ASSIGNMENT-3

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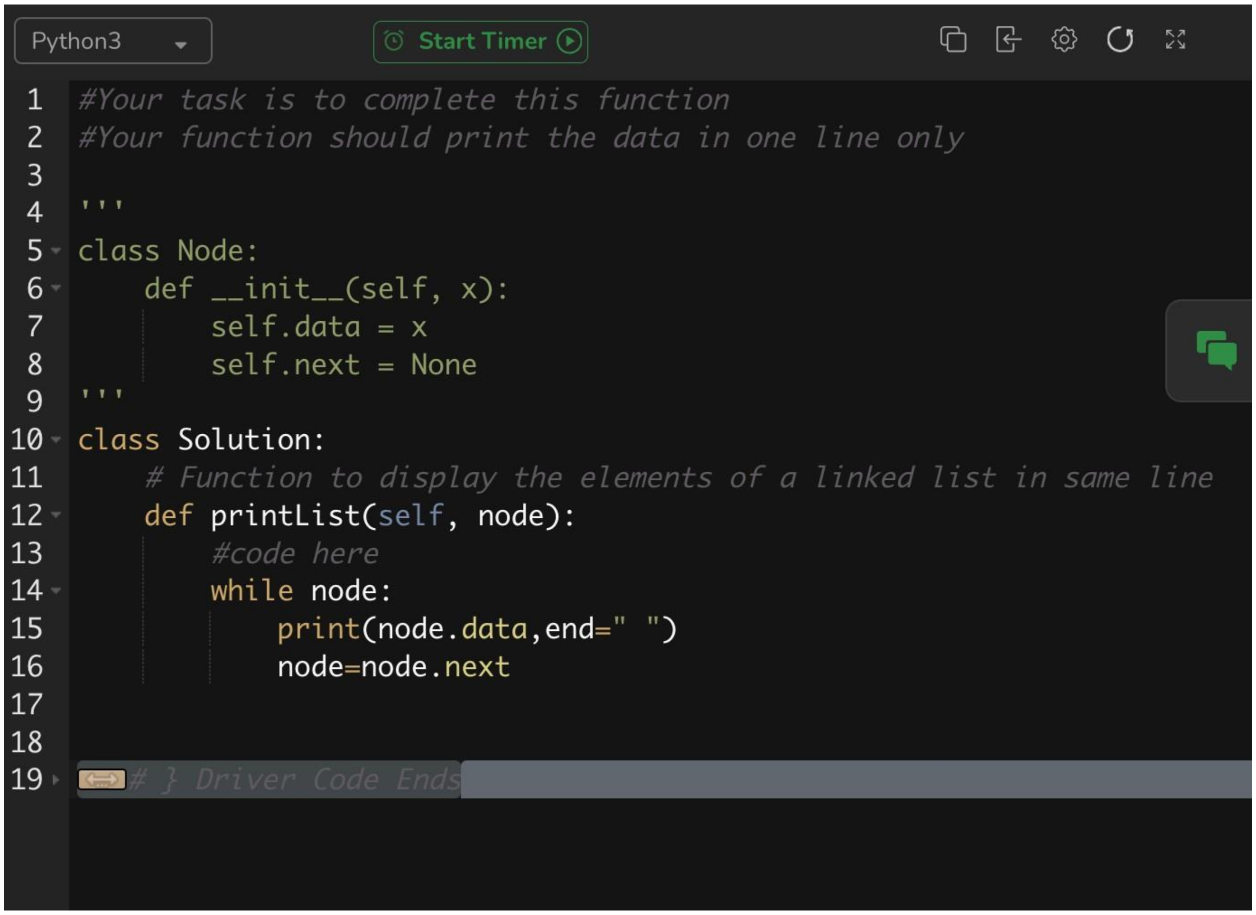
SUBJECT: AP-2
CLASS- IOT-610/B

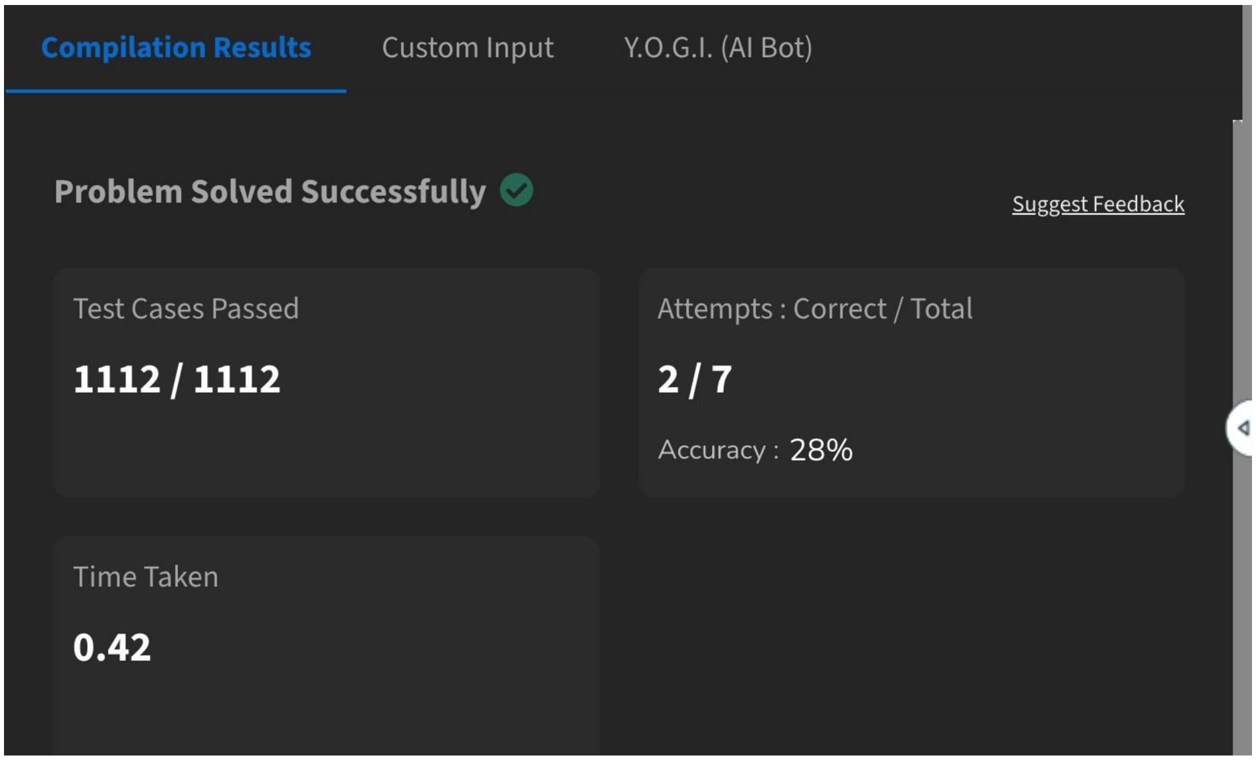
1. **Print Linked List:** https://www.geeksforgeeks.org/problems/printlinked-list-elements/0



```
#Your task is to complete this function
#Your function should print the data in one line only

'''
class Node:
    def __init__(self, x):
        self.data = x
        self.next = None
'''
class Solution:
    # Function to display the elements of a linked list in same line
    def printList(self, node):
        #code here
        while node:
            print(node.data,end=" ")
            node=node.next


# } Driver Code Ends
```


