GIET UNIVERSITY, GUNUPUR – 765022

B. Tech –2nd Semester (2024-2025): **ASSIGNMENT**

BESBS 2040– Data Structures and Algorithms

1. Design an algorithm to perform deletion operation by searching an ITEM in an array A[100] having elements from lower bound LB to upper bound UB.
2. Write an algorithm to sort a list of elements present in an array X[10] in ascending order.
3. What is row-major order and column-major order?
   Given a matrix Q[7][8] having base address 1000. If the size of each memory is 4 bytes, and we need to find the address of Q[[4][3] then find the address in row-major order and also in column-major order.
4. Write down the algorithm to test a matrix is sparse or not. If sparse how to store the matrix non-zero elements information into another 3-columnar matrix.
5. Write down the algorithm to perform PUSH and POP operations on a given stack using an array.
6. Write down the algorithm to convert a given infix expression into equivalent postfix notation using stack.
7. Write down the algorithm to perform INSERTION and DELETION operations on a linear queue implemented using an array.
8. Given infix expression Q = A-S/D+(E*F^G)-H
   Find its equivalent postfix using stack.
9. Given two arrays A[5] and B[7] having elements in ascending order. Design an algorithm to apply merging operation on both arrays and generate the resultant list into array C[12] in ascending order.
10. Write down the algorithm to evaluate a given postfix expression using stack.
11. Given a stack STK[SIZE] where SIZE=4.
    Initially the TOP= -1.
    Apply the below list of operations on the stack and elaborate the execution process in detail.
    PUSH(10), PUSH(20), POP(), PUSH(30), PUSH(40), PUSH(50), PUSH(60), POP(), POP(), POP(), PUSH(70).
12. Given a list of elements from LB to UB in an array A[100].
    Write two algorithms to perform:
    a) Insertion of an item at a specific location
    b) search for a given item
13. Given a linear queue QUEUE[SIZE] where SIZE=5.
    Initially Front=-1 and Rear=-1
    Apply the below lits of operations on the queue and elaborate the execution process in details.
    INSERT(1), INSERT(2), INSERT(3), DELETE(), DELETE(), INSERT(4), INSERT(5), DELETE(), INSERT(6), INSERT(7)
14. List out:
    a) The stack overflow and underflow conditions and
    b) Linear queue overflow and underflow conditions
15. Define the terms:
    Abstract Datatype, Linked list, Queue, Tree, Stack.