

Đã bắt đầu vào lúc	Thứ sáu, 23 Tháng chín 2022, 2:32 PM
Tình trạng	Đã hoàn thành
Hoàn thành vào lúc	Thứ sáu, 30 Tháng chín 2022, 10:45 AM
Thời gian thực hiện	6 ngày 20 giờ
Điểm	14,00 của 14,00 (100%)

Câu hỏi 1

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` is used to store a node in a singly linked list, described on the following:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode();
    LLNode(int val, LLNode* next);
}
```

Where `val` is the value of node, `next` is the pointer to the next node.

Request: Implement function:

```
LLNode* addLinkedList(LLNode* l0, LLNode* l1);
```

Where `l0`, `l1` are two linked lists represented positive integers, each node is a digit, the head is the least significant digit (the value of each node is between 0 and 9, the length of each linked list is between 0 and 100000). This function returns the linked list representing the sum of the two integers.

Example:

Given `l0 = [2, 3]` (representing 32) and `l1 = [1, 8]` (representing 81). The result would be `l0 = [3, 1, 1]` (representing 32 + 81 = 113).

Note:

In this exercise, the libraries `iostream`, `string`, `cstring`, `climits`, `utility`, `vector`, `list`, `stack`, `queue`, `map`, `unordered_map`, `set`, `unordered_set`, `functional`, `algorithm` has been included and `namespace std` are used. You can write helper functions and classes. Importing other libraries is allowed, but not encouraged, and may result in unexpected errors.

For example:

Test	Result
<pre>int arr1[] = {2, 9}; int arr2[] = {0, 5}; LLNode* head1 = LLNode::createWithIterators(arr1, arr1 + sizeof(arr1) / sizeof(int)); LLNode* head2 = LLNode::createWithIterators(arr2, arr2 + sizeof(arr2) / sizeof(int)); LLNode* newhead = addLinkedList(head1, head2); LLNode::printList(newhead); head1->clear(); head2->clear(); newhead->clear();</pre>	<pre>[2, 4, 1]</pre>

Answer: (penalty regime: 0, 0, 0, 5, 10, ... %)

Reset answer

```
1 LLNode* addLinkedList(LLNode* l0, LLNode* l1) {
2     // STUDENT ANSWER
3     if(l0==nullptr&& l1==nullptr){
4         return nullptr;
5     }
6     LLNode *ret=new LLNode;
7     LLNode *start= ret;
8     int nho=0;
9     while(l0!=nullptr&&l1!=nullptr){
10         //ret->next=new LLNode();
11         //ret=ret->next;
12         if(l0->val+l1->val+nho>=10){
13             ret->val=(l0->val+l1->val+nho)%10;
14             nho=1;
15         }
16         else{
17             ret->val=(l0->val+l1->val+nho)%10;
```

```
18         nno=0;
19     }
20     l0=l0->next;
21     l1=l1->next;
22     if(l0!=nullptr&&l1!=nullptr){
23         ret->next=new LLNode();
24         ret=ret->next;
25     }
26 }
27 while(l1!=nullptr){
28     ret->next=new LLNode();
29     ret=ret->next;
30     ret->val=l1->val+nho;
31     l1=l1->next;
32     nho=0;
33 }
34 while(l0!=nullptr){
35     ret->next=new LLNode();
36     ret=ret->next;
37     ret->val=l0->val+nho;
38     l0=l0->next;
39     nho=0;
40 }
41 //cout<<nho<<endl;
42 if(nho){
43     ret->next=new LLNode();
44     ret=ret->next;
45     ret->val=nho;
46 }
47 //cout<<total<<endl;
48
49 return start;
50 }
```

	Test	Expected	Got	
✓	int arr1[] = {2, 9}; int arr2[] = {0, 5}; LLNode* head1 = LLNode::createWithIterators(arr1, arr1 + sizeof(arr1) / sizeof(int)); LLNode* head2 = LLNode::createWithIterators(arr2, arr2 + sizeof(arr2) / sizeof(int)); LLNode* newhead = addLinkedList(head1, head2); LLNode::printList(newhead); head1->clear(); head2->clear(); newhead->clear();	[2, 4, 1]	[2, 4, 1]	✓

Passed all tests! ✓

Chỉnh xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 2

Chính xác

Điểm 1,00 của 1,00

Polynomials is an important application of arrays and linked lists. A polynomial is composed of different terms where each of them holds a coefficient and an exponent. A polynomial $p(x)$ is the expression in variable x which is in the form $(a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0)$, where a_n, a_{n-1}, \dots, a_0 fall in the category of real numbers and 'n' is the non-negative integer, which is called the degree of polynomial.

Example: $10x^2 + 26x$, here 10 and 26 are coefficients and 2, 1 is its exponential value.

Points to keep in Mind while working with Polynomials:

- The sign of each coefficient and exponent is stored within the coefficient and the exponent itself.
- The storage allocation for each term in the polynomial must be done in descending order of their exponent.

In this question, complete SLinkedList class is included. You should use this class to complete your Polynomial class with initialized frame as following. This task is implement insertTerm to insert a term into a polynomial.

```
class Polynomial;
class Term {
private:
    double coeff;
    int exp;
    friend class Polynomial;
public:
    Term(double coeff = 0.0, int exp = 0) {
        this->coeff = coeff;
        this->exp = exp;
    }
    bool operator==(const Term& rhs) const {
        return this->coeff == rhs.coeff && this->exp == rhs.exp;
    }
    friend ostream & operator<<(ostream &os, const Term& term) {
        cout << endl;
        cout << "Term: " << "(" << term.coeff << " " << term.exp << ")";
        return os;
    }
};

class Polynomial {
private:
    SLinkedList<Term>* terms;
public:
    Polynomial() {
        this->terms = new SLinkedList<Term>();
    }
    ~Polynomial() {
        this->terms->clear();
    }
    void insertTerm(const Term& term);
    void insertTerm(double coeff, int exp);
    void print() {
        SLinkedList<Term>::Iterator it;
        cout << "[";
        for (it = this->terms->begin(); it != this->terms->end(); it++) {
            cout << (*it);
        }
        cout << endl << "]";
    }
};
```

For example:

Test	Result
<pre>Polynomial *poly = new Polynomial(); poly->insertTerm(6.0, 2); poly->insertTerm(4.0, 5); poly->insertTerm(4.0, 3); poly->insertTerm(6.0, 5); poly->insertTerm(-1.0, 0); poly->insertTerm(-6.0, 6); poly->insertTerm(6.0, 6); poly->print();</pre>	<pre>[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]</pre>
<pre>int n = 5; int coeff[] = { 1, 2, 3, 4, 5 }; int exp[] = { 1, 2, 3, 4, 5 }; Polynomial p1; for (int i = 0; i < n; ++i) p1.insertTerm(coeff[i], exp[i]); p1.print();</pre>	<pre>[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]</pre>

Answer: (penalty regime: 0, 0, 0, 5, 10 %)

Reset answer

```

1 void Polynomial::insertTerm(const Term& term) {
2     // STUDENT ANSWER
3     insertTerm (term.coeff, term.exp);
4 }
5
6 void Polynomial::insertTerm(double coeff, int exp) {
7     // STUDENT ANSWER
8     Term* term = new Term(coeff,exp);
9     int index=0;
10    if(terms->empty() && (*term).coeff!=0){
11        terms->add(*term);
12    }
13    else if((*term).coeff == 0){}
14    else
15    {
16        SLinkedList<Term>::Iterator it;
17        int check =0;
18        for(it= this->terms->begin(); it != this->terms->end(); it++){
19            if((*it).exp == (*term).exp){
20                check =1;
21                break;
22            }else if((*it).exp < (*term).exp) {
23                check =2;
24                break;
25            }else{
26                index++;
27            }
28        }
29        if(check ==1){
30            if((*it).coeff + (*term).coeff == 0){
31                terms->removeItem(*it);
32            } else{
33                (*it).coeff += (*term).coeff;
34            }
35        } else if(check == 2){
36            terms->add(index, (*term));
37        } else if ((*term).exp >=0){
38            terms->add((*term));
39        } else{
40            return;
41        }
42    }
43 }
44
```



	Test	Expected	Got	
✓	<pre>Polynomial *poly = new Polynomial(); poly->insertTerm(6.0, 2); poly->insertTerm(4.0, 5); poly->insertTerm(4.0, 3); poly->insertTerm(6.0, 5); poly->insertTerm(-1.0, 0); poly->insertTerm(-6.0, 6); poly->insertTerm(6.0, 6); poly->print();</pre>	<pre>[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]</pre>	<pre>[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]</pre>	✓
✓	<pre>int n = 5; int coeff[] = { 1, 2, 3, 4, 5 }; int exp[] = { 1, 2, 3, 4, 5 }; Polynomial p1; for (int i = 0; i < n; ++i) p1.insertTerm(coeff[i], exp[i]); p1.print();</pre>	<pre>[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]</pre>	<pre>[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]</pre>	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 3

Chính xác

Điểm 1,00 của 1,00

Implement Iterator class in class SLinkedList.

Note: Iterator is a concept of repetitive elements on sequence structures. Iterator is implemented in class vector, list in STL container in C++ (<https://www.geeksforgeeks.org/iterators-c-stl/>). Your task is to implement the simple same class with iterator in C++ STL container.

Please read example and testcase carefully.