Compilation Results Custom Input Y.O.G.I. (AI Bot)

Problem Solved Successfully

Suggest Feedback

Test Cases Passed

1112 / 1112

Attempts : Correct / Total

2 / 7

Accuracy : 28%

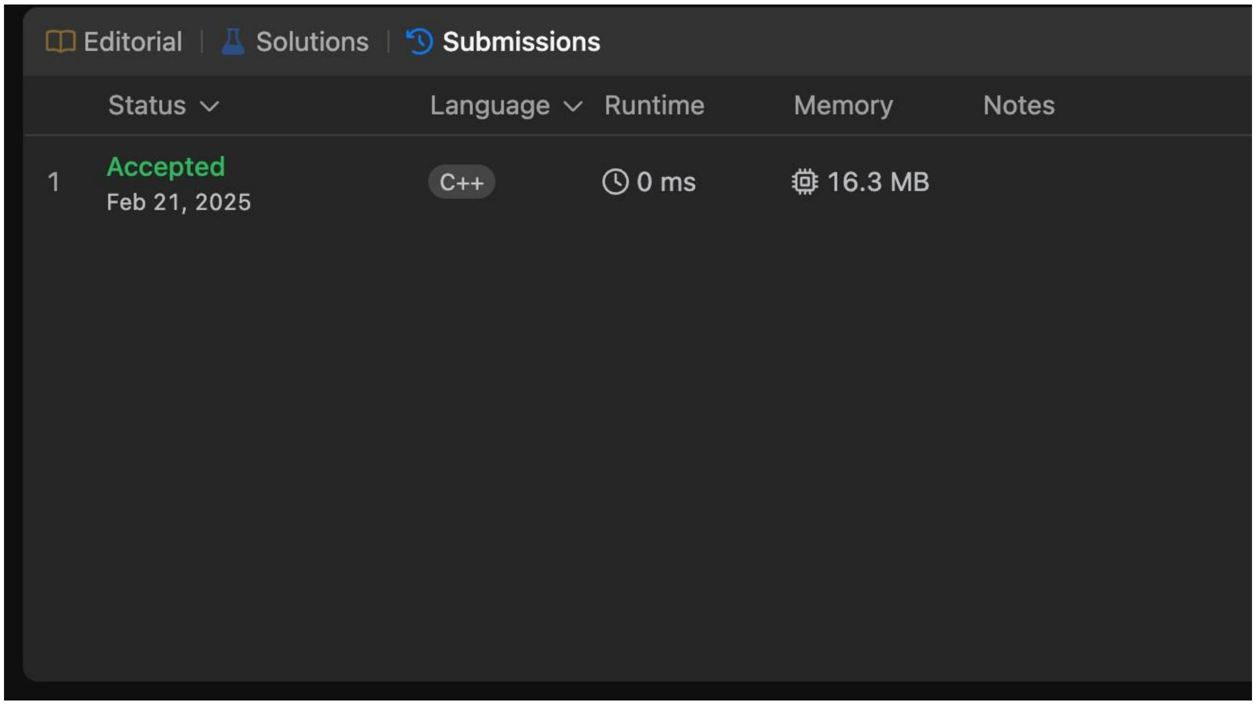
Time Taken

0.42

2. Remove duplicates from a sorted list: https://leetcode.com/problems/remove-duplicatesfrom-sorted-list/description/

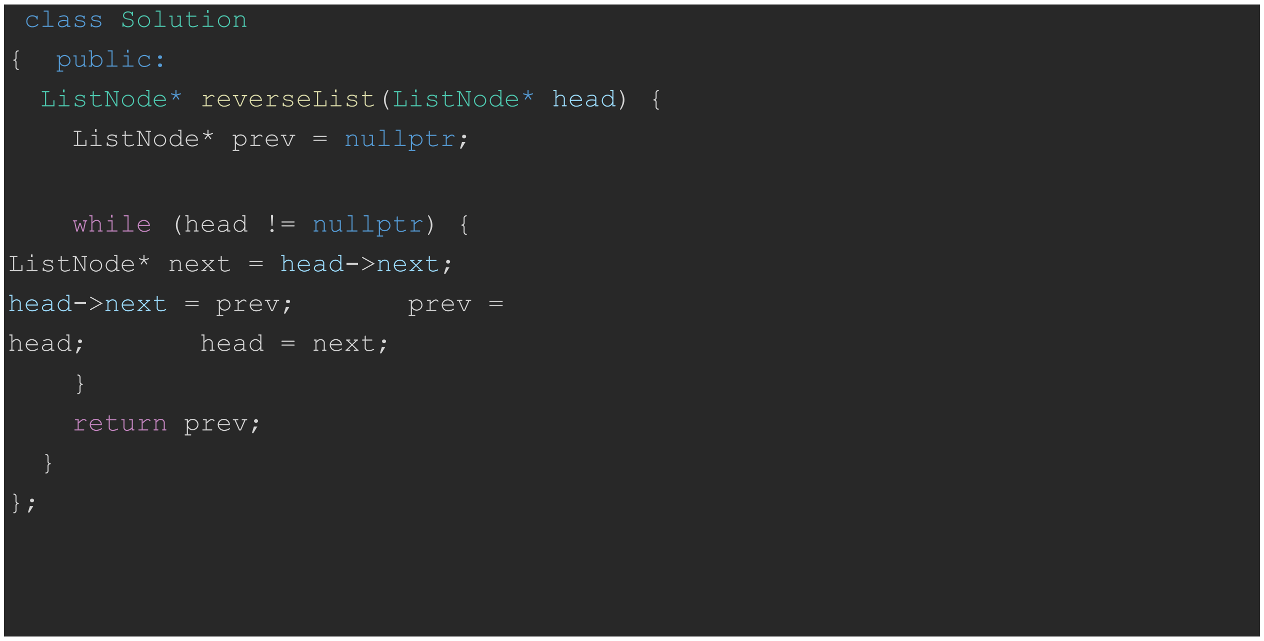
```
class Solution {
public:
  ListNode* deleteDuplicates(ListNode* head) {
    ListNode* curr = head;

    while (curr != nullptr) {        while (curr->next &&
