EXPERIMENT -3

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Branch: BE -IT **Section/Group:**22BET_IOT-703(B)

Semester: 6th **Subject Code:** 22ITP-351

PROBLEM-1

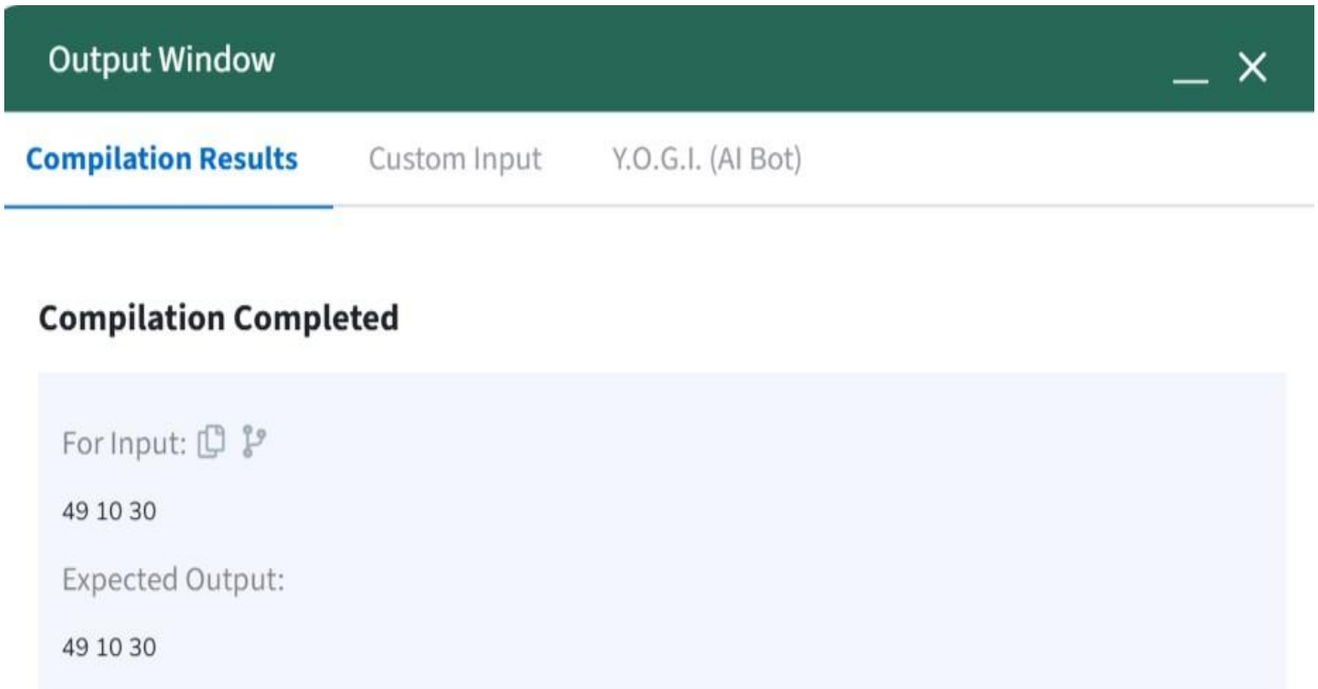
AIM:-

Print linked list

CODE:-

```
class Node {
   int data;
   Node next;
Node(int data) {
this.data = data;
this.next = null;
   }
}

class Solution {     void
printList(Node head) {
Node temp = head;        while
(temp != null) {
          System.out.print(temp.data + " ");
temp = temp.next;
       }
       System.out.println();
   }
}

public class Main {     public static void
main(String[] args) {        Node head =
new Node(49);        head.next = new
Node(10);        head.next.next = new
Node(30);

       Solution sol = new Solution();
sol.printList(head);
   }
}
```

