Data Structures and Algorithms – Assignment 3.1

Stack & Queue Applications

Question I: Postfix Expression Evaluation

Implement a program which calculates the value of the postfix expression.

Test case:

Input: 1 2 3 * + 4 - Output: 3

Input: 2 3 * 15 5 / + 10 - Output: -1

Input: 10 2 * 8 4 / + Output: 22

Question II: Infix to postfix conversion

This problem requires you to write a program to convert an infix expression to a postfix expression. (Reference Video)

Input: A collection of error-free simple arithmetic expressions. The input has an arbitrary number of blanks between any two symbols. A symbol may be a letter (A – Z), an operator (+, – , *, or /), a left parenthesis, or a right parenthesis. Each operand is composed of a single letter. The input expressions are in infix notation.

Example

A + B – C

A + B * C

(A + B) / (C – D)

((A + B) * (C – D) + E) / (F + G)

Output: Your output will consist of the input expression, followed by its corresponding postfix expression. All output (including the original infix expression) must be clearly formatted.

Example

A B + C –

A B C * +

A B + C D - /

A B + C D - * E + F G + /

Question III: Solution of Q5 in the Lab Assignment 3

Question IV: Solution of Q6 in the Lab Assignment 3