curr->val == curr->next->val)          curr->next = curr-
>next->next;        curr = curr->next;
    }
    return head;
  }
};
```



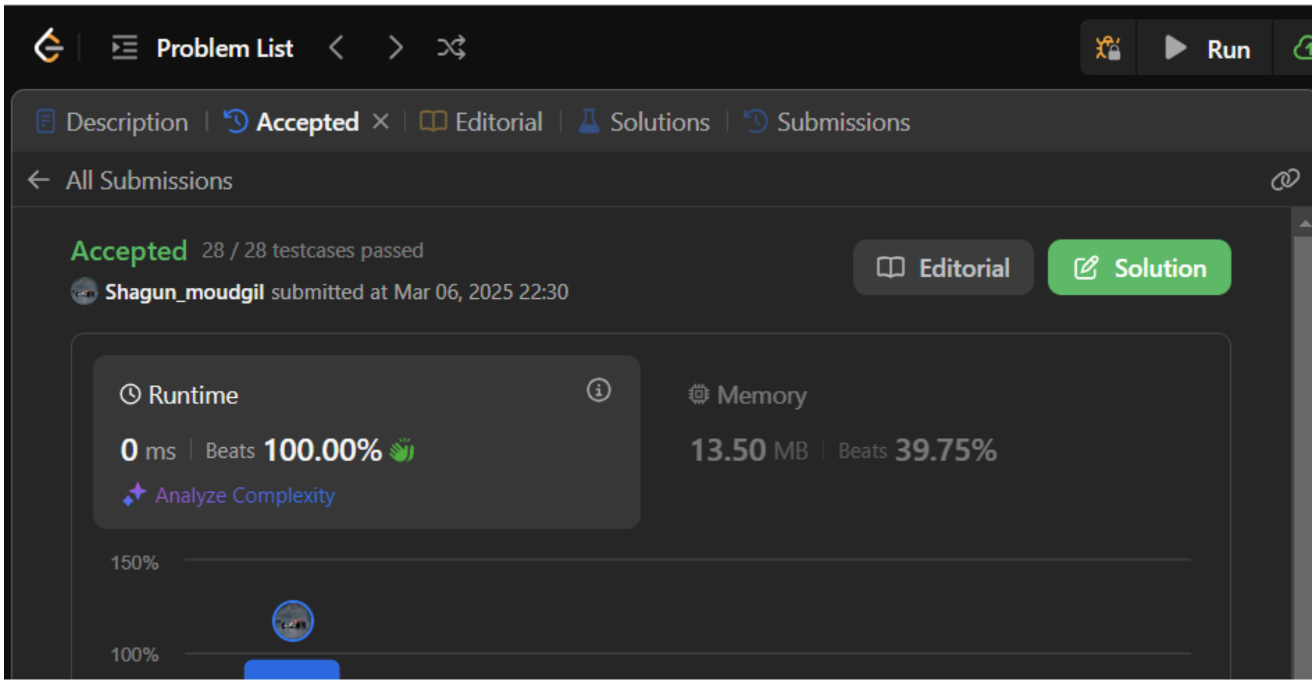
	Status	Language	Runtime	Memory	Notes
1	Accepted Feb 21, 2025	C++	0 ms	16.3 MB	

3. Reverse a linked list: https://leetcode.com/problems/reverse-linkedlist/description/



```
 class Solution
{  public:
  ListNode* reverseList(ListNode* head) {
    ListNode* prev = nullptr;

    while (head != nullptr) {
ListNode* next = head->next;
head->next = prev;       prev =
head;       head = next;
    }
    return prev;
  }
};
```