OUTPUT:-



PROBLEM-2

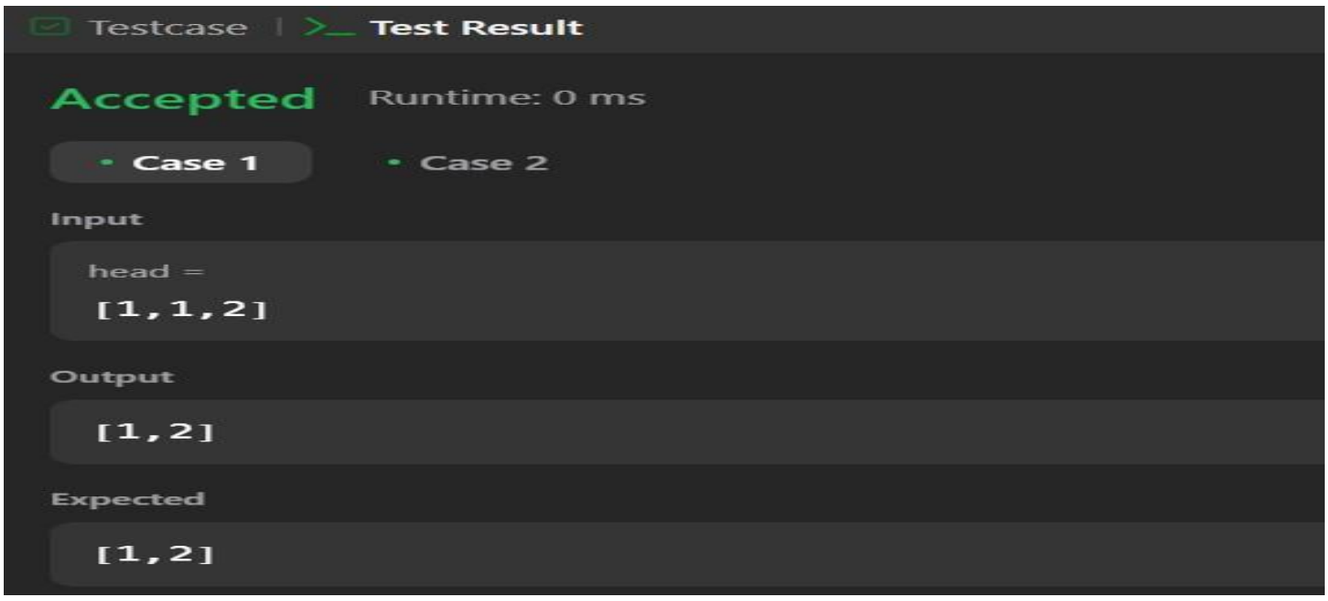
AIM:-

Remove duplicates from a sorted list

CODE:-

```
class Solution {
    public ListNode deleteDuplicates(ListNode head) {
        ListNode res = head;

        while (head != null && head.next != null) {
if (head.val == head.next.val) {
head.next = head.next.next;
            } else {
head = head.next;
            }
        }
        return res;
    }
}
```

