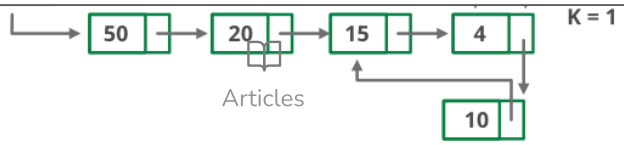
Detect and remove loop in linked list

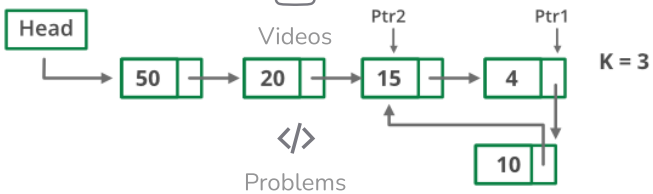
Method using Floyd's Cycle detection algorithm :

1. This method is also dependent on Floyd's Cycle detection algorithm.
2. Detect Loop using Floyd's Cycle detection algorithm and get the pointer to a loop node.
3. Count the number of nodes in the loop. Let the count be k.
4. Fix one pointer to the head and another to a kth node from the head.
5. Move both pointers at the same pace, they will meet at the loop starting node.
6. Get a pointer to the last node of the loop and make the next of it NULL.

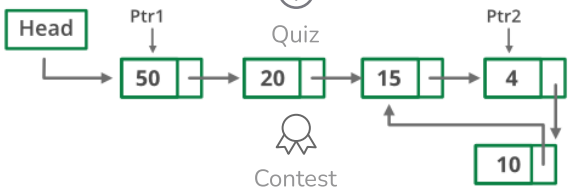
Below image is a dry run of the 'remove loop' function in the code :



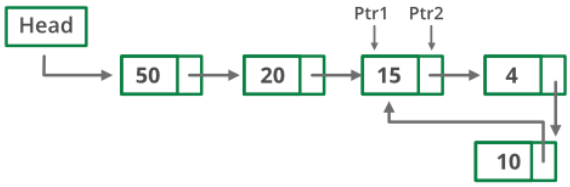
Step 1: Find number of nodes involved in loop



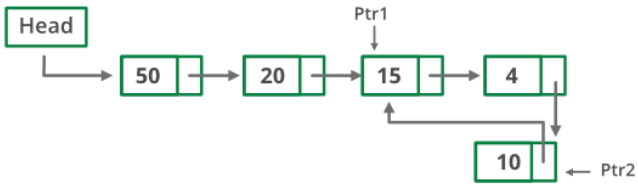
Step 2: Fix one pointer to head and other pointer to K nodes after head



Step 3: Find starting node of loop



Step 4: Find last node of the loop



Step 5: Remove loop

Below is the implementation of the above approach:

```
static Node head;

static class Node {

    int data;
    Node next;

    Node(int d)
    {
        data = d;
        next = null;
    }
}

// Function that detects loop in the list
int detectAndRemoveLoop(Node node)
{
    Node slow = node, fast = node;
    while (slow != null && fast != null
        && fast.next != null) {
        slow = slow.next;
        fast = fast.next.next;

        // If slow and fast meet at same point then loop
        // is present
        if (slow == fast) {
            removeLoop(slow, node);
            return 1;
        }
    }
    return 0;
}

// Function to remove loop
void removeLoop(Node loop, Node head)
{
```

```
        while (ptr1.next != ptr2) {
            // keeping track beforeing moving next
            prevNode = ptr1;
            ptr1 = ptr1.next;
            k++;
        }
        prevNode.next = null;
    }

    // Function to print the linked list
    void printList(Node node)
    {
        while (node != null) {
            System.out.print(node.data + " ");
            node = node.next;
        }
    }

    // Driver program to test above functions
    public static void main(String[] args)
    {
        LinkedList list = new LinkedList();
        list.head = new Node(50);
        list.head.next = new Node(20);
        list.head.next.next = new Node(15);
        list.head.next.next.next = new Node(4);
        list.head.next.next.next.next = new Node(10);

        // Creating a loop for testing
        head.next.next.next.next.next = head.next.next;
        list.detectAndRemoveLoop(head);
        System.out.println(
            "Linked List after removing loop : ");
        list.printList(head);
    }
}
```

Dash

Output

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