Problem List

Description | Accepted | Editorial | Solutions | Submissions

All Submissions

Accepted 28 / 28 testcases passed

Shagun_moudgil submitted at Mar 06, 2025 22:30

Editorial Solution

Runtime

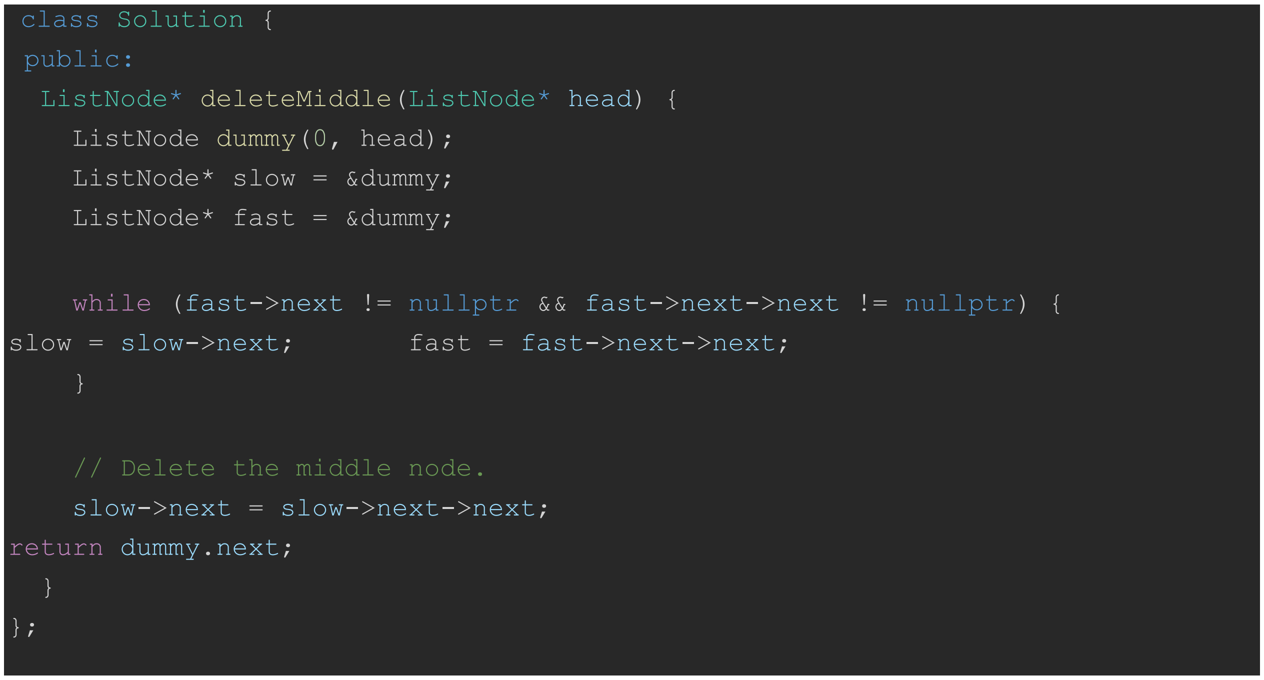
0 ms | Beats 100.00%

Analyze Complexity

Memory

13.50 MB | Beats 39.75%

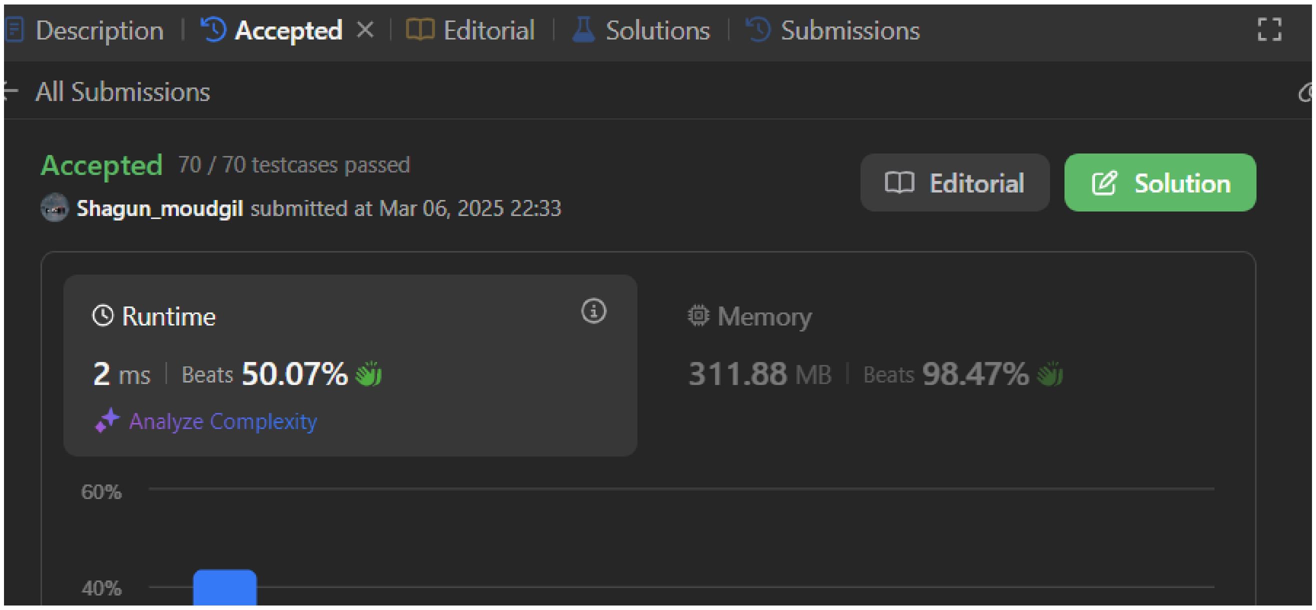
4. **Delete middle node of a list: https://leetcode.com/problems/delete-the-middlenode-of-a-linked-list/description/**



```
 class Solution {
 public:
  ListNode* deleteMiddle(ListNode* head) {
    ListNode dummy(0, head);
    ListNode* slow = &dummy;
    ListNode* fast = &dummy;

    while (fast->next != nullptr && fast->next->next != nullptr) {
slow = slow->next;        fast = fast->next->next;
    }

    // Delete the middle node.
    slow->next = slow->next->next;
return dummy.next;
  }
};
```