OUTPUT:-



PROBLEM-3

AIM:-

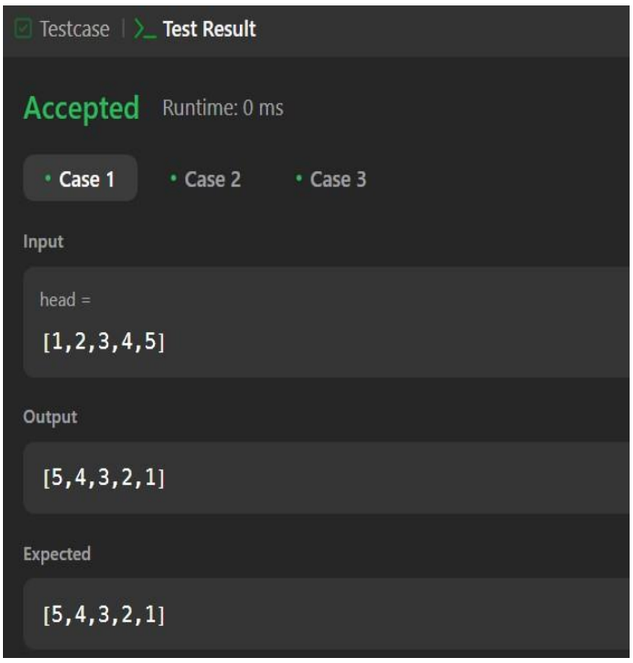
Reverse a linked list

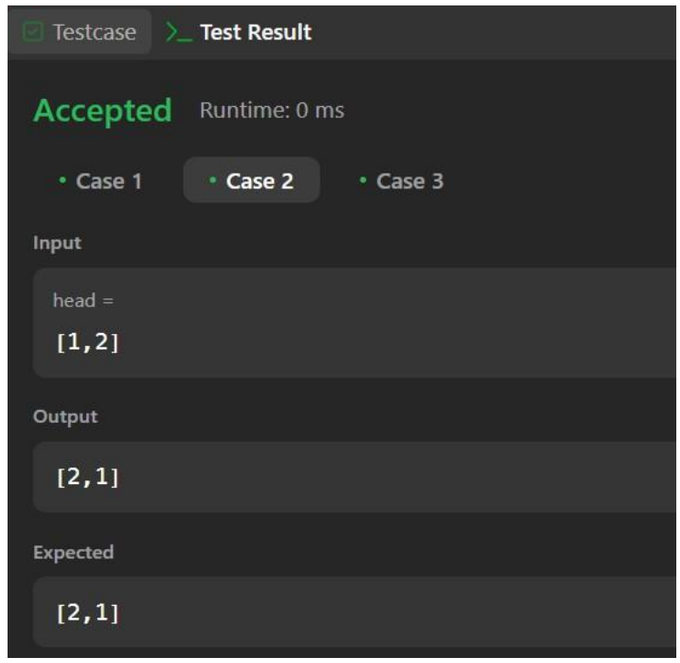
CODE:-

```
class Solution {     public ListNode
reverseList(ListNode head) {
        ListNode node = null;


        while (head != null) {
            ListNode temp =
head.next;            head.next =
node;            node = head;
head = temp;
        }
        return
node;
```

```
    }
}
```