```

template <class T>
class SLinkedList
{
public:
    class Iterator; //forward declaration
    class Node;     //forward declaration
protected:
    Node *head;
    Node *tail;
    int count;
public:
    SLinkedList() : head(NULL), tail(NULL), count(0){};
    ~SLinkedList();
    void add(const T &e);
    void add(int index, const T &e);
    T removeAt(int index);
    bool removeItem(const T &removeItem);
    bool empty();
    int size();
    void clear();
    T get(int index);
    void set(int index, const T &e);
    int indexOf(const T &item);
    bool contains(const T &item);
    string toString();
    SLinkedList(const SLinkedList &list)
    {
        this->count = 0;
        this->head = NULL;
        this->tail = NULL;
    }
    Iterator begin()
    {
        return Iterator(this, true);
    }
    Iterator end()
    {
        return Iterator(this, false);
    }
public:
    class Node
    {
    private:
        T data;
        Node *next;
        friend class SLinkedList<T>;
    public:
        Node()
        {
            next = 0;
        }
        Node(Node *next)
        {
            this->next = next;
        }
        Node(T data, Node *next = NULL)
        {
            this->data = data;
            this->next = next;
        }
    };
    class Iterator
    {
    private:
        SLinkedList<T> *pList;
        Node *current;
        int index; // corresponding with current node

```



```

public:
    Iterator(SLinkedList<T> *pList, bool begin);
    Iterator &operator=(const Iterator &iterator);
    void set(const T &e);
    T &operator*();
    bool operator!=(const Iterator &iterator);

    // Prefix ++ overload
    Iterator &operator++();

    // Postfix ++ overload
    Iterator operator++(int);

};
};

```

For example:

Test	Result
<pre> SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); it++){ assert(*it == expvalue); expvalue += 1; } </pre>	
<pre> SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); ++it){ assert(*it == expvalue); expvalue += 1; } </pre>	

Answer: (penalty regime: 0, 0, 0, 5, 10 %)

Reset answer

```

1  template <class T>
2  SLinkedList<T>::Iterator::Iterator(SLinkedList<T>* pList, bool begin)
3  {
4      this->pList = pList;
5      if (begin == true)
6      {
7          if (this->pList != nullptr)
8          {
9              this->current = pList->head;
10             this->index = 0;
11         }
12         else
13         {
14             this->current = nullptr;
15             this->index = -1;
16         }
17     }
18     else

```

```

19  }
20      this->current = nullptr;
21      this->index = (pList != nullptr? pList->size() : 0);
22  }
23  /*
24      Constructor of iterator
25      * Set pList to pList
26      * begin = true:
27      * * Set current (index = 0) to pList's head if pList is not NULL
28      * * Otherwise set to NULL (index = -1)
29      * begin = false:
30      * * Always set current to NULL
31      * * Set index to pList's size if pList is not NULL, otherwise 0
32  */
33  }
34
35  template <class T>
36  typename SLinkedList<T>::Iterator& SLinkedList<T>::Iterator::operator=(const Iterator& iterator)
37  {
38      this->current = iterator.current;
39      this->index = iterator.index;
40      this->pList = iterator.pList;
41      return *this;
42  /*
43      Assignment operator
44      * Set this current, index, pList to iterator corresponding elements.
45  */
46  }
47
48  template <class T>
49  void SLinkedList<T>::Iterator::remove()
50  {
51      if (current == nullptr)
52      {
53          throw std::out_of_range("Segmentation fault!");
54      }
55      pList->removeAt(index);
56      index -= 1;
57      if (index == -1)
58      {
59          current = nullptr;
60      }
61      else
62      {
63          int i = 0;
64          Node* x = pList->head;
65          while (x != nullptr)
66          {
67              if (i == index)
68              {
69                  break;
70              }
71              i++;
72              x = x->next;
73          }
74          current = x;
75      }
76  /*
77      Remove a node which is pointed by current
78      * After remove current points to the previous node of this position (or node with index - 1)
79      * If remove at front, current points to previous "node" of head (current = NULL, index = -1)
80      * Exception: throw std::out_of_range("Segmentation fault!") if remove when current is NULL
81  */
82  }
83
84  template <class T>
85  void SLinkedList<T>::Iterator::set(const T& e)
86  {
87      if (current == nullptr)
88      {
89          throw std::out_of_range("Segmentation fault!");
90      }
91      current->data = e;

```

```

92  //
93      Set the new value for current node
94      * Exception: throw std::out_of_range("Segmentation fault!") if current is NULL
95  */
96  }
97
98  template <class T>
99  T& SLinkedList<T>::Iterator::operator*()
100 {
101     if (current == nullptr)
102     {
103         throw std::out_of_range("Segmentation fault!");
104     }
105     return current->data;
106 }
107     Get data stored in current node
108     * Exception: throw std::out_of_range("Segmentation fault!") if current is NULL
109 */
110 }
111
112 template <class T>
113 bool SLinkedList<T>::Iterator::operator!=(const Iterator& iterator)
114 {
115     return (current == iterator.current && index == iterator.index? false : true);
116 }
117     /*
118     Operator not equals
119     * Returns false if two iterators points the same node and index
120     */
121 }
122 // Prefix ++ overload
123 template <class T>
124 typename SLinkedList<T>::Iterator& SLinkedList<T>::Iterator::operator++()
125 {
126     if (index == pList->size())
127     {
128         throw std::out_of_range("Segmentation fault!");
129     }
130     index++;
131     if (index == 0)
132     {
133         current = pList->head;
134     }
135     else
136     {
137         current = current->next;
138     }
139     return *this;
140 }
141     /*
142     Prefix ++ overload
143     * Set current to the next node
144     * If iterator corresponds to the previous "node" of head, set it to head
145     * Exception: throw std::out_of_range("Segmentation fault!") if iterator corresponds to the end
146     */
147 }
148 // Postfix ++ overload
149 template <class T>
150 typename SLinkedList<T>::Iterator SLinkedList<T>::Iterator::operator++(int)
151 {
152     if (index == pList->size())
153     {
154         throw std::out_of_range("Segmentation fault!");
155     }
156     Iterator temp = *this;
157     ++*this;
158     return temp;
159 }
160     /*
161     Postfix ++ overload
162     * Set current to the next node
163     * If iterator corresponds to the previous "node" of head, set it to head
164     * Exception: throw std::out_of_range("Segmentation fault!") if iterator corresponds to the end
165     */
166 }

```



	Test
✔	<pre>SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); it++){ assert(*it == expvalue); expvalue += 1; }</pre>
✔	<pre>SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); ++it){ assert(*it == expvalue); expvalue += 1; }</pre>

Passed all tests! ✔

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 4

Chính xác

Điểm 1,00 của 1,00

Class `LinkedList` is used to represent single linked list, described as the following:

```
class LinkedList {
public:
    class Node;
private:
    Node* head;
    Node* tail;
    int size;
public:
    class Node {
    private:
        int value;
        Node* next;
        friend class LinkedList;
    public:
        Node() {
            this->next = NULL;
        }
        Node(Node* node) {
            this->value = node->value;
            this->next = node->next;
        }
        Node(int value, Node* next = NULL) {
            this->value = value;
            this->next = next;
        }
    };
    LinkedList(): head(NULL), tail(NULL), size(0) {};
    void partition(int k);
};
```

In this class; `head`, `tail` and `size` are the pointers of the first element, the last element and size of linked list.

Request: Implement function

```
void LinkedList::partition(int k);
```

To rearrange elements in this linked list by this way: split all elements of this linked list to 3 groups include: group I (the value of each element is smaller than k), group II (the value of each element is equal to k) and group III (the value of each element is larger than k); after that, move group I to the head of linked list, group II is after group I and group III is after group II. Note that the orders of the elements of each group are unchanged.

Example:

- The given linked list: 10->55->45->42->50
- k=45

In this case, group I includes elements with value 10 and 42, group II includes elements with 45 and group III includes elements with value 55 and 50. Rearrange by above way, this linked list will become 10->42->45->55->50 (the orders of the elements in each group is unchanged: 10 before 42 and 55 before 50).

Note: In this exercise, libraries `iostream`, `sstream` and `using namespace std`; have been used. You can add other functions for your answer, but you are not allowed to add other libraries.

For example:

Test	Result
<pre> LinkedList* l1 = new LinkedList(); l1->add(20); l1->add(30); l1->add(10); l1->add(60); l1->add(40); l1->add(45); l1->add(55); l1->partition(45); cout << l1->toString() << "\n"; </pre>	[20,30,10,40,45,60,55]

Answer: (penalty regime: 0 %)

Reset answer