Accepted 70 / 70 testcases passed

Shagun_moudgil submitted at Mar 06, 2025 22:33

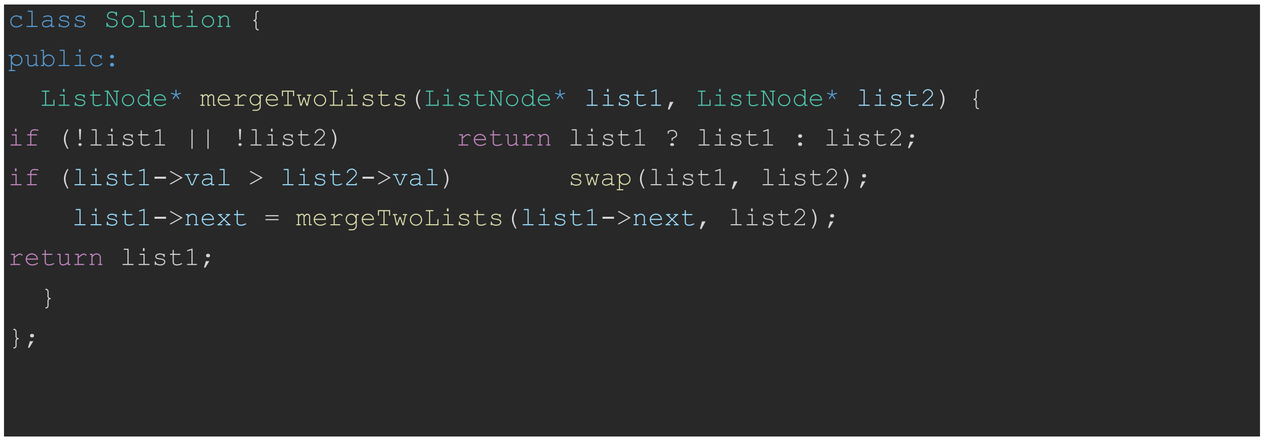
Runtime

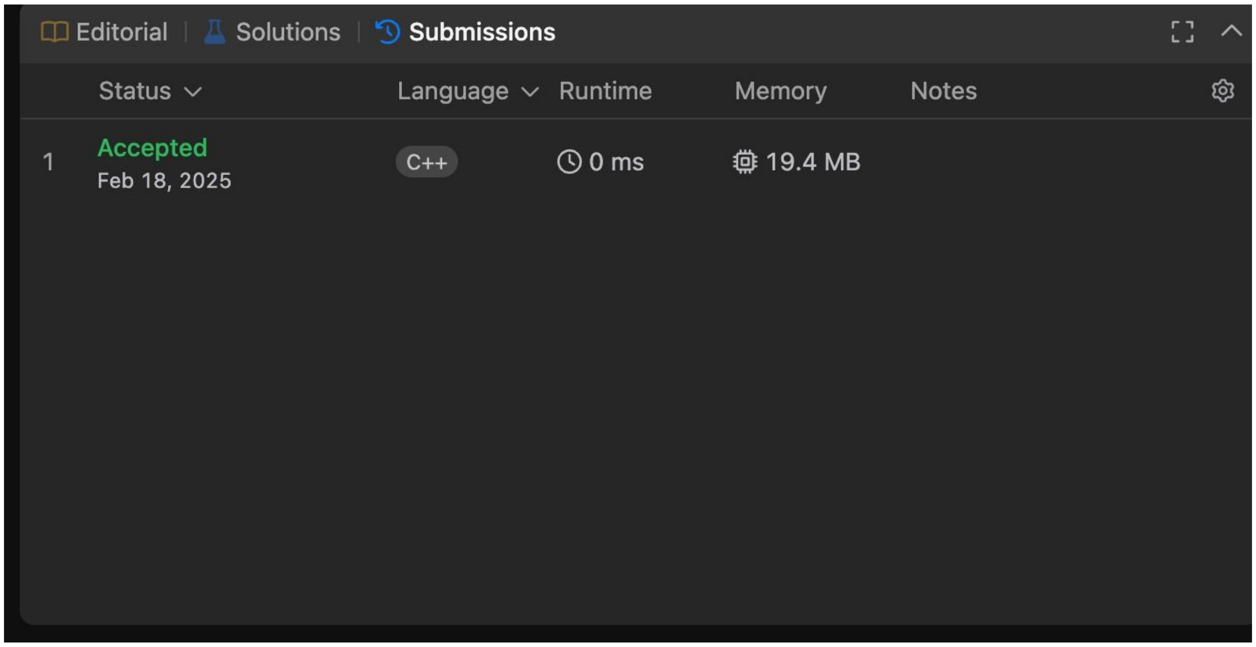
2 ms | Beats 50.07%

Memory

311.88 MB | Beats 98.47%

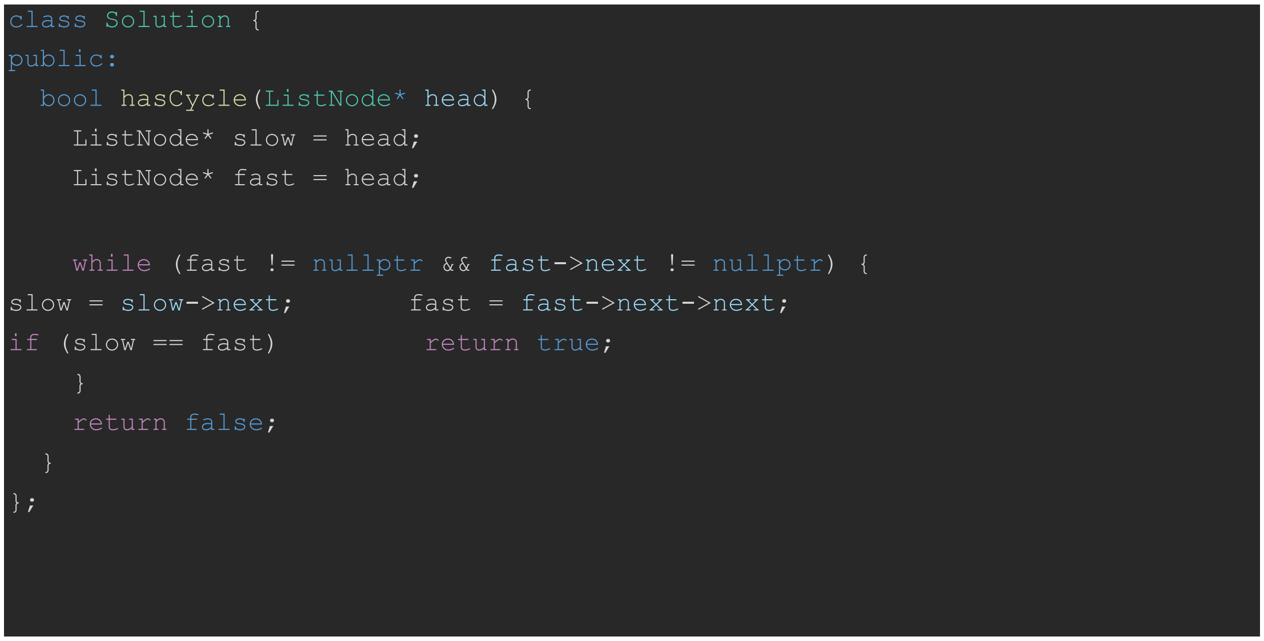
5. **Merge two sorted linked lists: https://leetcode.com/problems/merge-two-sortedlists/description/**


```
class Solution {
public:
  ListNode* mergeTwoLists(ListNode* list1, ListNode* list2) {
if (!list1 || !list2)        return list1 ? list1 : list2;
if (list1->val > list2->val)        swap(list1, list2);
    list1->next = mergeTwoLists(list1->next, list2);
return list1;
  }
};
```