OUTPUT:-





PROBLEM-4

AIM:-

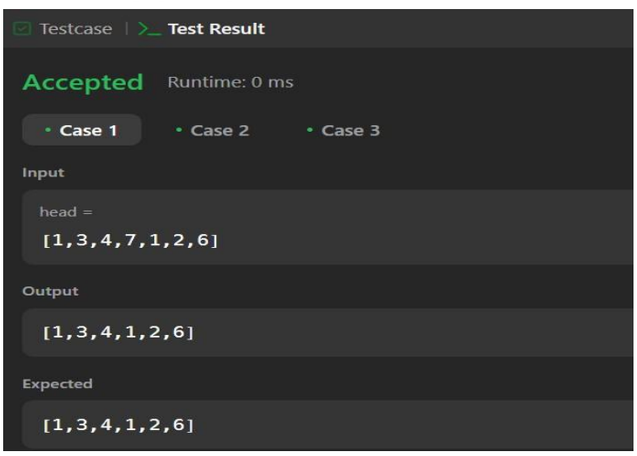
Delete middle node of a list

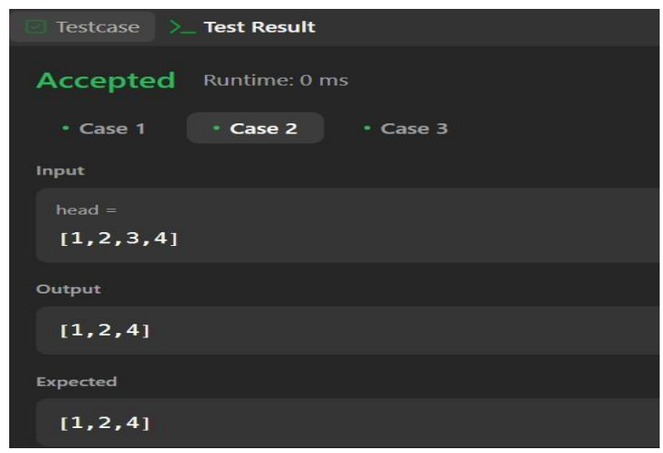
CODE:-

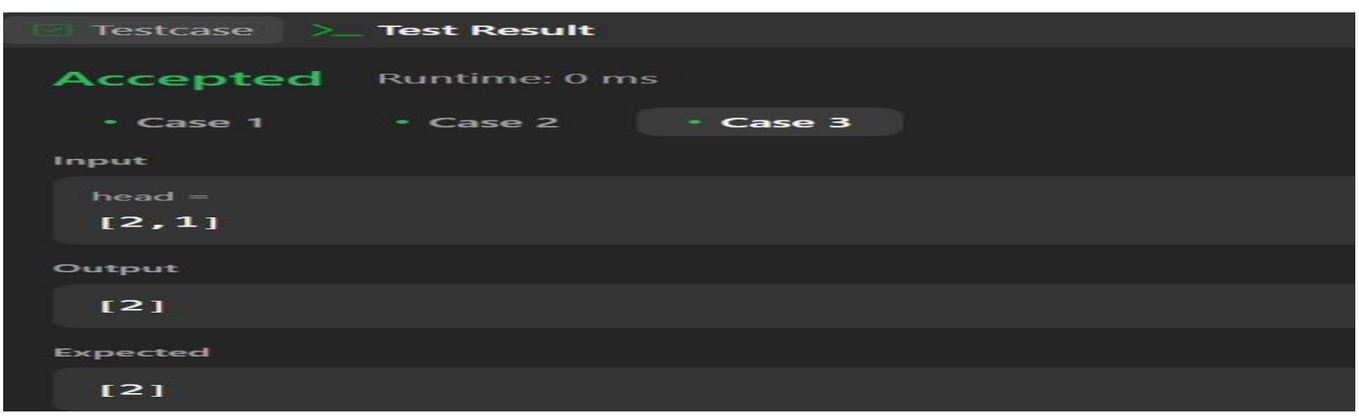
```
class Solution {
    public ListNode deleteMiddle(ListNode head) {
ListNode counter = head;        int count = 0;
while(counter != null){            counter =
counter.next;            count++;
        }
        ListNode curr = head;
if(count == 1){
return curr.next;
```

```
        }
        int middle = (count/2) - 1;
        count = 0;  while(count
        != middle){
            curr = curr.next;
count++;
        }
        curr.next = curr.next.next;
return head;
    }
}
```

