MANAV RACHNA vidyanatariksha

MANAV RACHNA UNIVERSITY
(FORMERLY MANAV RACHNA COLLEGE OF ENGINEERING
NAAC ACCREDITED 'A' GRADE INSTITUTION)
Declared as State Private University under section 2f of the UGC act, 1956

# DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

*"T3, Examination May 2018"*

**Semester**:2nd
**Subject**: DATA STRUCTURES
**Branch**: CSE
**Course Type:** Core
**Time**: 3 Hours
**Max.Marks**: 80

**Date of Exam**:21/05/2018
**Subject Code**: CSH102-T
**Session**: I
**Course Nature:Hard**
**Program: B.Tech**
**Signature: HOD/Associate HOD:**

## Part-A [10]-Each Question Carries two marks.

**Q1.**

a) What is a stack? What is the end of the stack from which data can be stored and removed called?
b) Track a stack matching parentheses for {(a + b) * (c + d)].
c) What does FIFO stand for? What data structure implements FIFO?
d) What is printer spooling? Which data structure is used to implement the same?
e) What type of relationship does a tree represent? How many leaves are there in a complete binary tree of n nodes?
f) What are the two ways of representing a binary tree?
g) What is the advantage of an AVL tree?
h) What is the difference between a tree and a graph?
i) What is the number of edges in a complete directed graph with N vertices? What is the number if the graph is undirected?
j) Define adjacent node, path and complete graph?

## Part B [3]Each Question Carries 15 Marks (Attempt Any Two)

**Q2.** (a) Write an algorithm that evaluates a prefix expression. (5)
(b)Translate following infix expression A+(B*C-(D/E^F)*G)*H) in to postfix expression using stack. (4)
c) Evaluate 1 2 3 + *, 1 2 – 3 + 4 *, and 1 2 + 3 4 + * using postfix evaluation function. (6)

**Q3.** (a) What is a Dequeue? What are the types of Dequeues? (1+4)
(b) What is a queue? Write an algorithm that remove an item from queue implemented as an array. (1+4)
c) Explain how circular queue overcome the limitation of linear queue. (5)

**Q4** (a) Write an algorithm for push and pop item from a stack implemented as an array. (5)
(b) Write an algorithm to add items in a circular queue implemented as an array. (5)
c) What is a priority queue? Write an algorithm to insert data in a priority queue? (1+4)

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## Part C [3]Each Question Carries 15 Marks (Attempt Any Two)

**Q5**.(a) Construct the binary tree with the following. (5)

Inorder:- D H B E A F C I G

Postorder:- H D E B F I G C A

(b) What is a strictly binary tree? What is a complete binary tree? Is a complete binary tree a strictly binary tree too ? (2+2+1)

c) What is an AVL tree? What are the types of rotations? (1+4)

**Q6.**(a) Define the properties of B-tree? How does a B-tree differ from a binary tree? (2+1)

(b) What is threaded binary tree? Explain the procedure to remove all the null pointers of binary tree.(5)

c) What is binary search tree? Create a binary search tree for the numbers: 40,60,50,33,55,11. Find the inorder, preorder and postorder traversal of created binary search tree. (1+3+3)

**Q7**. (a) Explain the difference between a directed and an undirected graph with example ? (5)

(b) Represent a directed graph with nodes A, B, C, and D and edges (A, B), (C, D), (C, A), and (A,D) as a set of linked lists. (5)

c) What are the searching techniques for graph? Describe depth first search algorithm (5)

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