(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-JUNE 2017

Paper Code: BCA-108 ***Subject: Data Structure using C***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit.

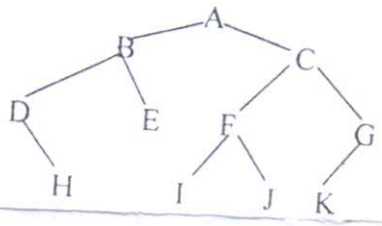
Q1 (a) Add and subtract the following two sparse matrices. **(5)**

0	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	2	0	0	0
2	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	0	0	0	0
0	0	0	9	0		0	0	0	0	0

(b) Perform insertion sort on the following values. **(5)**
6, 55, 11, 10, 18

(c) Convert the following infix expression into postfix expression. **(5)**
$(A+B-C*D)/H$

(d) Write the preorder traversal of the following tree. **(5)**



(e) Write a Recursive function to count number of nodes in Tree. **(5)**

UNIT-I

Q2 (a) Classify primitive and non-primitive data structures. Discuss the operations performed on data structures. **(6)**

(b) Evaluate the following postfix expression using stacks **(6.5)**
320, 10, *, 10, 60, 100, *, /

Q3 (a) Explain why circular queue is better than linear queue? **(6)**

(b) Discuss D-queues and priority queues. What are the applications of stacks and queues? **(6.5)**

UNIT-II

Q4 (a) Write a function to insert a node at the end of single linked list. **(6)**

(b) Write a function to delete a node from beginning of double linked list. **(6.5)**

Q5 (a) A binary tree T has 09 nodes. The inorder and preorder traversals of T yield the following sequences of nodes. **(6)**
Inorder: D G B A H E I C F
Preorder: A B D G C E H I F
Draw the tree T

P.T.O.

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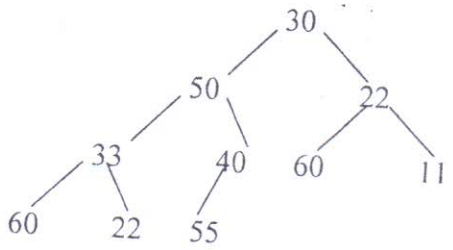
(b) Consider the following binary tree T with N=10 nodes. What is the inorder traversal of the tree? **(6.5)**



UNIT-III

Q6 (a) Construct B-tree of order 3 by inserting the following keys in the order shown. **(6.5)**

18 19, 6, 10, 40

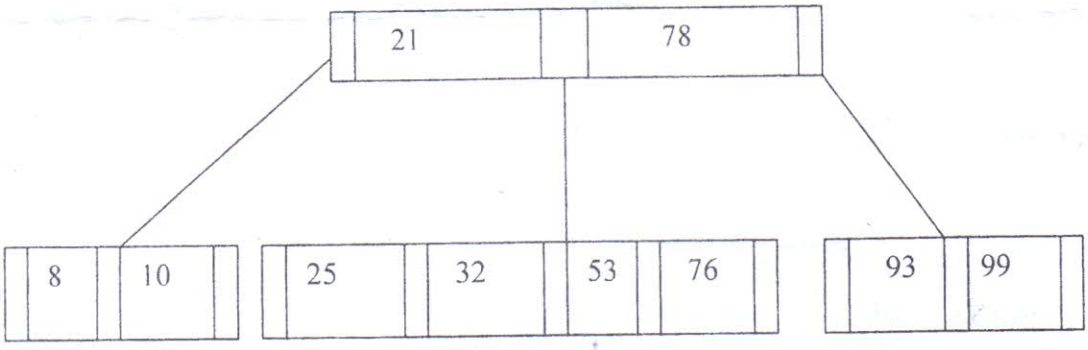
(b) Construct Binary Search Tree of the following keys in the order shown **(6)**

1, 2, 3, 15, 8, 25, 7, 9, 10, 13

Q7 (a) Construct an AVL search tree of the following values **(6)**

11, 20, 23, 5, 3

(b) Insert the following values in the order of their occurrence 30, 31 in the given B tree of order 5. **(6.5)**



UNIT-IV

Q8 (a) Define hashing. Why do we use hashing? Discuss any two hashing methods with example. **(6.5)**

(b) Which searching technique is best and under what conditions? Justify your answer with the help of an example. **(6)**

Q9 (a) Compare Selection sort and Merge sort. **(6)**

(b) Which sorting technique is better and why? Explain with an example. **(6.5)**

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END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY 2018

Paper Code: BCA 108 ***Subject: Data Structure Using C***

Time : 3 Hours ***Maximum Marks :75***

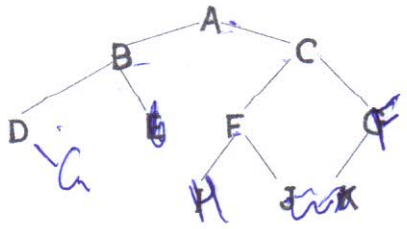
Note: Attempt any five questions including Q. NO.1 which is compulsory. Select atleast one question from each unit.