```

1 void LinkedList::partition(int k) {
2     Node*head1=nullptr,*head2=nullptr,*head3=nullptr,*tail1,*tail2,*tail3,*temp;
3     for(temp=head;temp!=nullptr;temp=temp->next){
4         if(temp->value<k){
5             if(head1==nullptr){
6                 head1 = temp;
7                 tail1=head1;
8                 //head=head1;
9             }
10            else{
11                tail1->next=temp;
12                tail1=tail1->next;
13                //temp=temp->next;
14            }
15            //temp=temp->next;
16        }
17        if(temp->value==k){
18            if(head2==nullptr){
19                head2 = temp;
20                tail2=head2;
21                //if(head1){
22                //    head=head2;
23                //}
24            }
25            else{
26                tail2->next=temp;
27                tail2=tail2->next;
28                //temp=temp->next;
29            }
30            //temp=temp->next;
31        }
32        if(temp->value>k){
33            if(head3==nullptr){
34                head3 = temp;
35                tail3=head3;
36            }
37            else{
38                tail3->next=temp;
39                tail3=tail3->next;
40                //temp=temp->next;
41            }
42            //temp=temp->next;
43        }
44    }
45    }
46    if(head1!=nullptr&&head2!=nullptr&&head3!=nullptr){
47        head=head1;
48        tail1->next=head2;
49        tail2->next=head3;
50        tail=tail3;
51        tail->next=nullptr;
52    }
53    if(head1!=nullptr&&head2!=nullptr&&head3==nullptr){
54        head=head1;
55        tail1->next=head2;
56        tail=tail2;
57        tail->next=nullptr;
58    }
59    if(head1!=nullptr&&head2==nullptr&&head3!=nullptr){
60        head=head1;

```

```

61         tail1->next=head3;
62         tail=tail3;
63         tail->next=nullptr;
64
65     }
66     if(head1&&!head2&&!head3){
67         head=head1;
68         tail=tail1;
69         tail->next=nullptr;
70     }
71     if(head1==nullptr&&head2!=nullptr&&head3!=nullptr){
72         head=head2;
73         tail2->next=head3;
74         tail=tail3;
75         tail->next=nullptr;
76     }
77     if(!head1&&head2&&!head3){
78         head=head2;
79         //tail2->next=head3;
80         tail=tail2;
81         tail->next=nullptr;
82     }
83     if(!head1&&!head2&&head3){
84         head=head3;
85         tail=tail3;
86         tail->next=nullptr;
87     }
88     if(!head1&&!head2&&!head3){
89         return ;
90     }
91
92
93 }

```

	Test	Expected	Got	
✓	LinkedList* l1 = new LinkedList(); l1->add(20); l1->add(30); l1->add(10); l1->add(60); l1->add(40); l1->add(45); l1->add(55); l1->partition(45); cout << l1->toString() << "\n";	[20, 30, 10, 40, 45, 60, 55]	[20, 30, 10, 40, 45, 60, 55]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 5

Chính xác

Điểm 1,00 của 1,00

Cho node root của một danh sách liên kết đơn, hiện thực hàm sau đây:

```
void reduceDuplicate(Node* root);
```

để giảm các phần tử trùng lặp liên tiếp trong danh sách. Nếu có các phần tử liên tiếp giống nhau, ta chỉ giữ lại 1 phần tử.

Ví dụ, ta có 1 danh sách 122234452, sau khi thực hiện hàm reduceDuplicate ta thu được danh sách 123452. (số 2 cuối cùng giữ nguyên do nó không liên tiếp với dãy 222 phía trước)

Lưu ý: Các bạn có thể include thêm thư viện nếu cần thiết

Cấu trúc của một node được cho bên dưới. Các bạn chỉ cần viết nội dung hàm reduceDuplicate, các cấu trúc khác đã được import sẵn.

```
class Node
{
    int data;
    Node* next;
public:
    Node(): data(0), next(nullptr){}

    Node(int data, Node* next)
    {
        this->data = data;
        this->next = next;
    }

    int getData()
    {
        return this->data;
    }

    void setData(int data)
    {
        this->data = data;
    }

    Node* getNext()
    {
        return this->next;
    }

    void setNext(Node* next)
    {
        this->next = next;
    }
};
```

For example:

Test	Result
------	--------

Test	Result
Node* node1 = new Node(1, nullptr); Node* node2 = new Node(1, node1); Node* node3 = new Node(0, node2); printList(node3); reduceDuplicate(node3); printList(node3);	HEAD -> 0 -> 1 -> 1 -> NULL HEAD -> 0 -> 1 -> NULL

Answer: (penalty regime: 0, 0, 0, 100 %)

Reset answer

```
1 void reduceDuplicate(Node* root)
2 {
3     if(root == NULL) return;
4     Node* str = root;
5     while(str->getNext() != NULL) {
6         Node* check = str->getNext();
7         if(str->getData() == check->getData()) {
8             check = check->getNext();
9             free(str->getNext());
10            str->setNext(check);
11        } else str = str->getNext();
12    }
13 }
```

Test	Expected	Got	
------	----------	-----	--

	Test	Expected	Got	
✓	<pre>Node* node1 = new Node(1, nullptr); Node* node2 = new Node(1, node1); Node* node3 = new Node(0, node2); printList(node3); reduceDuplicate(node3); printList(node3);</pre>	<pre>HEAD -> 0 -> 1 -> 1 -> NULL HEAD -> 0 -> 1 -> NULL</pre>	<pre>HEAD -> 0 -> 1 -> 1 -> NULL HEAD -> 0 -> 1 -> NULL</pre>	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 6

Chính xác

Điểm 1,00 của 1,00

Class Train represents to a train, described as the following:

```
class Train {
public:
    class TrainCar;
private:
    TrainCar* head;
    TrainCar* tail;
    int size;
public:
    class TrainCar {
    private:
        int remainingSpace;
        TrainCar* next;
        friend class Train;
    public:
        TrainCar() {this->next = NULL;}
        TrainCar(int remainingSpace, TrainCar* next = NULL) {
            this->remainingSpace = remainingSpace;
            this->next = next;
        }
    };
    Train() {
        this->head = new TrainCar(0);
        this->tail = this->head;
        this->size = 1;
    }
    int allocate(int containerSize);
    int totalRemainingSpace();
};
```

In this class:

- **head** is head of train (cannot contain container, index=0).
- **tail** is the last traincar of the train.
- **size** is the number of traincars the train has (include the head of train).

Each traincar (except head of train) can contains an amount of mass. Each traincar includes **remainingSpace representing its current ability of containing and **next** presenting the next traincar (the head of train is the first traincar).**

Load the containers into the traincars of the train following these rules:

- Each container can be loaded into only one traincar.
- With a container with mass **M**, we must load it into the traincar having current ability of containing $\geq M$ and it is the smallest (if more than one traincar satisfying, choose the traincar with the smallest index). After that, we must update its current ability of containing.

Request: Implement functions

```
int Train::allocate(int containerSize); int Train::totalRemainingSpace();
```

where:

- Function **allocate** implements for loading the container with mass **containerSize** into the train. Return the result is the index of the traincar used for loading this container (if can) and return -1 (if cannot load).

- Function `totalRemainingSpace` implements for calculating the sum of the mass the train can contains. Return the result is the sum of the mass the train can contains currently.

Example:

- $N(M)$ represents that the traincar with index N can contain mass of M .

- Train:

`0(0)->1(200)->2(400)->3(300)->4(600)->5(500)->6(100)`

- Implement `allocate(390)`: the result is 2, update train:

`0(0)->1(200)->2(10)->3(300)->4(600)->5(500)->6(100)`

- Implement `allocate(590)`: the result is 4, update train:

`0(0)->1(200)->2(10)->3(300)->4(10)->5(500)->6(100)`

- Implement `totalRemainingSpace()`: the result is 1120.

- Implement `allocate(510)`: the result is -1.

- Implement `allocate(10)`: the result is 2, update train:

`0(0)->1(200)->2(0)->3(300)->4(10)->5(500)->6(100)`

Note: In this exercise, libraries `iostream` and `using namespace std`; have been used. You can add other functions for your answer, but you are not allowed to add other libraries.

For example:

Test	Result
<pre>Train* t = new Train(); t->add(200); t->add(400); t->add(300); t->add(600); t->add(500); t->add(100); cout << t->allocate(390) << "\n"; cout << t->allocate(590) << "\n"; cout << t->totalRemainingSpace() << "\n"; cout << t->allocate(510) << "\n"; cout << t->allocate(10) << "\n";</pre>	<pre>2 4 1120 -1 2</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 int Train::allocate(int containerSize) {
2     TrainCar * temp=head,*store_small=nullptr;
3     int i=0,smallest=INT32_MAX,pos_small;
4     while(temp!=nullptr){
5         if(containerSize<=temp->remainingSpace){
6             //temp->remainingSpace-=containerSize;
7             //cout<<smallest<<endl;
8             if(smallest>temp->remainingSpace){
9                 smallest=temp->remainingSpace;
10                store_small=temp;
11                pos_small=i;
12            }
13        }
14        temp=temp->next;
15        i++;
16    }
17    if(store_small){
18        store_small->remainingSpace-=containerSize;
19        return pos_small;
20    }
21    return -1;
22 }
23
24 int Train::totalRemainingSpace() {
25     TrainCar * temp=head;
26     int sum=0;
27     while(temp!=nullptr){
```

```
28         sum+=temp->remainingSpace,
29         temp=temp->next;
30     }
31     return sum;
32 }
```

