UCS301 Data Structures
Lab Assignment 3: Stacks
(Week 3)

1. Develop a menu driven program demonstrating the following operations on a Stack using array:
   (i) push(), (ii) pop(), (iii) isEmpty(), (iv) isFull(), (v) display(), and (vi) peek().

2. Given a string, reverse it using STACK. For example "DataStructure" should be output as "erutcurtSataD."

3. Write a program that checks if an expression has balanced parentheses.

4. Write a program to convert an Infix expression into a Postfix expression.

5. Write a program for the evaluation of a Postfix expression.

Additional Questions

1. Given an array A, find the nearest smaller element for every element A[i] in the array such that the element has an index smaller than i.
   https://www.interviewbit.com/problems/nearest-smaller-element/

2. Design a stack that supports getMin() in O(1) time and O(1) extra space. https://www.geeksforgeeks.org/design-a-stack-that-supports-getmin-in-o1-time-and-o1-extra- space/

3. Given an array arr[ ] of integers, the task is to find the Next Greater Element for each element of the array in order of their appearance in the array. Note: The Next Greater Element for an element x is the first greater element on the right side of x in the array. Elements for which no greater element exist, consider the next greater element as -1.
   Next Greater Element (NGE) for every element in given Array - GeeksforGeeks

4. Given an array of integers temperatures represents the daily temperatures, return an array answer such that answer[i] is the number of days you have to wait after the ith day to get a warmer temperature. If there is no future day for which this is possible, keep answer[i] == 0 instead.
   Daily Temperatures - LeetCode

5. You have an array A of integers of size N, an array B (initially empty) and a stack S (initially empty). You are allowed to do the following operations:
   a) Take the first element of array A and push it into S and remove it from A.
   b) Take the top element from stack S, append it to the end of array B and remove it from S.

   You have to tell if it possible to move all the elements of array A to array B using the above operations such that finally the array B is sorted in ascending order.
   Stack Sort Practice Problem in Amazon Coding Interview Questions