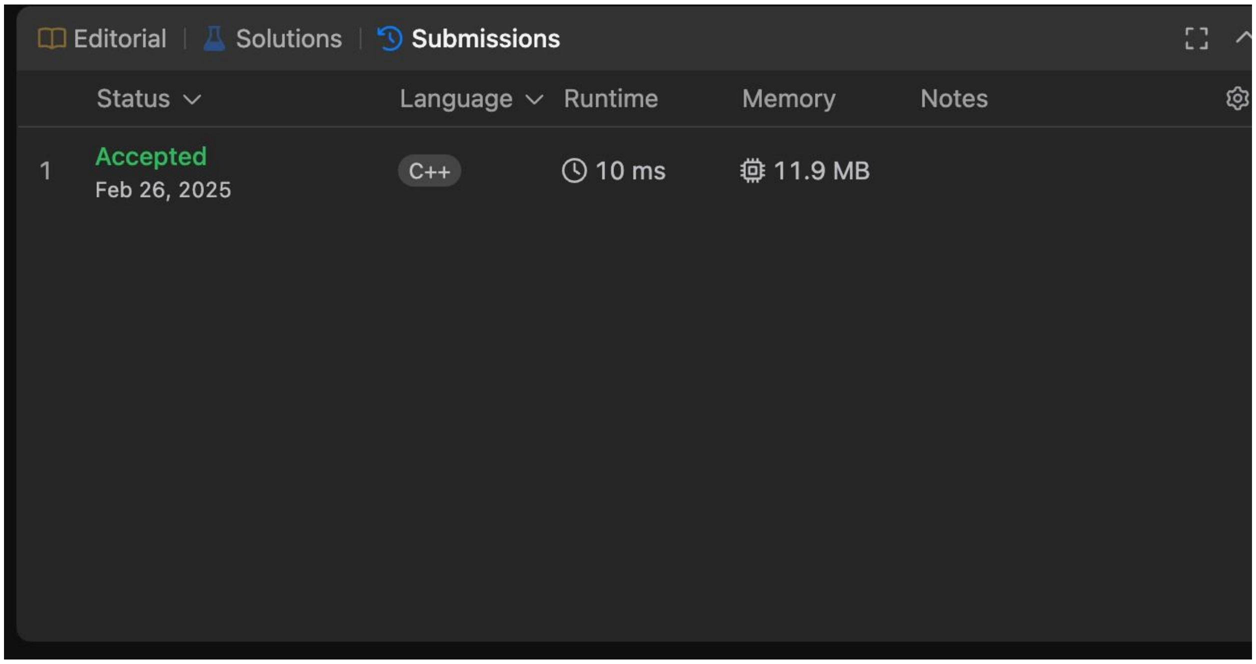

Editorial | Solutions | Submissions

	Status	Language	Runtime	Memory	Notes
1	Accepted Feb 18, 2025	C++	0 ms	19.4 MB	

6. **Detect a cycle in a linked list:** https://leetcode.com/problems/linked-listcycle/description/


```
class Solution {
public:
  bool hasCycle(ListNode* head) {
    ListNode* slow = head;
    ListNode* fast = head;

    while (fast != nullptr && fast->next != nullptr) {
slow = slow->next;        fast = fast->next->next;
if (slow == fast)          return true;
    }
    return false;
  }
};
```