	Test	Expected	Got	
✓	Train* t = new Train(); t->add(200); t->add(400); t->add(300); ; t->add(600); t->add(500); t->add(100); cout << t->allocate(390) << "\n"; cout << t->allocate(590) << "\n"; cout << t->totalRemainingSpace() << "\n"; cout << t->allocate(510) << "\n"; cout << t->allocate(10) << "\n";	2 4 1120 -1 2	2 4 1120 -1 2	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 7

Chính xác

Điểm 1,00 của 1,00

Implement methods **add**, **size** in template class **SLinkedList (which implements List ADT)** representing the singly linked list with type T with the initialized frame. The description of each method is given in the code.

```
template <class T>
class SLinkedList {
public:
    class Node; // Forward declaration
protected:
    Node* head;
    Node* tail;
    int count;
public:
    SLinkedList();
    ~SLinkedList();
    void    add(T e);
    void    add(int index, T e);
    int     size();
public:
    class Node {
    private:
        T data;
        Node* next;
        friend class SLinkedList<T>;
    public:
        Node() {
            next = 0;
        }
        Node(Node* next) {
            this->next = next;
        }
        Node(T data, Node* next) {
            this->data = data;
            this->next = next;
        }
    };
};
```

For example:

Test	Result
SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(index); } cout << list.toString();	[0,1,2,3,4,5,6,7,8,9]
SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(0, index); } cout << list.toString();	[9,8,7,6,5,4,3,2,1,0]

Answer: (penalty regime: 0, 0, 0, 5, 10, 15, ... %)

Reset answer

```

1  template <class T>
2  void SLinkedList<T>::add(const T& e) {
3      /* Insert an element into the end of the list. */
4      if (!count) {
5          head = tail = new Node(e);
6      } else {
7          tail->next = new Node(e);
8          tail = tail->next;
9      }
10     count++;
11 }
12 template<class T>
13 void SLinkedList<T>::add(int index, const T& e) {
14     /* Insert an element into the list at given index. */
15     if(index == 0) {
16         if(!count) {
17             head = tail = new Node(e);
18         } else {
19             Node* m = new Node(e, head);
20             head = m;
21         }
22         count++;
23         return;
24     }
25     if(index == count) {
26         tail->next = new Node(e);
27         tail=tail->next;
28         count++;
29         return;
30     }
31     Node* str = head;
32     for(int i=0;i<index - 1 ;i++) {
33         str = str->next;
34     }
35     Node* nn = str->next;
36     Node* n = new Node(e, nn);
37     str->next = n;
38     while(tail->next) tail=tail->next;
39     count++;
40 }
41
42 template<class T>
43 int SLinkedList<T>::size() {
44     /* Return the length (size) of list */
45     return count;
46 }

```

Test	Expected	Got	
------	----------	-----	--

	Test	Expected	Got	
✓	<pre>SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(index); } cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8,9]	[0,1,2,3,4,5,6,7,8,9]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 8

Chính xác

Điểm 1,00 của 1,00

Implement methods **get**, **set**, **empty**, **indexOf**, **contains** in template class **SLinkedList** (which implements **List ADT**) representing the singly linked list with type T with the initialized frame. The description of each method is given in the code.

```
template <class T>
class SLinkedList {
public:
    class Node; // Forward declaration
protected:
    Node* head;
    Node* tail;
    int count;
public:
    SLinkedList(): head(NULL), tail(NULL), count(0);
    ~SLinkedList() { };
    void    add(T e);
    void    add(int index, T e);
    int     size();
    bool    empty();
    T       get(int index);
    void    set(int index, T e);
    int     indexOf(T item);
    bool    contains(T item);
public:
    class Node {
    private:
        T data;
        Node* next;
        friend class SLinkedList<T>;
    public:
        Node() {
            next = 0;
        }
        Node(Node* next) {
            this->next = next;
        }
        Node(T data, Node* next = NULL) {
            this->data = data;
            this->next = next;
        }
    };
};
```

For example:

Test	Result
------	--------

Test	Result
<pre> SLinkedList<int> list; int values[] = {10, 15, 2, 6, 4, 7, 40, 8}; int index[] = {0, 0, 1, 3, 2, 3, 5, 0}; int expvalues[] = {8, 15, 2, 4, 7, 10, 40, 6}; for (int idx = 0; idx < 8; idx++){ list.add(index[idx], values[idx]); } assert(list.size() == 8); for (int idx = 0; idx < 8; idx++){ assert(list.get(idx) == expvalues[idx]); } cout << list.toString(); </pre>	[8,15,2,4,7,10,40,6]
<pre> SLinkedList<int> list; assert(list.empty() == true); cout << list.toString(); </pre>	[]

Answer: (penalty regime: 0, 0, 0, 5, 10, 15, ... %)

Reset answer

```

1  template<class T>
2  T SLinkedList<T>::get(int index) {
3      /* Give the data of the element at given index in the list. */
4      if (index>=count||index<0) throw out_of_range("");
5      Node * temp = head;
6      while (index>=1)
7      {
8          temp = temp->next;
9          index--;
10     }
11     return temp->data;
12 }
13
14 template <class T>
15 void SLinkedList<T>::set(int index, const T& e) {
16     /* Assign new value for element at given index in the list */
17     if (index>=count||index<0) throw out_of_range("");
18     Node * temp = head;
19     while (index>=1)
20     {
21         temp = temp->next;
22         index--;
23     }
24     temp->data = e;
25 }
26
27 template<class T>
28 bool SLinkedList<T>::empty() {
29     /* Check if the list is empty or not. */
30     if (count>0) return 0;
31     else return 1;
32 }
33
34
35 template<class T>
36 int SLinkedList<T>::indexOf(const T& item) {
37     /* Return the first index wheter item appears in list, otherwise return -1 */
38     Node * temp = head;
39     int index = 0;
40     while (temp!=nullptr)
41     {
42         if (temp->data==item) return index;

```

```

43     else{
44         temp = temp->next;
45         index++;
46     }
47 }
48 return -1;
49 }
50
51 template<class T>
52 bool SLinkedList<T>::contains(const T& item) {
53     /* Check if item appears in the list */
54     Node * temp = head;
55     while (temp!=nullptr)
56     {
57         if (temp->data==item) return 1;
58     }
59     temp = temp->next;
60 }
61 }
62 return 0;
63 }

```

	Test	Expected	Got	
✓	<pre> SLinkedList<int> list; int values[] = {10, 15, 2, 6, 4, 7, 40, 8}; int index[] = {0, 0, 1, 3, 2, 3, 5, 0}; int expvalues[] = {8, 15, 2, 4, 7, 10, 40, 6}; for (int idx = 0; idx < 8; idx++){ list.add(index[idx], values[idx]); } assert(list.size() == 8); for (int idx = 0; idx < 8; idx++){ assert(list.get(idx) == expvalues[idx]); } cout << list.toString(); </pre>	[8,15,2,4,7,10,40,6]	[8,15,2,4,7,10,40,6]	✓
✓	<pre> SLinkedList<int> list; assert(list.empty() == true); cout << list.toString(); </pre>	[]	[]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 9

Chính xác
Điểm 1,00 của 1,00

Implement methods **removeAt**, **removeItem**, **clear** in template class **SLinkedList** (which implements **List ADT**) representing the singly linked list with type T with the initialized frame. The description of each method is given in the code.

```
template <class T>
class SLinkedList {
public:
    class Node; // Forward declaration
protected:
    Node* head;
    Node* tail;
    int count;
public:
    SLinkedList();
    ~SLinkedList();
    void    add(T e);
    void    add(int index, T e);
    int     size();
    bool    empty();
    int     size();
    void    clear();
    T       get(int index);
    void    set(int index, T e);
    int     indexOf(T item);
    bool    contains(T item);
    T       removeAt(int index);
    bool    removeItem(T item);
public:
    class Node {
    private:
        T data;
        Node* next;
        friend class SLinkedList<T>;
    public:
        Node() {
            next = 0;
        }
        Node(Node* next) {
            this->next = next;
        }
        Node(T data, Node* next = NULL) {
            this->data = data;
            this->next = next;
        }
    };
};
```

For example:

Test	Result
<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(0) == list.removeAt(0)); cout << list.toString();</pre>	[1,2,3,4,5,6,7,8,9]

Test	Result
<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(9) == list.removeAt(9)); cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8]
<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.removeItem(9)); cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8]

Answer: (penalty regime: 0, 0, 0, 5, 10, 15, ... %)

