Top-20 Training Program
(LinkedList Problems)

Apply the problem solving techniques discussed in class to solve the following problems.

Problem1: Split and Combine

Write an efficient function which divides the list into two equal sublists and put the second sublist at front of first sublist in single pass only. If the number of elements is odd, extra element go into the first sublist. What is the space complexity of your solution?

Examples

Input: 2 4 5 3 8 7 6 1 9 Output: 7 6 1 9 2 4 5 3 8

Input: 1 3 5 7 2 4 6 8 Output: 2 4 6 8 1 3 5 7

Problem2: Cloning a Linked List

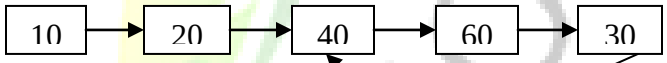
Given a linked list, where each node contains one more extra field called as random pointer (other than the normal "next" pointer) which could point to any other node or itself i.e., there could be loops. Write an efficient function to duplicate this linked list. What are the time and space complexities of your solution?

Problem3: Loop Removal in Singly Linked List

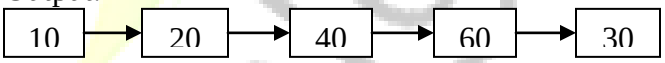
Given a single linked list with a loop in it, find an efficient algorithm to remove the loop. What are the time and space complexities of your solution?

Example:

Input:



Output:



Problem4: Sorting of Linked List

Write an efficient function to sort elements of a single linked list. Assume that there might be external applications which points to some of the nodes of given linked list, so you are not allowed to just copy the elements of one node to other. What are the time and space complexities of your solution?