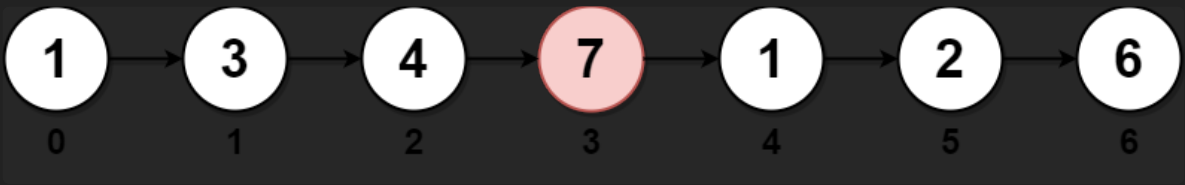
C++ Assignments | Linkedlist - 2 | Week 15

1. You are given the `head` of a linked list. **Delete** the **middle node**, and return *the* `head` *of the modified linked list*. **[Leetcode 2095]**

   The **middle node** of a linked list of size `n` is the `⌊n / 2⌋th` node from the **start** using **0-based indexing**, where `⌊x⌋` denotes the largest integer less than or equal to `x`.

   - For `n = 1`, `2`, `3`, `4`, and `5`, the middle nodes are `0`, `1`, `1`, `2`, and `2`, respectively.

   Example 1:



   Input: head = [1,3,4,7,1,2,6]

   Output: [1,3,4,1,2,6]

   Explanation:

   The above figure represents the given linked list. The indices of the nodes are written below.

   Since n = 7, node 3 with value 7 is the middle node, which is marked in red.

   We return the new list after removing this node.

   Example 2:

   Input: head = [1,2,3,4]

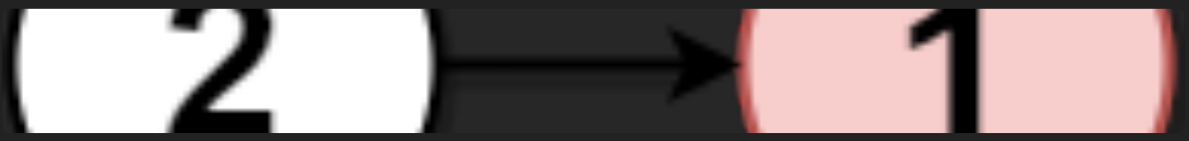
   Output: [1,2,4]

   Explanation:

   The above figure represents the given linked list.

   For n = 4, node 2 with value 3 is the middle node, which is marked in red.

Example 3:



Input: head = [2,1]

Output: [2]

Explanation:

The above figure represents the given linked list.

For n = 2, node 1 with value 1 is the middle node, which is marked in red.

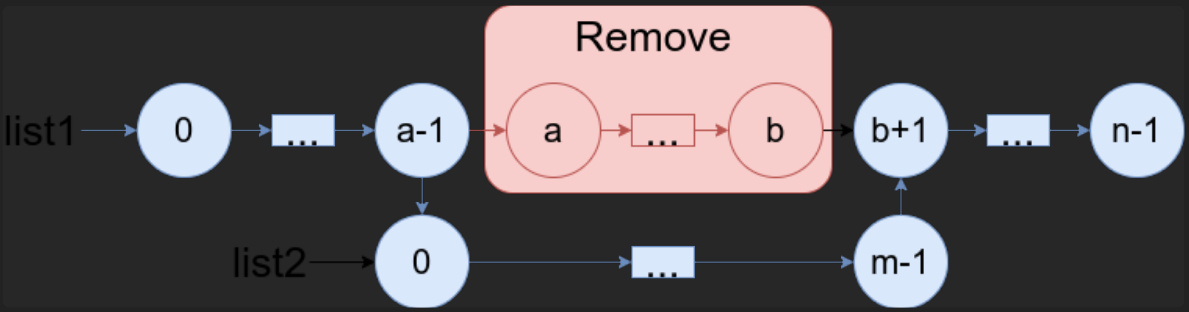
Node 0 with value 2 is the only node remaining after removing node 1.