Q1. a) Define data structures. In how many ways can you categorized data structures? Explain each of them.

b) Perform selection sort on the following values
6, 55, 11, 10, 18

c) Convert the following infix expression into postfix expression.
(A*B-C/D)+H

d) Write the postorder traversal of the following tree.



e) Explain the difference between a circular linked list and a singly linked list. **(5x5=25)**

Unit-I

Q2. a) Write a short note on different operations that can be performed on data structures. **(4.5)**

b) Evaluate the following postfix expression using stacks. **(8)**
320, 10, *, 10, 60, 100, +, *, /

Q3. a) Explain why circular queue is better than linear queue? Give examples. **(4.5)**

b) Discuss D-queues and priority queues. What are the applications of stacks, queues, D-queues and priority queues? **(8)**

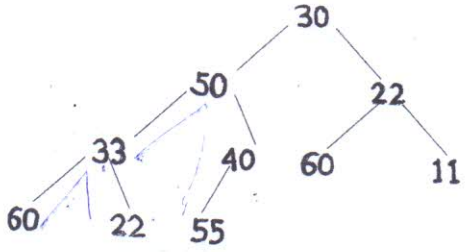
Unit-II

Q4. a) Write a function to insert a node at the beginning of single linked list. **(4.5)**

b) Write a function to delete a note from the end of double linked list. **(8)**

Q5. a) A binary tree T has 09 nodes. The inorder & preorder traversals of T yield the following sequences of nodes. **(4.5)**
Inorder: D G B A H E I C F
Preorder: A B D G C E H I F.
Draw the tree T

b) Consider the following binary tree T with with N=10 nodes. What is the inorder traversal of the tree? **(8)**



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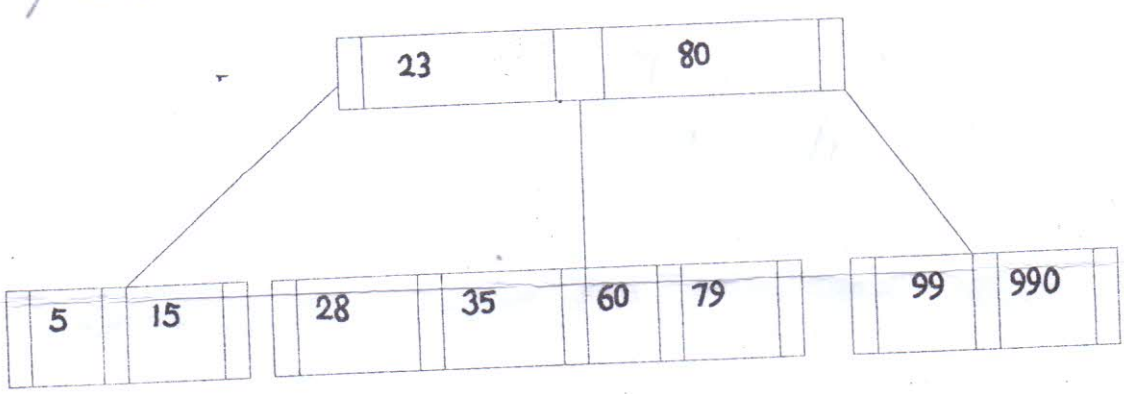
Unit-III

Q6. a) Construct B-tree of order 3 by inserting the following keys in the order shown. 18, 19, 6, 10, 40, 45, 5, 8. **(4.5)**

b) Construct Binary Search Tree of the following keys in the order shown.
1, 2, 3, 15, 8, 25, 7, 9 **(8)**

Q7. a) Construct an AVL search tree of the following values: **(4.5)**
11, 20, 23, 5, 3, 7, 9, 6

b) Insert the following values in the order of their occurrence 32, 34 in the given B tree of order 5. **(8)**



Unit-IV

Q8. a) Define hashing. Why do we use hashing? Discuss any two hashing methods with example. **(4.5)**

b) Which searching technique is best and under what conditions? Justify your answer with the help of an example. **(8)**

Q9. a) Explain merge sort with example. **(4.5)**

b) Which sorting technique is better and why? Explain with an example. **(8)**

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END TERM EXAMINATION

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SECOND SEMESTER [BCA] MAY-JUNE 2019

Paper Code: BCA-108 ***Subject: Data Structures Using C***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 Attempt following in brief **(Any Five)**: **(5x5=25)**

(a) Explain array implementation of Priority queues and list implementation of Priority queues.
(b) Describe Multi way search trees and its operations in detail.
(c) Illustrate the linked list representation of list.
(d) Explain the algorithms for Garbage collection.
(e) Write a program to insert an element in sorted array at its deserving position and explain.
(f) Explain Sparse Matrices and their types with the help of suitable example.
(g) Write a program to implement linear link list, showing all the operations that can be performed on a linked list.