Reset answer

```

1  template <class T>
2  T SLinkedList<T>::removeAt(int index)
3  {
4      /* Remove element at index and return removed value */
5
6      T result;
7      Node *fhead = head;
8
9      if (index == 0)
10     {
11         result = head->data;
12         Node *tmp = head->next;
13         Node *k = head;
14         head = tmp;
15         delete k;
16     }
17     else if ((index < count - 1) && (index > 0))
18     {
19         for (int i = 1; i < index; i++)
20             fhead = fhead->next;
21         result = fhead->next->data;
22         Node *tmp = fhead->next;
23         fhead->next = fhead->next->next;
24
25         delete tmp;
26     }
27     else if (index == (count - 1))
28     {
29         result = tail->data;
30
31         for (int i = 1; i < count - 1; i++)
32             fhead = fhead->next;
33
34         Node *tmp = tail;
35         fhead->next = nullptr;
36
37         delete tmp;
38         tail = fhead;
39     }
40     count--;
41     return result;
42 }
43
44 template <class T>
45 bool SLinkedList<T>::removeItem(const T& item)
46 {
47     /* Remove the first appearance of item in list and return true. otherwise return false */

```

```

48     Node* fhead = head;
49     int index = 0;
50     bool isFound = false;
51
52     while(fhead)
53     {
54         if (fhead->data == item)
55         {
56             isFound = true;
57             break;
58         }
59         index++;
60         fhead = fhead->next;
61     }
62
63     if (!isFound) return false;
64
65     fhead = head;
66
67     if (index == 0)
68     {
69         Node *tmp = head->next;
70         Node *k = head;
71         head = tmp;
72         delete k;
73     }
74     else if ((index < count - 1) && (index > 0))
75     {
76         for (int i = 1; i < index; i++)
77             fhead = fhead->next;
78
79         Node *tmp = fhead->next;
80         fhead->next = fhead->next->next;
81
82         delete tmp;
83     } else if (index == (count - 1))
84     {
85         for (int i = 1; i < count - 1; i++)
86             fhead = fhead->next;
87
88         Node *tmp = tail;
89         fhead->next = nullptr;
90
91         delete tmp;
92         tail = fhead;
93     }
94
95     count--;
96     return true;
97 }
98
99
100 template<class T>
101 void SLinkedList<T>::clear(){}
102     /* Remove all elements in list */
103
104     Node* current = head;
105
106     while (current != nullptr)
107     {
108         Node* next = current->next;
109         delete current;
110         current = next;
111     }
112     head = nullptr;
113     tail = nullptr;
114     count = 0;
115 }

```



	Test	Expected	Got	
✓	<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(0) == list.removeAt(0)); cout << list.toString();</pre>	[1,2,3,4,5,6,7,8,9]	[1,2,3,4,5,6,7,8,9]	✓
✓	<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(9) == list.removeAt(9)); cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8]	[0,1,2,3,4,5,6,7,8]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 10

Chính xác
Điểm 1,00 của 1,00

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
};
```

Given a singly linked list head node.
Your task is to implement a function with following prototype:

```
LLNode* foldLinkedList(LLNode* head);
```

The function returns head node of the folded singly linked list.

More info:
A folded singly linked list is achieved by taking the first half of the linked list and folding over the second half and merging the intersecting nodes by taking their sum.

- Note:**
- The `iostream` library has been used and `namespace std` is being used. No other libraries are allowed.
 - The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
 - You can write helper functions.

For example:

Test	Result
<pre>int arr[] = {9, 5, 7, 5, 0}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[9, 5, 7, 5, 0] [7, 10, 9]</pre>
<pre>int arr[] = {8, 4, 6, 8, 5, 3}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[8, 4, 6, 8, 5, 3] [14, 9, 11]</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* foldLinkedList(LLNode* head) {
2     // STUDENT ANSWER
3     if(head==nullptr) return nullptr;
4     LLNode* temp=head;
5     int length=0;
6     while(temp!=nullptr){
7         length++;
8         temp=temp->next;
9     }
10    temp=head;
11    int *arr=new int[length];
12    for(int i=0;temp!=nullptr;i++){
13        arr[i]=temp->val;
14        temp=temp->next;
15    }
```



```

16     int firsthalf,secondhalf;
17     if(length%2==0){
18         firsthalf=length/2-1;
19         secondhalf=length/2;
20     }
21     else{
22         firsthalf=length/2-1;
23         secondhalf=length/2+1;
24     }
25     LLNode*ret_head=new LLNode();
26     temp=ret_head;
27     while(firsthalf>=0){
28         temp->val=arr[firsthalf]+arr[secondhalf];
29         if(firsthalf!=0){
30             temp->next = new LLNode();
31             temp=temp->next;
32         }
33         firsthalf--;
34         secondhalf++;
35     }
36     if(length%2==0){
37     }
38     else{
39         temp= new LLNode();
40         temp->next=ret_head;
41         temp->val=arr[length/2];
42         ret_head=temp;
43     }
44 }
45 return ret_head;
46 }

```

	Test	Expected	Got	
✓	<pre> int arr[] = {9, 5, 7, 5, 0}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [9, 5, 7, 5, 0] [7, 10, 9] </pre>	<pre> [9, 5, 7, 5, 0] [7, 10, 9] </pre>	✓
✓	<pre> int arr[] = {8, 4, 6, 8, 5, 3}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [8, 4, 6, 8, 5, 3] [14, 9, 11] </pre>	<pre> [8, 4, 6, 8, 5, 3] [14, 9, 11] </pre>	✓