	Status	Language	Runtime	Memory	Notes
1	Accepted Feb 26, 2025	C++	10 ms	11.9 MB	

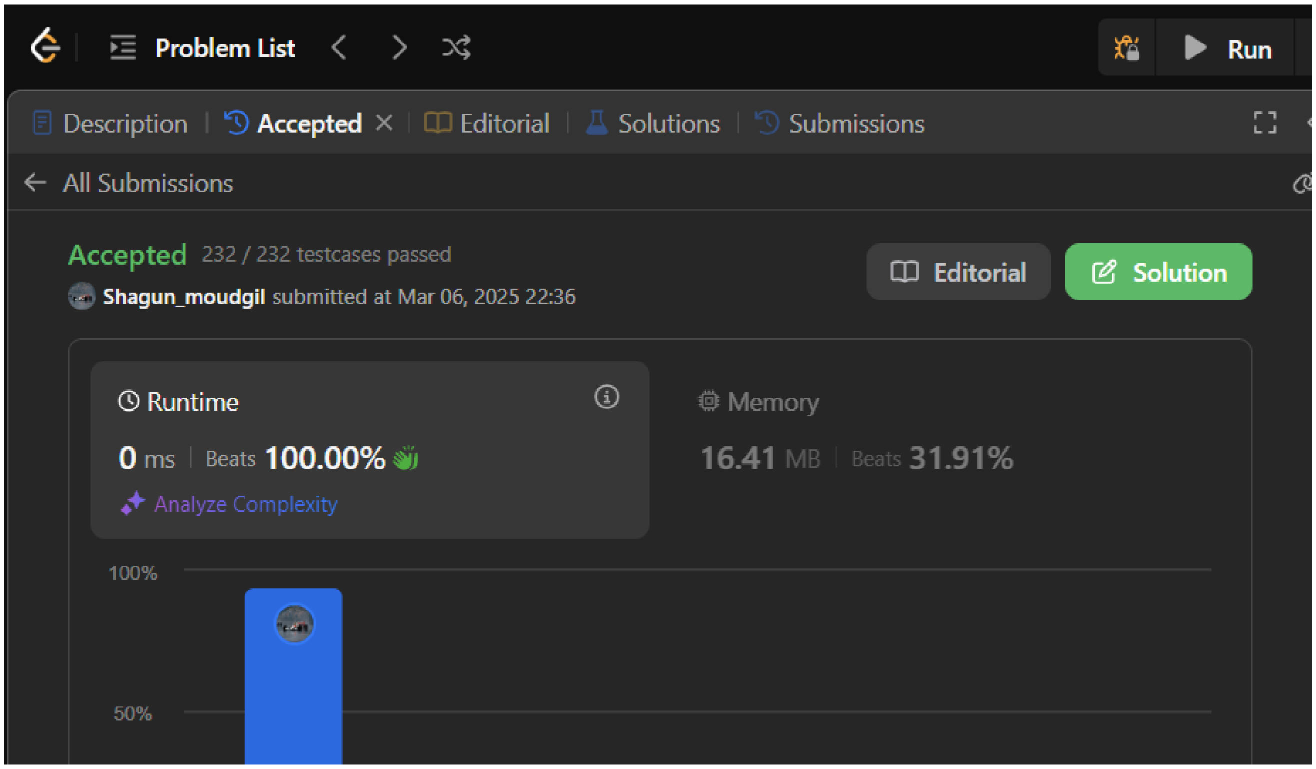
7. Rotate a list: https://leetcode.com/problems/rotatelist/description/

```
class Solution {
public:
  ListNode* rotateRight(ListNode* head, int k) {
if (!head || !head->next || k == 0)        return
head;

    ListNode* tail;
int length = 1;
    for (tail = head; tail->next; tail = tail->next)
      ++length;      tail->next = head;   //
Circle the list.

    const int t = length - k % length;
for (int i = 0; i < t; ++i)        tail
= tail->next;
    ListNode* newHead = tail->next;     tail-
>next = nullptr;

    return newHead;
  } };
```



Accepted 232 / 232 testcases passed

Shagun_moudgil submitted at Mar 06, 2025 22:36

Runtime

0 ms | Beats 100.00%

Memory

16.41 MB | Beats 31.91%

8. Sort List: https://leetcode.com/problems/sortlist/description/

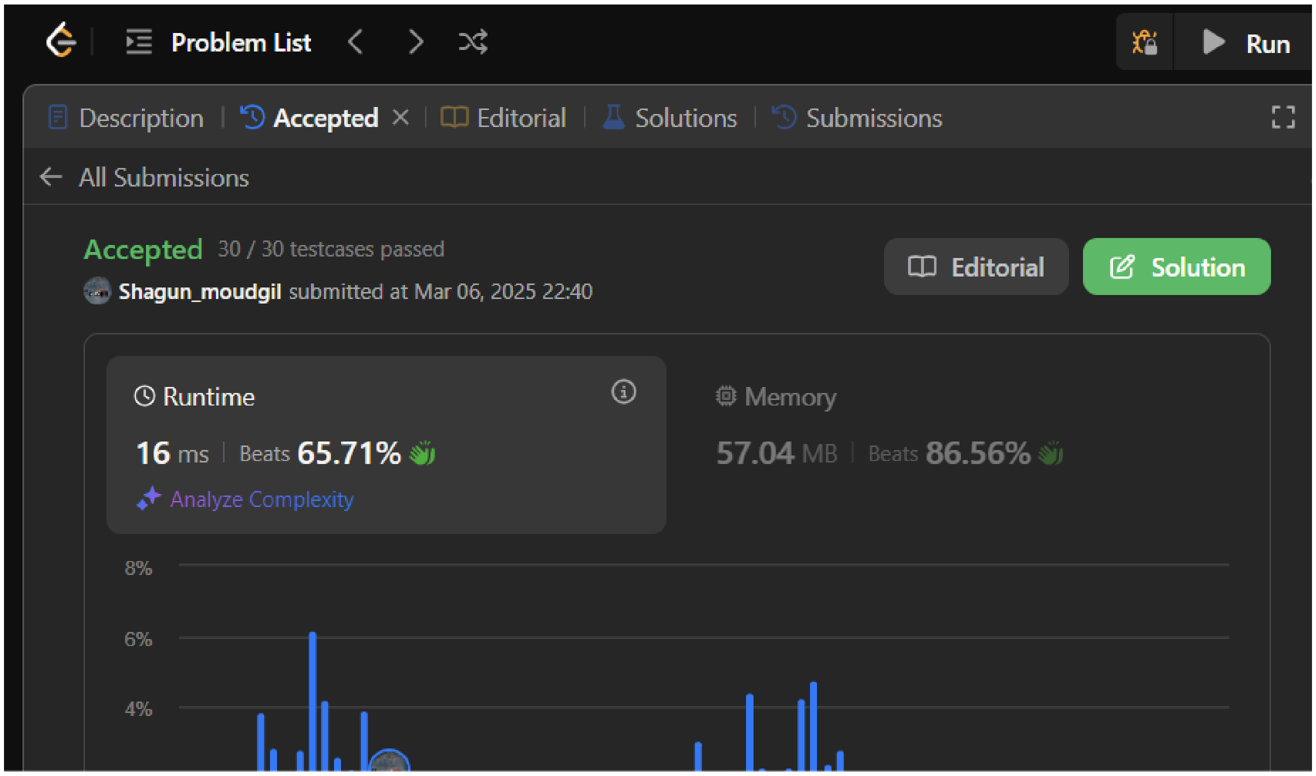
```
 class Solution {  public:
  ListNode* sortList(ListNode* head) {
const int length = getLength(head);
    ListNode dummy(0, head);
     for (int k = 1; k < length; k *= 2)
{
      ListNode* curr = dummy.next;
      ListNode* tail = &dummy;
      while (curr != nullptr) {          ListNode* l
= curr;          ListNode* r = split(l, k);
curr = split(r, k);          auto [mergedHead,
mergedTail] = merge(l, r);          tail->next =
mergedHead;          tail = mergedTail;
      }
    }
    return dummy.next;
  }
private:
  int getLength(ListNode* head) {      int length = 0;
for (ListNode* curr = head; curr; curr = curr->next)
      ++length;
return length;
  }

  ListNode* split(ListNode* head, int k) {
while (--k && head)       head = head-
>next;
    ListNode* rest = head ? head->next : nullptr;
if (head != nullptr)       head->next = nullptr;
return rest;
  }
  pair<ListNode*, ListNode*> merge(ListNode* l1, ListNode* l2) {
    ListNode dummy(0);
    ListNode* tail = &dummy;

    while (l1 && l2) {
if (l1->val > l2->val)
swap(l1, l2);       tail-
>next = l1;       l1 = l1-
>next;       tail = tail-
>next;
    }
    tail->next = l1 ? l1 : l2;
while (tail->next != nullptr)
```

```
      tail = tail->next;

    return {dummy.next, tail};
  }
};
```



