binary Tree. Consider the following general tree T. Find the corresponding Binary Tree T´. 3+6+6=15



4. Illustrate the Marge sort and Quick sort with suitable example. 15

5. What do you mean by a hash function? Write an algorithm to search a record in a hash table. What is collision? Explain how open addressing linear probing can be used to resolve collision.
3+4+3+5

6. Construct a Binary Tree where in-order and pre-order traversals of a Binary Tree are given as follows:

Pre-order	A	B	D	G	H	E	I	C	F	J	K
In-order	G	D	H	B	E	I	A	C	J	F	K

7. Define AVL TREE. Construct an AVL Tree for the following data arrived in the sequence Given below:
37,42,95,21,40,41,10,100,87,72. 5+10=15

8. a) Write algorithms to implement the queue insertion and deletion using linked list.
b) Write an algorithm to reverse a linked list. 8+7= 15

9. a) Consider the Queue given below which FRONT=1 and REAR=5

	A	B	C	D	E				

i. ADD F
ii. DELETE two alphabets
iii. ADD H,J
iv. DELETE four Alphabets
v. ADD K

b) Define STACK with Example. Why STACK is called LIFO? 10+(3+2)=15

10. a) What are the advantages of threaded binary tree?
b) What are the ways of representing binary trees in memory? Which one do you prefer and why?
c) Convert the prefix expression — -/ab*+bcd into infix expression and then draw the corresponding expression tree. 4+(2+4)+5=15

11. Define Queue with example. Convert infix expression Q: A+ (B*C-(D/E^F)*G)*H into its equivalent postfixes expression and prefix expression. 7.5+7.5=15

12. a) Construct a binary tree where in order and preorder traversals of a binary tree is given follows:
In order Sequence: E,A,C,K,F,H,D,B,G
Preorder Sequence: F, A,E,K,C,D,H,G,B
b) Construct a binary tree where in order and preorder traversals of a binary tree is given follows:
In order Sequence: E,A,C,K,F,H,D,B,G
Preorder Sequence: F, A,E,K,C,D,H,G,B 7.5+7.5=15