OUTPUT:-







PROBLEM-5

AIM:-

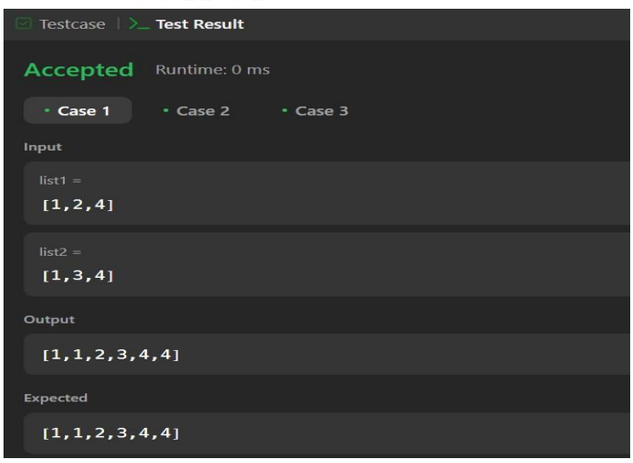
Merge two sorted linked lists

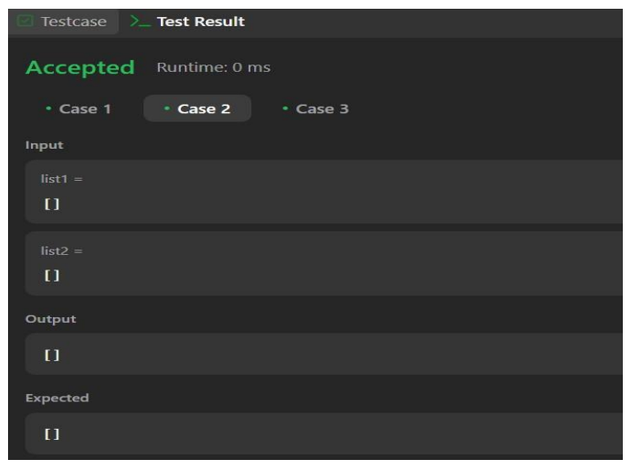
CODE:-

```
class Solution {
    public ListNode mergeTwoLists(ListNode list1, ListNode list2) {
        ListNode dummy = new ListNode();
        ListNode cur = dummy;

        while (list1 != null && list2 != null) {
if (list1.val > list2.val) {                cur.next
= list2;                list2 = list2.next;
            } else {
```

```
                cur.next = list1;
        list1 = list1.next;
            }
            cur = cur.next;
        }

        cur.next = (list1 != null) ? list1 : list2;

        return dummy.next;
    }
}
```

