Mid-term Exam

Data Structures

Course Instructor	Ma'am Abeeda
Lab Instructors	Mr. Sohaib Ahmad Ms. Ammarah Nasir
Section	3A
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National University of Computer and Emerging Sciences

Department of Computer Science
FAST-NU, Lahore, Pakistan

Important Instructions (Please read them before attempting the exam):

• Submit **ONLY .cpp File** in this format (Make the File **named** with your **Roll Number** e.g., L19-4152).

• **Plagiarism** will result in an **F grade** in the lab.

• No cell phones are allowed. Sharing of **USBs** or any other items is **not allowed.**

• Use **Visual Studio 2012.**

Question 1

Given a singly linked list, The task is to rotate the linked list counter-clockwise by k nodes. *k is smaller than the count of nodes in a linked list, so (k+1)th node i.e. 50, becomes the head node, and 60's next points to 10*

Input: linked list = 10->20->30->40->50->60, k = 4
Output: 50->60->10->20->30->40.

Question 2
Given a stack of integers, sort it in ascending order using another temporary stack.

Examples:

Input : [34, 3, 31, 98, 92, 23]

Output : [3, 23, 31, 34, 92, 98]

Input : [3, 5, 1, 4, 2, 8]

Output : [1, 2, 3, 4, 5, 8]

Question 3

Note: Write the recursive code

You are given an integer array nums. Two players are playing a game with this array: player 1 and player 2.

Player 1 and player 2 take turns, with player 1 starting first. Both players start the game with a score of 0. At each turn, the player takes one of the numbers from either end of the array (i.e., nums[0] or nums[nums.length - 1]) which reduces the size of the array by 1. The player adds the chosen number to their score. The game ends when there are no more elements in the array.

Return true if Player 1 can win the game. If the scores of both players are equal, then player 1 is still the winner, and you should also return true. You may assume that both players are playing optimally.

Example 1:

Input: nums = [1,5,2]
Output: false
Explanation: Initially, player 1 can choose between 1 and 2.
If he chooses 2 (or 1), then player 2 can choose from 1 (or 2) and 5. If player 2 chooses 5, then player 1 will be left with 1 (or 2).
So, final score of player 1 is 1 + 2 = 3, and player 2 is 5.
Hence, player 1 will never be the winner and you need to return false.

Example 2:

Input: nums = [1,5,233,7]
Output: true
Explanation: Player 1 first chooses 1. Then player 2 has to choose between 5 and 7. No matter which number player 2 chooses, player 1 can choose 233.
Finally, player 1 has more score (234) than player 2 (12), so you need to return True representing

player1 can win.