2. You are given two linked lists: `list1` and `list2` of sizes `n` and `m` respectively.

   Remove `list1`'s nodes from the `ath` node to the `bth` node, and put `list2` in their place.

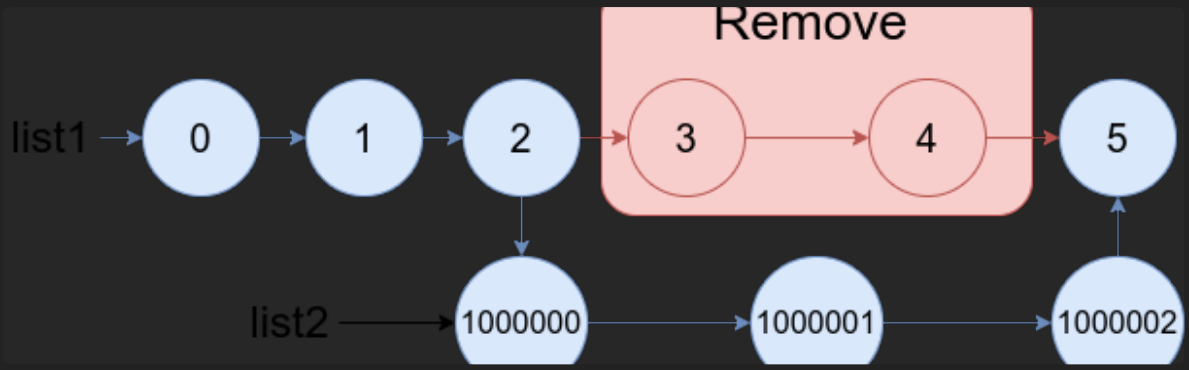
   [Leetcode 1669]

   The blue edges and nodes in the following figure indicate the result:



Build the result list and return its head.

Example 1:

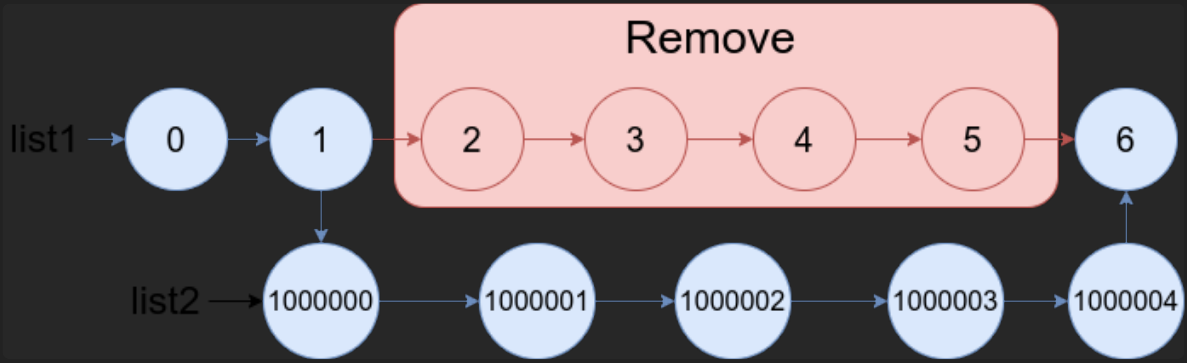


Input: list1 = [0,1,2,3,4,5], a = 3, b = 4, list2 = [1000000,1000001,1000002]

Output: [0,1,2,1000000,1000001,1000002,5]

Explanation: We remove the nodes 3 and 4 and put the entire list2 in their place. The blue edges and nodes in the above figure indicate the result.