Q2 (a) The in-order and pre-order traversal of a tree are given below. Construct corresponding binary tree. Write its equivalent post order traversal. **(6)**

Inorder : DBMINEAFCJGK

Preorder : ABDEIMNCFGJK

(b) Create a stack of integer using a program. Make provision for checking overflow and underflow conditions. **(6.5)**

Q3 (a) Write an algorithm which convert infix expression into postfix expression. **(6)**

(b) Convert following infix expression into equivalent post fix expression **(6.5)**
A+B*C-D/E

Q4 (a) Insert following values in BST and show the resultant tree **(6)**

12, 3, 4, 5, 11, 20, 54

(b) Traverse the binary search tree made in section (a) in pre-order, in-order and post-order. **(6.5)**

Q5 (a) Write a neat algorithm for Merge Sort and explain. **(6)**
(b) Perform the Merge Sort on following data: **(6.5)**
12, 34, 43, 2, 1, 5, 6, 32, 90, 18

Q6 (a) How two dimensional errors are internally stored? What is column major and row major matrixes? **(6)**
(b) Write a neat algorithm for selection short and perform it on the following data: **(6.5)**
12, 23, 3, 4, 5, 65, 76, 6, 54, 43, 32, 2

Q7 (a) Differentiate between left skew and right skew binary search tree. **(6)**
(b) What are the disadvantages of binary search tree? How AVL tree can compensate for these disadvantages? Explain using suitable example. **(6.5)**

Q8 (a) Explain B+tree. How multi-level indexing can be achieved using B+ tree? Explain any one application of B+tree. **(6)**
(b) Create the B+ tree for the following insertions when the order is 3. **(6.5)**
12,24,35,46,68,77,82,19,11,90,13,87,65,54,23,88,33,99,22

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END TERM EXAMINATION

SECOND SEMESTER [BCA] JULY 2023

Paper Code: BCA-106 ***Subject: Data Structure and Algorithm Using C***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1 **Answer the following:-** **(2.5x10=25)**

(a) Define an Algorithm.
(b) What is Dynamic Memory Allocation method?
(c) List down any four application of data structure.
(d) Define Stack and Queue.
(e) Define Graphs and Tree.
(f) Define the hash function.
(g) What are the asymptotic notations?
(h) Define the Acyclic graph.
(i) What are Binary Trees?
(j) Define adjacency matrix.

UNIT-I

Q2 (a) What is Sparse Matrix and how will you represent Sparse Matrix by 2D Array? **(8.5)**

(b) What is Time Complexity also write the Time Complexity of Selection Sort, Bubble Sort, Insertion Sort, Heap Sort, Quick Sort, Merge Sort, Radix sort? **(4)**

OR

Q3 (a) Consider the following array: Arr= 14, 33,27, 35, 10, Sort this array using Bubble sort Algorithm. **(9.5)**

(b) Explain in Simple term how Hash Tables are implemented? **(3)**

UNIT-II

Q4 (a) What is Dynamic Memory Allocation and how can you determine the size of an allocated portion of memory? **(6.5)**

(b) Write the Difference between: **(6)**
(i) Static and Dynamic Memory Allocation
(ii) Calloc() and Malloc()

OR

Q5 (a) Write a Program in C to create and Display a Singly Linked List. **(6.5)**

(b) Write an algorithm for Binary Search and also write a simple Binary Search Program in C. **(6)**

UNIT-III

Q6 (a) Write a Program to Reverse a String using Stack. **(6)**

(b) Write the steps to Convert Infix Expression to a Postfix Expression and Convert an Infix Expression exp="a+b*c+d" to Postfix Expression. **(6.5)**

OR

Q7 (a) Write a Short note on: **(6)**
(i) Linear Queue
(ii) Circular Queue
(iii) Priority Queue

(b) What is Abstract Data Types and its features, also write the advantages and Disadvantages of Abstract Data Types. **(6.5)**

P.T.O.

OR

Q8 (a) Convert the infix expression A × B + A × (B × D + C × E) into Polish notation? **(6.5)**

(b) Why and when should I use Stack or Queue data structures instead of Arrays/Lists? **(6)**

UNIT-IV

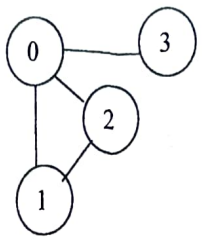
Q9 (a) Define the terms: **(8)**

(i) Graphs
(ii) Acyclic Graphs
(iii) AVL
(iv) Heap Tree

(b) What do you mean by degree of vertex? Define indegree and outdegree of vertex with example. **(4.5)**

OR

Q10 (a) What is Adjency Matrix, what are pros and cons of Adjency Matrix. Draw the Matrix representation of the graph for a given tree. **(8.5)**



(b) Explain how Heap Sort Works with the help of an example. **(4)**

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