	Test	Expected	Got	
✓	<pre>int arr[] = {}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[] []</pre>	<pre>[] []</pre>	✓
✓	<pre>int arr[] = {7, 3, 1, 9, 4, 6, 3, 8, 5, 5}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[7, 3, 1, 9, 4, 6, 3, 8, 5, 5] [10, 12, 9, 8, 12]</pre>	<pre>[7, 3, 1, 9, 4, 6, 3, 8, 5, 5] [10, 12, 9, 8, 12]</pre>	✓
✓	<pre>int arr[] = {8, 6, 9, 7, 3, 7, 6, 0, 3, 2, 2, 4, 6, 3, 6, 4, 2, 8, 3, 4, 2, 9, 4, 9, 5, 8, 5, 6, 9, 1, 5, 5, 9, 3, 1, 4, 2, 0, 1, 5, 1, 2, 9, 5, 0, 5, 3, 5, 1, 0, 6, 7, 3, 0, 9, 4, 0, 6, 0, 1, 3, 2, 9, 6, 6, 4, 4, 1, 5, 9, 6, 1, 1, 7, 9, 7, 7, 5, 1, 8, 4, 1, 4, 3, 0, 7, 7, 7, 9, 2, 9, 4, 2, 1, 2, 5, 7, 6, 5, 3, 1, 7, 2, 4, 3}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[8, 6, 9, 7, 3, 7, 6, 0, 3, 2, 2, 4, 6, 3, 6, 4, 2, 8, 3, 4, 2, 9, 4, 9, 5, 8, 5, 6, 9, 1, 5, 5, 9, 3, 1, 4, 2, 0, 1, 5, 1, 2, 9, 5, 0, 5, 3, 5, 1, 0, 6, 7, 3, 0, 9, 4, 0, 6, 0, 1, 3, 2, 9, 6, 6, 4, 4, 1, 5, 9, 6, 1, 1, 7, 9, 7, 7, 5, 1, 8, 4, 1, 4, 3, 0, 7, 7, 7, 9, 2, 9, 4, 2, 1, 2, 5, 7, 6, 5, 3, 1, 7, 2, 4, 3] [3, 7, 15, 4, 1, 11, 3, 6, 3, 7, 18, 8, 7, 9, 5, 1, 7, 13, 7, 4, 10, 12, 14, 8, 16, 11, 6, 16, 9, 10, 8, 12, 2, 11, 10, 15, 11, 6, 15, 7, 8, 5, 4, 7, 10, 6, 11, 10, 4, 14, 11, 10, 11]</pre>	<pre>[8, 6, 9, 7, 3, 7, 6, 0, 3, 2, 2, 4, 6, 3, 6, 4, 2, 8, 3, 4, 2, 9, 4, 9, 5, 8, 5, 6, 9, 1, 5, 5, 9, 3, 1, 4, 2, 0, 1, 5, 1, 2, 9, 5, 0, 5, 3, 5, 1, 0, 6, 7, 3, 0, 9, 4, 0, 6, 0, 1, 3, 2, 9, 6, 6, 4, 4, 1, 5, 9, 6, 1, 1, 7, 9, 7, 7, 5, 1, 8, 4, 1, 4, 3, 0, 7, 7, 7, 9, 2, 9, 4, 2, 1, 2, 5, 7, 6, 5, 3, 1, 7, 2, 4, 3] [3, 7, 15, 4, 1, 11, 3, 6, 3, 7, 18, 8, 7, 9, 5, 1, 7, 13, 7, 4, 10, 12, 14, 8, 16, 11, 6, 16, 9, 10, 8, 12, 2, 11, 10, 15, 11, 6, 15, 7, 8, 5, 4, 7, 10, 6, 11, 10, 4, 14, 11, 10, 11]</pre>	✓
✓	<pre>int arr[] = {5, 8, 9, 4, 1, 3, 8, 2, 3, 3, 5, 5, 6, 8, 8, 7, 4, 8, 1, 5, 8, 5, 2, 5, 0, 9, 7, 0, 8, 1, 1, 3, 4, 8, 4, 0, 5, 1, 6, 6, 0, 2, 5, 2, 8, 2, 0, 8, 3, 0, 9, 4, 5, 2, 9, 3, 2, 2, 7, 0, 3, 7, 7, 2, 8, 0, 7, 4, 5, 9, 7, 2, 6, 3, 4, 3, 1, 2, 2, 6, 2, 7, 3, 1, 9, 7, 1, 9, 6, 2, 6, 8, 1, 1, 2, 9, 7, 6, 8, 6, 2, 9, 0, 8, 9, 0, 3, 0, 1, 6, 4, 3, 4, 5, 1, 8, 0, 6, 8, 2, 2, 3, 4, 3, 0, 5, 5, 1, 9, 8, 4, 9, 4, 9, 8, 7, 6, 1, 3, 8, 8, 6, 3, 0, 7, 3, 0, 9, 8, 1, 7, 8, 4, 8, 1, 4, 2, 2, 3, 8, 7, 2, 8, 0, 8, 8, 4, 2, 9, 5, 4, 2, 7, 6, 8, 4, 9, 6, 5, 1, 0, 5, 6, 7, 3, 2, 7, 0, 8, 7, 5, 0, 6, 3, 7, 5, 5, 9, 4, 5, 1, 4, 3, 6, 3, 2, 5, 9, 7, 8, 5, 0, 9, 1, 8, 7, 6, 1, 0, 5, 5, 7, 1, 8, 9, 8, 7, 7, 2, 9, 5, 8, 9, 3, 8, 4, 4, 7, 1, 7, 2, 6, 1, 6, 8, 8, 8, 7, 0, 8, 0, 5, 6, 8, 6, 8, 8, 4, 0, 6, 7, 5, 3, 6, 6, 2, 1, 9, 1, 9, 3, 0, 5, 5, 2, 1, 2, 7, 4, 9, 6, 6, 5, 3, 5, 6, 9, 8, 6, 8, 2, 7, 3, 4, 2, 6, 3, 0, 5, 9, 0, 9, 9, 7, 0, 8, 6, 9, 8, 7, 8, 4, 0, 8, 0, 3, 0, 1, 8, 4, 5, 0, 2, 7, 0, 7, 8, 4, 0, 3, 7, 5, 2, 5, 3, 9, 1, 2, 5, 1, 1, 2, 7, 4, 6,</pre>	<pre>[5, 8, 9, 4, 1, 3, 8, 2, 3, 3, 5, 5, 6, 8, 8, 7, 4, 8, 1, 5, 8, 5, 2, 5, 0, 9, 7, 0, 8, 1, 1, 3, 4, 8, 4, 0, 5, 1, 6, 6, 0, 2, 5, 2, 8, 2, 0, 8, 3, 0, 9, 4, 5, 2, 9, 3, 2, 2, 7, 0, 3, 7, 7, 2, 8, 0, 7, 4, 5, 9, 7, 2, 6, 3, 4, 3, 1, 2, 2, 6, 2, 7, 3, 1, 9, 7, 1, 9, 6, 2, 6, 8, 1, 1, 2, 9, 7, 6, 8, 6, 2, 9, 0, 8, 9, 0, 3, 0, 1, 6, 4, 3, 4, 5, 1, 8, 0, 6, 8, 2, 2, 3, 4, 3, 0, 5, 5, 1, 9, 8, 4, 9, 4, 9, 8, 9, 7, 6, 1, 3, 8, 8, 6, 3, 0, 7, 3, 0, 9, 8, 1, 7, 8, 4, 8, 1, 4, 2, 2, 3, 8, 7, 2, 8, 0, 8, 8, 4, 2, 9, 5, 4, 2, 7, 6, 8, 4, 9, 6, 5, 1, 0, 5, 6, 7, 3, 2, 7, 0, 8, 7, 5, 0, 6, 3, 7, 5, 5, 9, 4, 5, 1, 4, 3, 6, 3, 2, 5, 9, 7, 8, 5, 0, 9, 1, 8, 7, 6, 1, 0, 5, 5, 7, 1, 8, 9, 8, 7, 7, 2, 9, 5, 8, 9, 3, 8, 4, 4, 7, 1, 7, 2, 6, 1, 6, 8, 8, 8, 7, 0, 8, 0, 5, 6, 8, 6, 8, 8, 4, 0, 6, 7, 5, 3, 6, 6, 2, 1, 9, 1, 9, 3, 0, 5, 5, 2, 1, 2, 7, 4, 9, 6, 6, 5, 3, 5, 6, 9, 8, 6, 8, 2, 7, 3, 4, 2, 6, 3, 0, 5, 9, 0, 9, 9, 7, 0, 8, 6, 9, 8, 7, 8, 4, 0, 8, 0, 3, 0, 1, 8, 4, 5, 0, 2,</pre>	<pre>[5, 8, 9, 4, 1, 3, 8, 2, 3, 3, 5, 5, 6, 8, 8, 7, 4, 8, 1, 5, 8, 5, 2, 5, 0, 9, 7, 0, 8, 1, 1, 3, 4, 8, 4, 0, 5, 1, 6, 6, 0, 2, 5, 2, 8, 2, 0, 8, 3, 0, 9, 4, 5, 2, 9, 3, 2, 2, 7, 0, 3, 7, 7, 2, 8, 0, 7, 4, 5, 9, 7, 2, 6, 3, 4, 3, 1, 2, 2, 6, 2, 7, 3, 1, 9, 7, 1, 9, 6, 2, 6, 8, 1, 1, 2, 9, 7, 6, 8, 6, 2, 9, 0, 8, 9, 0, 3, 0, 1, 6, 4, 3, 4, 5, 1, 8, 0, 6, 8, 2, 2, 3, 4, 3, 0, 5, 5, 1, 9, 8, 4, 9, 4, 9, 8, 9, 7, 6, 1, 3, 8, 8, 6, 3, 0, 7, 3, 0, 9, 8, 1, 7, 8, 4, 8, 1, 4, 2, 2, 3, 8, 7, 2, 8, 0, 8, 8, 4, 2, 9, 5, 4, 2, 7, 6, 8, 4, 9, 6, 5, 1, 0, 5, 6, 7, 3, 2, 7, 0, 8, 7, 5, 0, 6, 3, 7, 5, 5, 9, 4, 5, 1, 4, 3, 6, 3, 2, 5, 9, 7, 8, 5, 0, 9, 1, 8, 7, 6, 1, 0, 5, 5, 7, 1, 8, 9, 8, 7, 7, 2, 9, 5, 8, 9, 3, 8, 4, 4, 7, 1, 7, 2, 6, 1, 6, 8, 8, 8, 7, 0, 8, 0, 5, 6, 8, 6, 8, 8, 4, 0, 6, 7, 5, 3, 6, 6, 2, 1, 9, 1, 9, 3, 0, 5, 5, 2, 1, 2, 7, 4, 9, 6, 6, 5, 3, 5, 6, 9, 8, 6, 8, 2, 7, 3, 4, 2, 6, 3, 0, 5, 9, 0, 9, 9, 7, 0, 8, 6, 9, 8, 7, 8, 4, 0, 8, 0, 3, 0, 1, 8, 4, 5, 0, 2,</pre>	✓