Example 2:



Input: list1 = [0,1,2,3,4,5,6], a = 2, b = 5, list2 = [1000000,1000001,1000002,1000003,1000004]

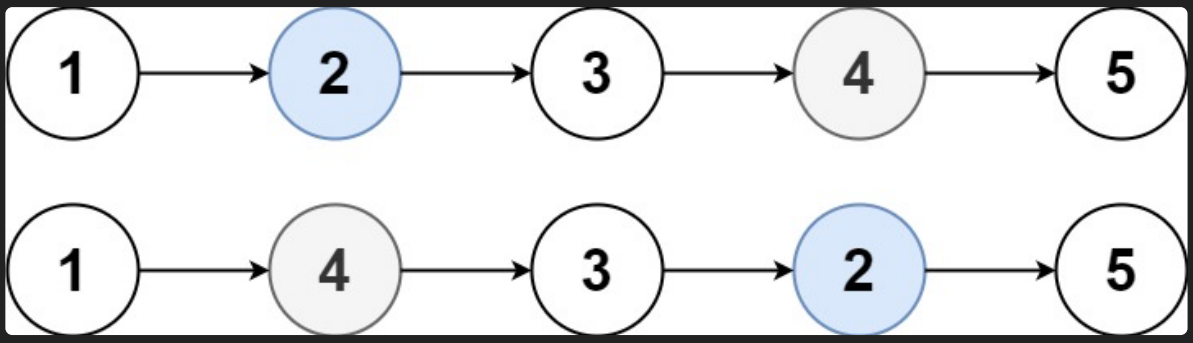
Output: [0,1,1000000,1000001,1000002,1000003,1000004,6]

Explanation: The blue edges and nodes in the above figure indicate the result.

3. You are given the `head` of a linked list, and an integer `k`.

   Return *the head of the linked list after **swapping** the values of the* `kth` *node from the beginning and the* `kth` *node from the end (the list is **1-indexed**).* **[Leetcode 1721]**

   Example 1:



   Input: head = [1,2,3,4,5], k = 2

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

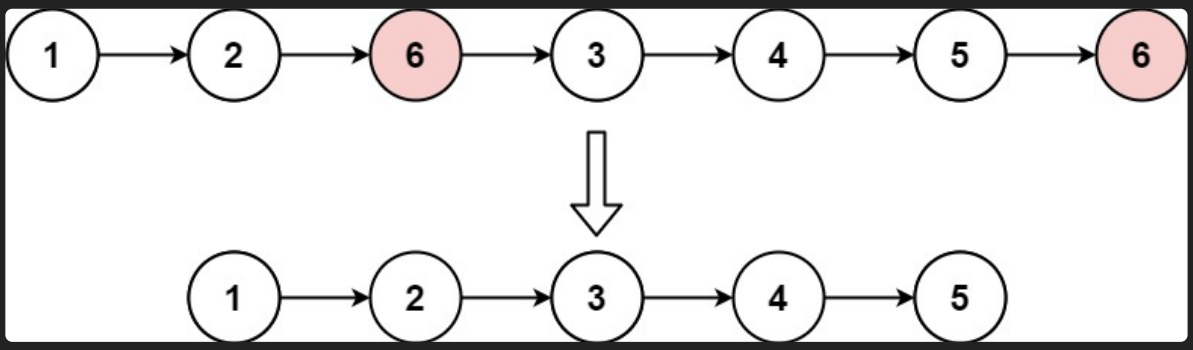
   Example 2:

   Input: head = [7,9,6,6,7,8,3,0,9,5], k = 5

   Output: [7,9,6,6,8,7,3,0,9,5]

4. Given the `head` of a linked list and an integer `val`, remove all the nodes of the linked list that has `Node.val == val`, and return *the new head*.

   Example 1:



Input: head = [1,2,6,3,4,5,6], val = 6

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

Example 2:

Input: head = [], val = 1

Output: []

Example 3:

Input: head = [7,7,7,7], val = 7

Output: []

5. Find the length of loop in Cycle of Linked List.

Note:- Please try to invest time doing the assignments which are necessary to build a strong foundation. Do not directly Copy Paste using Google or ChatGPT. Please use your brain😀.
