SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
BCA. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - III
20UCACT3004 - Data Structures and Algorithms

Total Duration : 2 Hrs 30 Mins. **Total Marks : 60**

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Let A be a collection of data element in the memory of the computer "Inserting" refers to the operation of adding another element to the collection A. Interpret the steps to insert an element in the linear array.

2. Consider the linear array in the given figure and solve the following queries:

NAME

1. Adam
2. Clark
3. Evans
4. Gupta
5. Jones
6. Lane
7. Pace
8. Smith

   a. Find NAME[2],NAME[4],NAME[6]
   b. If Davis is inserted into the array, how many names will be moved to a new location?
   c. Suppose Gupta is to be deleted from the array, how many names will be moved to a new location?

3. The given stack values are Chennai, Coimbatore, Madurai, Tirunelveli, Salem where stack allocation N=8 memory cell. Compute the following operations for the given stack values:
   a)PUSH(STACK, Trichy)
   b)POP(Stack, ITEM)
   c)POP(STACK,ITEM)
   d)PUSH(STACK, Kanyakumari)
   e) POP(STACK, ITEM)

Contd...

4. Consider a line of students standing in a queue in the food court. A new addition and a deletion are made in the existing line. Predict the operations of the queue with the required procedure for the given problem.
5. Linked list can be visualized as a chain of nodes, where every node points to the next node. Explain the representation of linked list in memory with an example.
6. Draw a binary tree for the following input list: 60,25,75,15,50,66,33,and 44. Apply the procedure to delete the nodes 25,75,44 from the tree.
7. Make use of binary search algorithm and compute the steps to search the number 26 from the list of numbers 10, 7, 17, 26, 32, 9.
8. Examine the various representation of graph with an example.

Section B

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. For the given table find the array length, Index start value and end value. Describe the basic operations performed in an array.

Elements	35	36	42	10	15	20	28	45	26	32
Index	0	1	2	3	4	5	6	7	8	9

10. For the following infix expression:
    Q: A= (B*C-(D/E↑F) *G)*H.
    Apply the procedure and transform to postfix notation.
11. Write the node structure for linked representation of polynomial. Determine the function to add two polynomials using linked list.
12. Compute a binary search tree for the following sequence of number: 45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69 and 48. Traverse the tree in Preorder, Inorder, and Postorder.
13. Assess the procedure using Merge Sort to sort the given sequence of elements: 66, 33, 40, 20, 50, 88, 60, 11, 77, 30, 45, and 65.

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