

END TERM EXAMINATION

SECOND SEMESTER [BCA] JUNE 2024

Paper Code: BCA-106

Subject: Data Structure and Algorithm Using C

Time: 3 Hours

Maximum Marks: 60

Note: Attempt all questions as directed. Internal Choice is indicated.

- Q1 Answer the following (Attempt any four) (4x5=20)
- (i) Give properties of good Algorithm. Explain how performance analysis of algorithm can be measured.
 - (ii) Explain all Dynamic memory allocation function with example
 - (iii) An array X [-15.....10, 15.....40] requires four byte of storage. If beginning location is 1300 determine the location of X [5][25] by using row major order and column major order.
 - (iv) Explain Adjacency Matrix and Adjacency List by taking a suitable example.
 - (v) Differentiate Linear and Non-linear data structure. Give four application of Data Structure.
 - (vi) Explain Binary Search Tree and construct a Binary Search Tree from the following set of letters.
J, R, D, G, T, E, M, H, P, A, F, Q
 - (vii) Explain the advantage and disadvantage of different types of queues.
 - (viii) Define hashing and explain at least four techniques to perform hashing and also give two methods of collision resolution.
- Q2 a) Consider a given list of numbers in sorted order (5)
10,20,30,40,50,60,70,80,90
Write a program to search an element 80 in a given list using binary search. Show all the steps.
- b) Write a program to perform the selection sort on the following list. Show all the pass. (5)
45,67,23,30,42,15,78,39,48
- OR
- Q3 Explain sparse matrix and its various types with example. Give function to convert it into its 3-tuple memory representation. (10)
- UNIT-II
- Q4 Write a program in C to implement the following functions on Doubly linked list (10)
- a) Insert a node at end
 - b) Delete a node from the beginning
 - c) Insert a node on the basis of information
- OR
- Q5 Write a program to do following operations on Single linked list (2x5=10)
- a) Reversal of Linked List
 - b) Linear search on linked list

Q6 a)

UNIT-III

Write an algorithm to convert infix expression to postfix expression. Convert the following infix expression into postfix expression using stack:
A+(B*C-(D/E^F)*G)*H
Note: ^ symbol is used for exponent. (6)

b)

Evaluate the following postfix expression
ABC+DE*/- for A=2, B=5, C=3, D=2, E=4.
Show stack at each step. (4)

OR

Q7 a)

What is circular queue and State the advantage of Circular Queue over linear queue? Illustrate with any example. (5)

b)

Write a program to implement insertion operation in a Circular Queue using array (5)

UNIT-IV

Q8 a)

Draw a tree T with the following traversals:
Inorder : **10, 25, 35, 40, 45, 61, 68, 71**
Preorder: **45, 25, 10, 35, 40, 61, 71, 68** (5)

b)

Draw an AVL tree with the following sequence:
Insert: **20, 15, 25, 30, 16, 18, 19**
Delete: 30 (5)

OR

Q9

Create a B-Tree of order 5 for the following sequence of keys (10)
C S D T A M P I B W N G R K E H O L J Y Q Z F X V U

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P/2

P.T.O.

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