	Test	Expected	Got	
	<pre> 1, 6, 3, 0, 2, 4, 8, 5, 9, 0, 6, 0, 1, 7, 4, 1, 5, 6, 3, 9, 5, 2, 7, 0, 4, 4, 0, 8, 5, 4, 8, 5, 0, 8, 9, 7, 3, 6, 4, 4, 5, 0, 5, 0, 7, 9, 3, 4, 7, 2, 7, 9, 2, 1, 0, 9, 1, 3, 8, 5, 9, 4, 0, 5, 9, 9, 5, 1, 1, 0, 2, 9, 8, 8, 8, 8, 2, 2, 5, 8, 3, 0, 5, 9, 5, 8, 7, 0, 6, 6, 2, 3, 5, 9, 0, 1, 9, 7, 1, 4, 5, 1, 5, 5, 3, 7, 2, 6, 4, 1, 3, 2, 4, 6, 5, 2, 4, 1, 1, 3, 5, 6, 2, 0, 0, 5, 4, 7, 8, 4, 3, 1, 7, 1, 9, 3, 8, 0, 7, 8, 0, 3, 6, 3, 8, 0, 3, 1, 7, 2, 1, 7, 9}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> 7, 0, 7, 8, 4, 0, 3, 7, 5, 2, 5, 3, 9, 1, 2, 5, 1, 1, 2, 7, 4, 6, 1, 6, 3, 0, 2, 4, 8, 5, 9, 0, 6, 0, 1, 7, 4, 1, 5, 6, 3, 9, 5, 2, 7, 0, 4, 4, 0, 8, 5, 4, 8, 5, 0, 8, 9, 7, 3, 6, 4, 4, 5, 0, 5, 0, 7, 9, 3, 4, 7, 2, 7, 9, 2, 1, 0, 9, 1, 3, 8, 5, 9, 4, 0, 5, 9, 9, 5, 1, 1, 0, 2, 9, 8, 8, 8, 8, 8, 2, 2, 5, 8, 3, 0, 5, 9, 5, 8, 7, 0, 6, 6, 2, 3, 5, 9, 0, 1, 9, 7, 1, 4, 5, 1, 5, 5, 3, 7, 2, 6, 4, 1, 3, 2, 4, 6, 5, 2, 4, 1, 1, 3, 5, 6, 2, 0, 0, 5, 4, 7, 8, 4, 3, 1, 7, 1, 9, 3, 8, 0, 7, 8, 0, 3, 6, 3, 8, 0, 3, 1, 7, 2, 1, 7, 9] [8, 7, 13, 14, 16, 12, 9, 14, 6, 7, 7, 14, 9, 7, 14, 9, 11, 9, 14, 10, 11, 10, 7, 13, 14, 10, 2, 9, 12, 9, 9, 7, 12, 12, 11, 6, 15, 9, 13, 14, 15, 11, 12, 5, 7, 8, 9, 7, 1, 10, 13, 9, 14, 14, 14, 3, 14, 6, 14, 15, 15, 8, 11, 2, 11, 7, 9, 5, 1, 9, 9, 11, 9, 6, 15, 6, 14, 10, 8, 5, 12, 9, 9, 10, 13, 3, 17, 3, 9, 13, 4, 3, 4, 11, 5, 14, 5, 14, 10, 1, 10, 13, 8, 8, 16, 0, 9, 6, 9, 15, 7, 2, 11, 13, 12, 17, 14, 6, 16, 4, 12, 13, 1, 13, 10, 4, 11, 9, 3, 10, 11, 15, 9, 6, 12, 5, 10, 4, 8, 4, 13, 10, 3, 7, 7, 11, 15, 9, 11, 3, 6, 17, 7, 10, 17, 7, 10, 5, 8, 11, 11, 15, 14, 2, 8, 9, 3, 12, 15, 10, 14, 10, 10, 3, 5, 9, 11, 9, 2, 12, 18, 10, 12, 14, 0, 14, 8, 9, 10, 8, 9, 7, 3, 11, 10, 10, 6, 10, 5, 14, 5, 6, 15, 2, 8, 12, 3, 8, 4, 4, 12, 11, 3, 9, 1, 5, 11, 9, 9, 3, 1, 8, 5, 11, 16, 8, 9, 5, 6, 15, 6, 10, 11, 12, 7, 15, 16, 6, 8, 11, 6, 11, 2, 11, 4, 8, 6, 10, 15, 14] </pre>	<pre> 7, 0, 7, 8, 4, 0, 3, 7, 5, 2, 5, 3, 9, 1, 2, 5, 1, 1, 2, 7, 4, 6, 1, 6, 3, 0, 2, 4, 8, 5, 9, 0, 6, 0, 1, 7, 4, 1, 5, 6, 3, 9, 5, 2, 7, 0, 4, 4, 0, 8, 5, 4, 8, 5, 0, 8, 9, 7, 3, 6, 4, 4, 5, 0, 5, 0, 7, 9, 3, 4, 7, 2, 7, 9, 2, 1, 0, 9, 1, 3, 8, 5, 9, 4, 0, 5, 9, 9, 5, 1, 1, 0, 2, 9, 8, 8, 8, 8, 8, 2, 2, 5, 8, 3, 0, 5, 9, 5, 8, 7, 0, 6, 6, 2, 3, 5, 9, 0, 1, 9, 7, 1, 4, 5, 1, 5, 5, 3, 7, 2, 6, 4, 1, 3, 2, 4, 6, 5, 2, 4, 1, 1, 3, 5, 6, 2, 0, 0, 5, 4, 7, 8, 4, 3, 1, 7, 1, 9, 3, 8, 0, 7, 8, 0, 3, 6, 3, 8, 0, 3, 1, 7, 2, 1, 7, 9] [8, 7, 13, 14, 16, 12, 9, 14, 6, 7, 7, 14, 9, 7, 14, 9, 11, 9, 14, 10, 11, 10, 7, 13, 14, 10, 2, 9, 12, 9, 9, 7, 12, 12, 11, 6, 15, 9, 13, 14, 15, 11, 12, 5, 7, 8, 9, 7, 1, 10, 13, 9, 14, 14, 14, 3, 14, 6, 14, 15, 15, 8, 11, 2, 11, 7, 9, 5, 1, 9, 9, 11, 9, 6, 15, 6, 14, 10, 8, 5, 12, 9, 9, 10, 13, 3, 17, 3, 9, 13, 4, 3, 4, 11, 5, 14, 5, 14, 10, 1, 10, 13, 8, 8, 16, 0, 9, 6, 9, 15, 7, 2, 11, 13, 12, 17, 14, 6, 16, 4, 12, 13, 1, 13, 10, 4, 11, 9, 3, 10, 11, 15, 9, 6, 12, 5, 10, 4, 8, 4, 13, 10, 3, 7, 7, 11, 15, 9, 11, 3, 6, 17, 7, 10, 17, 7, 10, 5, 8, 11, 11, 15, 14, 2, 8, 9, 3, 12, 15, 10, 14, 10, 10, 3, 5, 9, 11, 9, 2, 12, 18, 10, 12, 14, 0, 14, 8, 9, 10, 8, 9, 7, 3, 11, 10, 10, 6, 10, 5, 14, 5, 6, 15, 2, 8, 12, 3, 8, 4, 4, 12, 11, 3, 9, 1, 5, 11, 9, 9, 3, 1, 8, 5, 11, 16, 8, 9, 5, 6, 15, 6, 10, 11, 12, 7, 15, 16, 6, 8, 11, 6, 11, 2, 11, 4, 8, 6, 10, 15, 14] </pre>	
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	Test	Expected	Got	
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✓	<pre> int arr[] = {6, 5, 8, 2, 3, 1, 3, 7, 7, 9, 0, 4, 4, 8, 4, 2, 1, 9, 4, 3, 3, 6, 4, 4, 2, 5, 3, 7, 1, 7, 7, 1, 4, 7, 7, 7, 7, 0, 0, 8, 2, 9, 4, 9, 4, 9, 9, 6, 3, 0, 5, 3, 3, 9, 2, 3, 2, 4, 8, 9, 3, 1, 9, 2, 8, 3, 4, 7, 8, 5, 4, 3, 1, 8, 8, 7, 3, 1, 7, 1, 9, 2, 8, 5, 5, 3, 7, 1, 6, 6, 4, 2, 0, 6, 5, 1, 2, 3, 5, 7, 1, 9, 1, 4, 8, 6, 1, 9, 2, 8, 9, 8, 8, 7, 6, 0, 3, 9, 9, 7, 1, 8, 3, 4, 9, 8, 4, 1, 8, 4, 3, 8, 9, 0, 1, 1, 4, 6, 4, 7, 1, 9, 1, 5, 4, 5, 9, 0, 2, 8, 5, 4, 1, 6, 3, 3, 7, 8, 6, 5, 0, 3, 7, 7, 3, 9, 6, 4, 3, 2, 7, 9, 9, 0, 9, 2, 2, 5, 1, 6, 7, 4, 2, 0, 3, 7, 8, 8, 1, 6, 8, 0, 2, 2, 3, 2, 7, 9, 1, 2, 8, 5, 4, 8, 7, 1, 3, 1, 5, 8, 6, 8, 3, 4, 6, 9, 9, 9, 2, 7, 1, 1, 2, 1, 9, 6, 7, 3, 2, 4, 7, 0, 4, 4, 9, 8, 4, 6, 1, 7, 2, 0, 8, 0, 1, 9, 8, 8, 6, 5, 7, 0, 4, 8, 4, 9, 0, 2, 4, 0, 3, 6, 4, 6, 5, 3, 6, 6, 1, 6, 7, 3, 0, 2, 7, 1, 4, 9, 0, 5, 4, 0, 3, 6, 0, 9, 6, 3, 9, 4, 3, 9, 3, 6, 7, 6, 2, 9, 7, 7, 9, 5, 1, 1, 6, 1, 3, 7, 9, 0, 1, 4, 4, 4, 6, 6, 8, 5, 7, 1, 1, 5, 4, 6, 7, 8, 6, 8, 5, 0, 6, 4, 1, 2, 1, 3, 1, 5, 5, 5, 2, 3, 7, 7, 9, 6, 9, 0, 4, 8, 1, 3, 2, 0, 0, 7, 6, 6, 1, 7, 7, 3, 0, 9, 2, 8, 9, 5, 4, 7, 7, 3, 6, 9, 1, 5, 6, 8, 2, 6, 5, 3, 1, 0, 4, 3, 1, 3, 9, 4, 8, 5, 4, 7, 3, 5, 4, 2, 0, 2, 0, 9, 0, 3, 2, 9, 8, 3, 4, 1, 6, 8, 4, 5, 8, 0, 0, 2, 5, 5, 7, 5, 5, 6, 7, 4, 7, 5, 0, 6, 4, 8, 9, 2, 3, 8, 5, 2, 2, 5, 3, 2, 0, 4, 8, 6, 2, 5, 9, 6, 8, 5, 1, 1, 2, 9, 1, 1, 2, 3, 0, 4, 8, 1, 4, 3, 0, 0, 2, 6, 8, 9, 8, 1, 6, 1, 8, 7, 8, 6, 3, 4, 6, 3, 5, 5, 6, 5, 1, 7, 0, 5, 6, 0, 5, 6, 0, 6, 3, 7, 8, 3, 2, 9, 6, 7, 4, 2, 0, 5, 5, 1, 1, 1, 9, </pre>	<pre> [6, 5, 8, 2, 3, 1, 3, 7, 7, 9, 0, 4, 4, 8, 4, 2, 1, 9, 4, 3, 3, 6, 4, 4, 2, 5, 3, 7, 1, 7, 7, 1, 4, 7, 7, 7, 7, 0, 0, 8, 2, 9, 4, 9, 4, 9, 9, 6, 3, 0, 5, 3, 3, 9, 2, 3, 2, 4, 8, 9, 3, 1, 9, 2, 8, 3, 4, 7, 8, 5, 4, 3, 1, 8, 8, 7, 3, 1, 7, 1, 9, 2, 8, 5, 5, 3, 7, 1, 6, 6, 4, 2, 0, 6, 5, 1, 2, 3, 5, 7, 1, 9, 1, 4, 8, 6, 1, 9, 2, 8, 9, 8, 8, 7, 6, 0, 3, 9, 9, 7, 1, 8, 3, 4, 9, 8, 4, 1, 8, 4, 3, 8, 9, 0, 1, 1, 4, 6, 4, 7, 1, 9, 1, 5, 4, 5, 9, 0, 2, 8, 5, 4, 1, 6, 3, 3, 7, 8, 6, 5, 0, 3, 7, 7, 3, 9, 6, 4, 3, 2, 7, 9, 9, 0, 9, 2, 2, 5, 1, 6, 7, 4, 2, 0, 3, 7, 8, 8, 1, 6, 8, 0, 2, 2, 3, 2, 7, 9, 1, 2, 8, 5, 4, 8, 7, 1, 3, 1, 5, 8, 6, 8, 3, 4, 6, 9, 9, 9, 2, 7, 1, 1, 2, 1, 9, 6, 7, 3, 2, 4, 7, 0, 4, 4, 9, 8, 4, 6, 1, 7, 2, 0, 8, 0, 1, 9, 8, 8, 6, 5, 7, 0, 4, 8, 4, 9, 0, 2, 4, 0, 3, 6, 4, 6, 5, 3, 6, 6, 1, 6, 7, 3, 0, 2, 7, 1, 4, 9, 0, 5, 4, 0, 3, 6, 0, 9, 6, 3, 9, 4, 3, 9, 3, 6, 7, 6, 2, 9, 7, 7, 9, 5, 1, 1, 6, 1, 3, 7, 9, 0, 1, 4, 4, 4, 6, 6, 8, 5, 7, 1, 1, 5, 4, 6, 7, 8, 6, 8, 5, 0, 6, 4, 1, 2, 1, 3, 1, 5, 5, 5, 2, 3, 7, 7, 6, 9, 0, 4, 8, 1, 3, 2, 0, 0, 7, 6, 6, 1, 7, 7, 3, 0, 9, 2, 8, 9, 5, 4, 7, 7, 3, 6, 9, 1, 5, 6, 8, 2, 6, 5, 3, 1, 0, 4, 3, 1, 3, 9, 4, 8, 5, 4, 7, 3, 5, 4, 2, 0, 2, 0, 9, 0, 3, 2, 9, 8, 3, 4, 1, 6, 8, 4, 5, 8, 0, 0, 2, 5, 5, 7, 5, 5, 6, 7, 4, 7, 5, 0, 6, 4, 8, 9, 2, 3, 8, 5, 2, 2, 5, 3, 2, 0, 4, 8, 6, 2, 5, 9, 6, 8, 5, 1, 1, 2, 9, 1, 1, 2, 3, 0, 4, 8, 1, 4, 3, 0, 0, 2, 6, 8, 9, 8, 1, 6, 1, 8, 7, 8, 6, </pre>	<pre> [6, 5, 8, 2, 3, 1, 3, 7, 7, 9, 0, 4, 4, 8, 4, 2, 1, 9, 4, 3, 3, 6, 4, 4, 2, 5, 3, 7, 1, 7, 7, 1, 4, 7, 7, 7, 7, 0, 0, 8, 2, 9, 4, 9, 4, 9, 9, 6, 3, 0, 5, 3, 3, 9, 2, 3, 2, 4, 8, 9, 3, 1, 9, 2, 8, 3, 4, 7, 8, 5, 4, 3, 1, 8, 8, 7, 3, 1, 7, 1, 9, 2, 8, 5, 5, 3, 7, 1, 6, 6, 4, 2, 0, 6, 5, 1, 2, 3, 5, 7, 1, 9, 1, 4, 8, 6, 1, 9, 2, 8, 9, 8, 8, 7, 6, 0, 3, 9, 9, 7, 1, 8, 3, 4, 9, 8, 4, 1, 8, 4, 3, 8, 9, 0, 1, 1, 4, 6, 4, 7, 1, 9, 1, 5, 4, 5, 9, 0, 2, 8, 5, 4, 1, 6, 3, 3, 7, 8, 6, 5, 0, 3, 7, 7, 3, 9, 6, 4, 3, 2, 7, 9, 9, 0, 9, 2, 2, 5, 1, 6, 7, 4, 2, 0, 3, 7, 8, 8, 1, 6, 8, 0, 2, 2, 3, 2, 7, 9, 1, 2, 8, 5, 4, 8, 7, 1, 3, 1, 5, 8, 6, 8, 3, 4, 6, 9, 9, 9, 2, 7, 1, 1, 2, 1, 9, 6, 7, 3, 2, 4, 7, 0, 4, 4, 9, 8, 4, 6, 1, 7, 2, 0, 8, 0, 1, 9, 8, 8, 6, 5, 7, 0, 4, 8, 4, 9, 0, 2, 4, 0, 3, 6, 4, 6, 5, 3, 6, 6, 1, 6, 7, 3, 0, 2, 7, 1, 4, 9, 0, 5, 4, 0, 3, 6, 0, 9, 6, 3, 9, 4, 3, 9, 3, 6, 7, 6, 2, 9, 7, 7, 9, 5, 1, 1, 6, 1, 3, 7, 9, 0, 1, 4, 4, 4, 6, 6, 8, 5, 7, 1, 1, 5, 4, 6, 7, 8, 6, 8, 5, 0, 6, 4, 1, 2, 1, 3, 1, 5, 5, 5, 2, 3, 7, 7, 6, 9, 0, 4, 8, 1, 3, 2, 0, 0, 7, 6, 6, 1, 7, 7, 3, 0, 9, 2, 8, 9, 5, 4, 7, 7, 3, 6, 9, 1, 5, 6, 8, 2, 6, 5, 3, 1, 0, 4, 3, 1, 3, 9, 4, 8, 5, 4, 7, 3, 5, 4, 2, 0, 2, 0, 9, 0, 3, 2, 9, 8, 3, 4, 1, 6, 8, 4, 5, 8, 0, 0, 2, 5, 5, 7, 5, 5, 6, 7, 4, 7, 5, 0, 6, 4, 8, 9, 2, 3, 8, 5, 2, 2, 5, 3, 2, 0, 4, 8, 6, 2, 5, 9, 6, 8, 5, 1, 1, 2, 9, 1, 1, 2, 3, 0, 4, 8, 1, 4, 3, 0, 0, 2, 6, 8, 9, 8, 1, 6, 1, 8, 7, 8, 6, </pre>	✓