Accepted 30 / 30 testcases passed

Shagun_moudgil submitted at Mar 06, 2025 22:40

Runtime

16 ms | Beats 65.71%

Memory

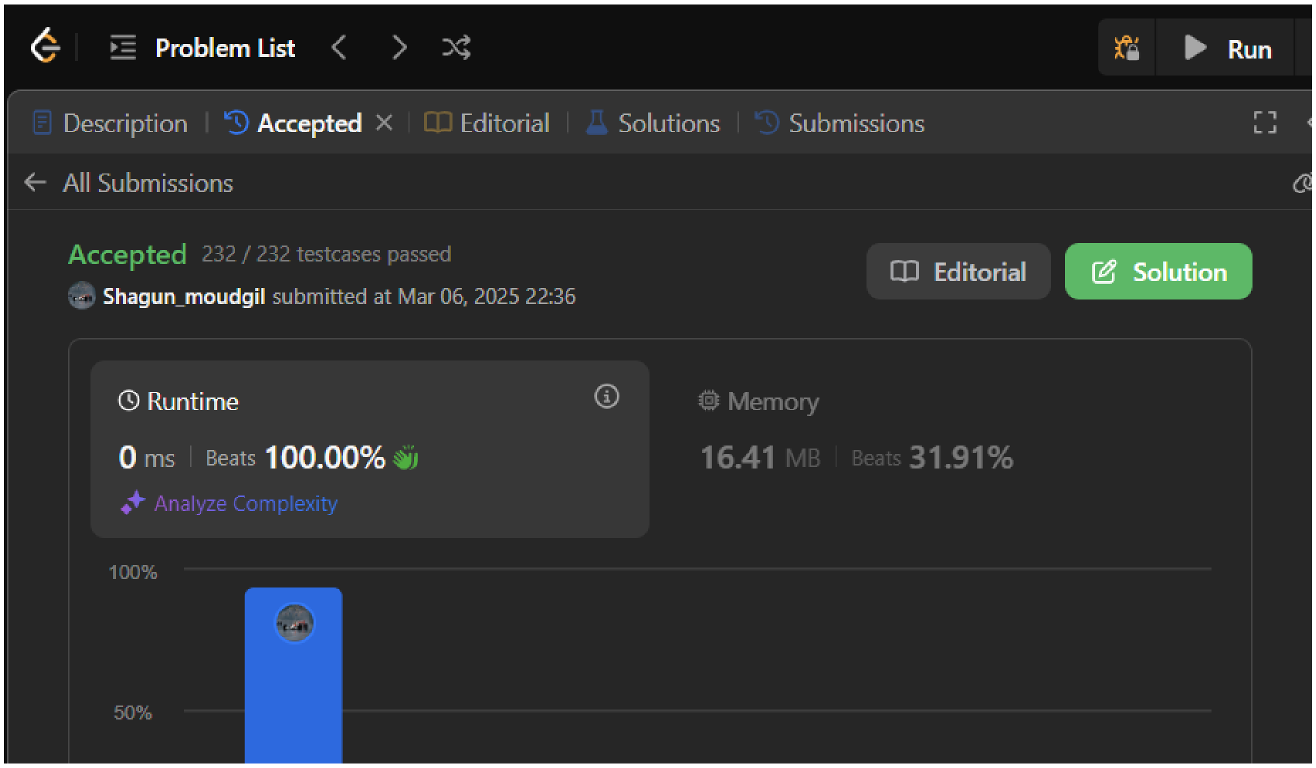
57.04 MB | Beats 86.56%

9. Merge k sorted lists: https://leetcode.com/problems/merge-k-sortedlists/description/

```
class Solution {
public:
  ListNode* mergeKLists(vector<ListNode*>& lists) {
    ListNode dummy(0);
ListNode* curr = &dummy;
    auto compare = [](ListNode* a, ListNode* b) { return a->val > b->val; };
priority_queue<ListNode*, vector<ListNode*>, decltype(compare)> minHeap(
compare);

    for (ListNode* list : lists)
if (list != nullptr)
minHeap.push(list);

    while (!minHeap.empty()) {
      ListNode* minNode = minHeap.top();
minHeap.pop();       if (minNode->next)
minHeap.push(minNode->next);       curr-
>next = minNode;       curr = curr-
>next;
    }
    return dummy.next;
  }
};
```



Accepted 232 / 232 testcases passed

Shagun_moudgil submitted at Mar 06, 2025 22:36

Runtime

0 ms | Beats 100.00%

Memory

16.41 MB | Beats 31.91%