**DATA STRUCTURES MAN 106**

**Practical -2 Spring Semester 2020-21**

1. Define STACK to be a stack class of characters with Push, Pop and emptyStack operations. Write main to invert the string. Write main to check whether a given string is a palindrome?
2. Write class STACK to implement stack of floating point numbers as an array of size Max. Initialize top to Max. Include following functions in the class:

underflow( ) // To check if the stack is empty

overflow( ) // To check if stack is full

push( ) // To insert an item in the stack

pop( ) // To retrieve single item from stack

1. Write a class TwoStack to manage two stacks in given array.
2. Implement the function peep in the class STACK which gives the ith item from the top of the stack without altering the stack.

5. Transform each of the following infix expressions into postfix expressions (Using operand stack):

1. (A - B) \* (C / D)
2. (A + B ^ D) \* (E - F) + G
3. A \*( B + D) / E - F \* ( G + H / K)
4. (A + B) \* ((C $ (D - E) + F) / G) $ (H - J)

Transform the infix expressions into prefix expressions in the Q.5.

6. Transform the following prefix expressions into infix:

1. + A - B C
2. + + A - \* $ B C D / + E F \* G H I
3. + - $ A B C \*D \* \* E F G

7. Transform each of the following postfix expressions to infix:

1. A B +C -
2. A B C + -
3. A B - C + D E F - + $
4. A B C D E - + $ \* E F \* -
5. A B + C \* D E - - FG+$

8. The Tower of Hanoi problem involves a stack of n graduated disks and a set of three needles called A, B and C. The initial setup places the n disks on needle A. The task for the player is to move the disks one at a time from needle A to B using C. The challenge is the fact that at no time a larger disk can be placed on top of a smaller disk.

9. Write following algorithms:

Conversion of infix to postfix expression

Conversion of infix to prefix

Evaluation of postfix expression

Evaluation of prefix expression