OUTPUT:-





PROBLEM-6

AIM:-

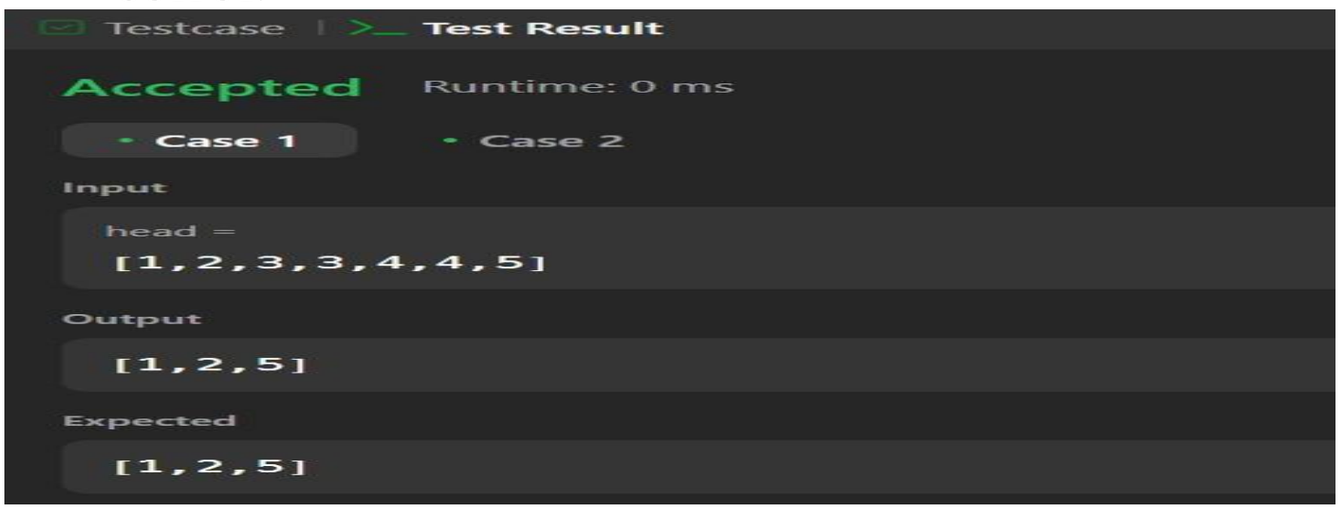
Remove duplicates from sorted lists 2

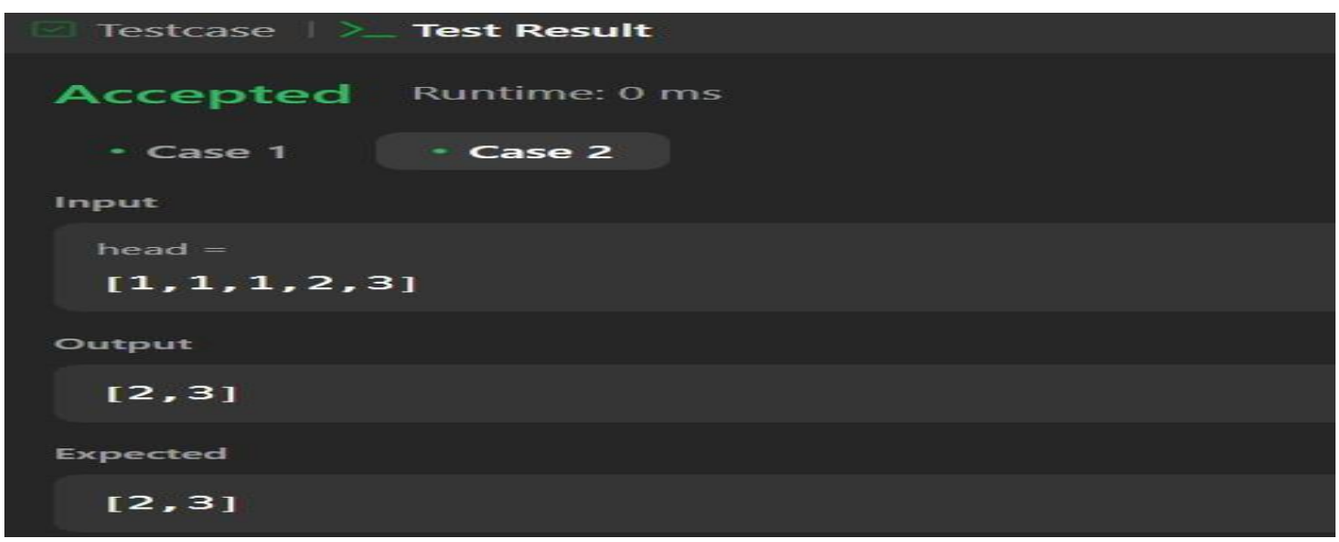
CODE:-

```
class Solution {     public ListNode
deleteDuplicates(ListNode head) {
        ListNode ans = new ListNode(1000, head);
        ListNode cur = ans;

        while (cur.next != null && cur.next.next != null) {
if (cur.next.val == cur.next.next.val) {                int val =
cur.next.val;                while (cur.next != null &&
```

```
cur.next.val == val) {                    cur.next =
cur.next.next;
            }
} else {
            cur = cur.next;
        }
    }

    return ans.next;
  }
}
```

