CS 210: Data Structure Lab

Stack, Queue and linked List

1. Define data structure for single link list. Write functions to (i) create a node (ii) Insert a new node after a given node in the list, (iii) Insert at the start of a list (iv) Insert a node at the end of a list, (v) delete a node after a given node in the list, (vi) delete the first node of the list and (vii) Delete the last node of the list. Create a list. Apply all the above operations randomly and print the final list.
2. Define a stack. Implement push and pop operation using link list. Reuse the functions from problem 1.
3. Define Queue. Implement Insert and Delete operations using link list. Reuse the functions from problem 1**.**
4. Write an O(n) algorithm to determine if there is a cycle in a single link list. The function should return YES/NO for a given input link list.
5. Write a program that evaluates a post-fix expression using **stack**. Your program reports if something is wrong in the input expression. You may assume that your all operands are single digit integer. Your output may be a floating point number.

   Input: A string that represents a post-fix expression.
   Output: Result of the evaluation

   Test1:
   Input: 6 5 4 / *
   Output: 7.5

   Test2:
   Input: 6 5 + 3 + +
   Output: Incorrect Input

   Test 3:
   Input: 4 + 4
   Output: Incorrect Input

   Test4:
   Input: 6 2 3 + - 3 8 2 / + * 2 $ 3 +
   Output: 52