Assignment - Write Functions /Algorithm for the following Questions.

(5 marks each)

Q1 (STACK): On a given machine, how do you check whether the stack grows up or down?

Hint: Use address of variables

Q2 (QUEUE): Given a stack of integers, how do you check whether each successive pair of numbers in the stack is consecutive or not. The pairs can be increasing or decreasing, and if the stack has an odd number of elements, the element at the top is left out of a pair. For example , if the stack of elements are [4,5,-2,-3,11,10,5,6,20] , then the output should be true because each of the pairs (4,5), (-2,-3),(11,10) and (5,6) consist of consecutive numbers.

Hint: Use STL stack and STL queue

Q3 (LINKEDLIST): Reverse the linked list in pairs. For example a linked list 1-> 2-> 3 -> 4 -> 5, then after the function has been called the linked list must be 2-> 1->4 -> 3 -> 5.

Note: Write either a recursive or a iterative function

Q4 (LINKEDLIST): Split a circular linked list into two equal parts circular linked lists. If the number of nodes in the list are odd then make first list with one extra node than second list.

Hint: Use the Floyd cycle finding algorithm

Q5(LINKEDLIST): N people have decided to elect a leader by arranging themselves in a circle and eliminating every Mth person around the circle, closing the ranks as each person drops out. Find which person will be the last one remaining (with rank 1).

Hint: N people form a circular linked list of N nodes

Q6 (BINARYTREE): Given a binary tree, print out all its root –to –leaf paths.

Hint: Using array to store path

Or

Given a binary tree, give an algorithm for checking the existence of path with given sum. That means, given a sum check whether there exists a path from root to any of the nodes.

Hint: Subtract the node value from the sum before calling its children