OUTPUT:-





PROBLEM-7

AIM:-

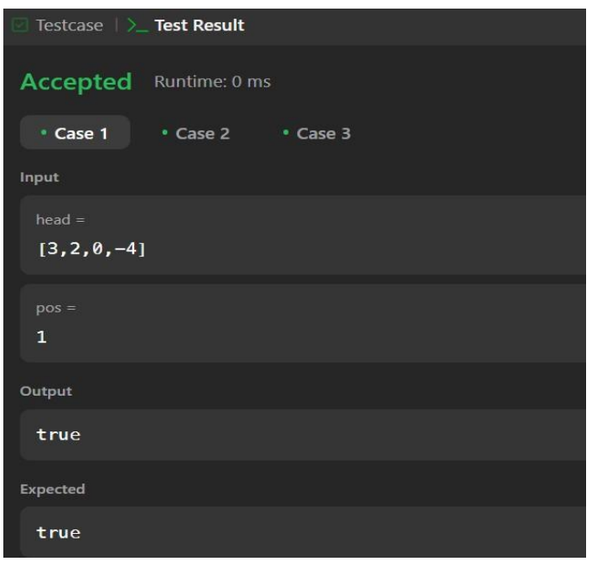
Detect a cycle in a linked list

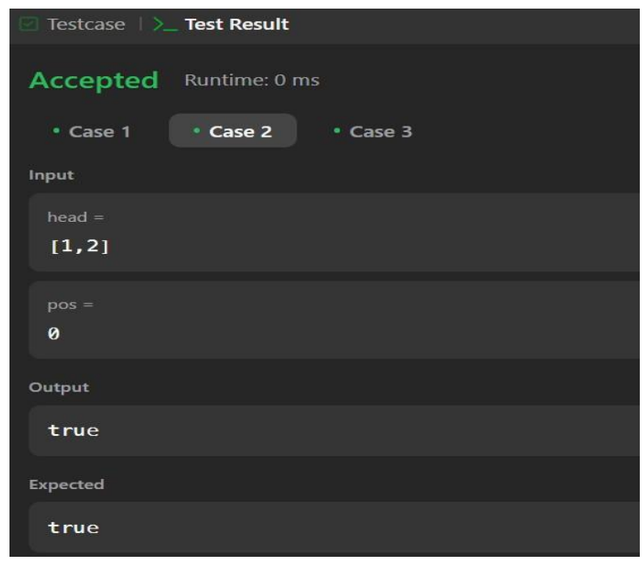
CODE:-

```
  public class Solution {     public boolean
hasCycle(ListNode head) {
        ListNode fast = head;
        ListNode slow = head;
```

```
        while (fast != null && fast.next != null) {
fast = fast.next.next;          slow = slow.next;


            if (fast == slow) {
return true;
            }
        }
        return false;
    }
}
```

OUTPUT:-





PROBLEM-8

AIM:-

Reverse linked list 2

CODE:-

```
class Solution {    public ListNode reverseBetween(ListNode head,
int left, int right) {
        if (head == null || left == right) {
return head;
        }
```

```
        ListNode dummy = new ListNode(0);
dummy.next = head;        ListNode prev =
dummy;
        for (int i = 0; i < left - 1; i++) {
prev = prev.next;
        }
        ListNode cur = prev.next;        for
(int i = 0; i < right - left; i++) {
ListNode temp = cur.next;
cur.next = temp.next;            temp.next
= prev.next;            prev.next = temp;
        }
        return dummy.next;
    }
}
```

