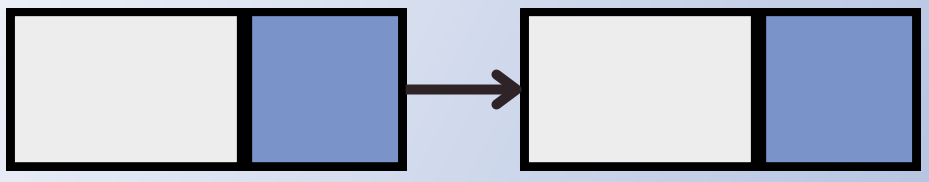
BHUSHAN KALE

BASIC TECHINQUES TO APPROACH

LINKED LIST



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REMOVE DUPLICATES FROM SORTED LIST

We can just solve it like in an array using another index to collect the valid nodes

Iterative

```
ListNode* deleteDuplicates(ListNode* head) {
  ListNode* dummy = new ListNode(0);
  dummy->next = head;
  ListNode* cur = dummy;
  int duplicate;
  while (cur->next && cur->next->next) {
    if (cur->next->val == cur->next->next->val) {
      duplicate = cur->next->val;
      while (cur->next && cur->next->val == duplicate)
        cur->next = cur->next->next;
    }
    else cur = cur->next;
  }
  return dummy->next;
}
```

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PALINDROME LINKED LIST

This can be solved by converting this palindrome into a normal vector or else with the help of linked list as follows

```
bool isPalindrome(ListNode* head) {
    if(!head || !head->next) return true;
    ListNode slow = head,fast = head->next;
    while(fast && fast->next) {//split into two halves while the
first half can be one-node longer;
        slow = slow->next;
        fast = fast->next->next;
    }
    fast = slow->next;
    slow->next = NULL;
    ListNode newHead(0); //reverse the second half;
    ListNode next = NULL,p = fast;
    while(p) {
        next = p->next;
        p->next = newHead.next;
        newHead.next = p;
        p = next;
    }
    fast = newHead.next; //compare the two lists;
    while(fast) {
        if(fast->val != head->val) return false;
        fast = fast->next;
        head = head->next;
    }
    return fast == NULL;
}
```

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ROTATE LIST

For Example:
Given 1->2->3->4->5->NULL and k = 2,
return 4->5->1->2->3->NULL.

```
ListNode* rotateRight(ListNode* head, int k) {
    if(!head) return head;
    int len = 1;
    ListNode *p = head;
    while(p->next) { len++; p = p->next; }
    p->next = head;
    if(k %= len)
        for(int i = 0; i < len-k; ++i, p=p->next) ;
    ListNode* newHead = p->next;
    p->next = NULL;
    return newHead;
}
```

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ADD TWO NUMBERS

You are given two linked lists representing two non-negative numbers. The digits are stored in reverse order and each of their nodes contain a single digit. Add the two numbers and return it as a linked list.

```
ListNode* addTwoNumbers(ListNode* l1, ListNode* l2) {
    int c = 0;
    ListNode newHead(0);
    ListNode *t = &newHead;
    while(c || l1 || l2) {
        c += (l1? l1->val : 0) + (l2? l2->val : 0);
        t->next = new ListNode(c%10);
        t = t->next;
        c /= 10;
        if(l1) l1 = l1->next;
        if(l2) l2 = l2->next;
    }
    return newHead.next;
}
```

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REVERSE LINKED LIST II

Reverse a linked list from position m to n in O(n) time

```cpp
ListNode* reverseBetween(ListNode* head, int m, int n) {
    ListNode newHead(0);
    newHead.next = head;
    ListNode *pre = &newHead, *cur = head, *next = NULL;
    int i = 1;
    while(i < n) {
        if(i++ < m) { pre = cur; cur = cur->next; }
        else {
            next = cur->next;
            cur->next = cur->next->next;
            next->next = pre->next;
            pre->next = next;
        }
    }
    return newHead.next;
}
```

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LINKED LIST CYCLE II

Given a linked list, return the node where the cycle begins. If there is no cycle, return null. Note: Do not modify the linked list.

```
ListNode *detectCycle(ListNode *head) {
    ListNode *slow = head, *fast = head;
    while(fast && fast->next) {
        slow = slow->next;
        fast = fast->next->next;
        if(slow == fast) break;
    }
    if(slow != fast) return NULL;
    fast = head;
    while(fast && fast->next) {
        if(slow == fast) return slow;
        slow = slow->next;
        fast = fast->next;
    }
    return NULL;
}
```

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REVERSE NODES IN K-GROUP

Given a linked list, return the node where the cycle begins.
If there is no cycle, return null

```
ListNode* reverseKGroup(ListNode* head, int k) {
  if(!head || !head->next) return head;
  ListNode newHead(0);
  ListNode *pre = &newHead, *cur = head, *next = NULL;
  newHead.next = head;
  int len = 0;
  for(ListNode *p = head; p; p = p->next) len++;
  int times = len/k;
  while(times) {
    for(int i = 1; i < k; ++i) {
      next = cur->next;
      cur->next = cur->next->next;
      next->next = pre->next;
      pre->next = next;
      if(i == k-1) {
        pre = cur;
        cur = cur->next;
      }
    }
    times--;
  }
  return newHead.next;
}
```

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THANK YOU!!

CONNECT WITH BHUSHAN KALE FOR MORE SUCH AMAZING POSTS!