OUTPUT:-

PROBLEM-9

AIM:-

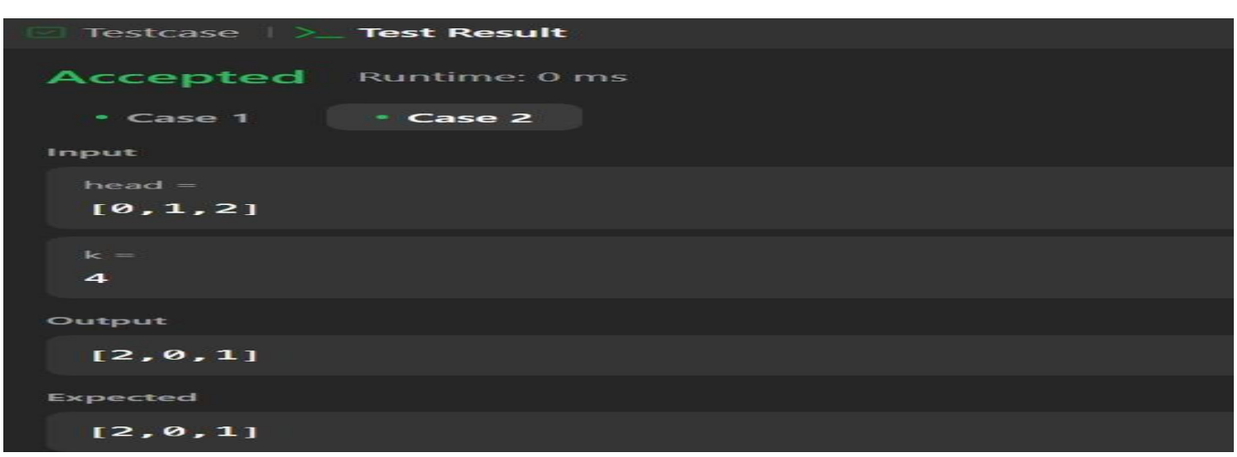
Rotate a list

CODE:-

```
class Solution {    public ListNode
rotateRight(ListNode head, int k) {        if (head ==
null || head.next == null || k == 0) {            return
head;
```

```
        }        int
length = 1;
        ListNode temp = head;
while (temp.next != null) {
temp = temp.next;
length++;
        }
        temp.next = head;
k = k % length;
        k = length - k;
while (k-- > 0) {
temp = temp.next;
        }
        head = temp.next;
temp.next = null;        return
head;
    }
}
```

OUTPUT:-



PROBLEM-10

AIM:-

Merge k sorted lists

CODE:-

```
class Solution {     public ListNode
mergeKLists(ListNode[] lists) {         if (lists ==
null || lists.length == 0) {             return null;
        }
        return mergeKListsHelper(lists, 0, lists.length - 1);
    }

    private ListNode mergeKListsHelper(ListNode[] lists, int start, int end) {
        if (start == end) {
return lists[start];
        }         if (start + 1 ==
end) {             return
merge(lists[start],
lists[end]);

        }         int mid = start + (end -
start) / 2;
        ListNode left = mergeKListsHelper(lists, start, mid);
ListNode right = mergeKListsHelper(lists, mid + 1, end);
        return merge(left, right);
    }

    private ListNode merge(ListNode l1, ListNode l2) {
        ListNode dummy = new ListNode(0);
        ListNode curr = dummy;

        while (l1 != null && l2 != null) {
if (l1.val < l2.val) {
curr.next = l1;                l1 = l1.next;
            } else {
curr.next = l2;
l2 = l2.next;
            }             curr =
curr.next;
        }         curr.next = (l1 != null) ?
l1 : l2;         return dummy.next;
    }
}
```

OUTPUT:-

Testcase | Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

lists =
[[1,4,5],[1,3,4],[2,6]]

Output

[1,1,2,3,4,4,5,6]

Expected

[1,1,2,3,4,4,5,6]

Testcase | Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

lists =
[]

Output

[]

Expected

[]

Testcase Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

lists =
[[]]

Output

[]

Expected

[]

PROBLEM-11

AIM:-

Sort List

CODE:-

```
class Solution {     public ListNode sortList(ListNode
head) {         if (head == null || head.next == null)
return head;         ListNode slow = head, fast =
head.next;         while (fast != null && fast.next !=
null) {             slow = slow.next;             fast =
fast.next.next;
        }
        ListNode mid = slow.next;
slow.next = null;
        ListNode left = sortList(head);
ListNode right = sortList(mid);
return merge(left, right);
    }
    private ListNode merge(ListNode l1, ListNode l2) {
        ListNode dummy = new ListNode(0);
        ListNode tail = dummy;

        while (l1 != null && l2 != null)
{             if (l1.val < l2.val) {
tail.next = l1;                l1 = l1.next;
            } else {
tail.next = l2;
l2 = l2.next;
            }
            tail = tail.next;
        }

        tail.next = (l1 != null) ? l1 : l2;
return dummy.next;
    }
}
```

OUTPUT:-

Testcase | >_ Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

head =
[4,2,1,3]

Output

[1,2,3,4]

Expected

[1,2,3,4]

Testcase | >_ Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

head =
[-1,5,3,4,0]

Output

[-1,0,3,4,5]

Expected

[-1,0,3,4,5]

Testcase >_ Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

head =
[]

Output

[]

Expected

[]