Test	Expected	Got
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Test	Expected	Got
<pre> 1, 2, 0, 0, 7, 9, 8, 1, 4, 3, 0, 1, 7, 8, 1, 9, 4, 0, 4, 6, 4, 6, 3, 4, 5, 9, 5, 4, 6, 3, 4, 2, 7, 2, 3, 6, 5, 0, 9, 2, 2, 7, 0, 7, 8, 2, 9, 8, 9, 3, 6, 5, 4, 6, 2, 9, 4, 1, 7, 1, 3, 4, 9, 5, 7, 0, 8, 9, 8, 1, 0, 8, 5, 3, 3, 1, 3, 2, 4, 3, 5, 9, 9, 8, 5, 8, 2, 2, 9, 6, 3, 0, 8, 9, 7, 8, 1, 8, 1, 8, 3, 4, 8, 7, 9, 0, 0, 8, 1, 9, 9, 2, 2, 2, 8, 8, 2, 6, 5, 9, 3, 0, 0, 9, 1, 8, 4, 4, 1, 0, 7, 1, 4, 6, 7, 4, 1, 8, 1, 8, 4, 8, 2, 7, 6, 6, 4, 5, 5, 4, 4, 1, 8, 6, 2, 9, 3, 6, 3, 5, 4, 7, 2, 2, 6, 5, 5, 4, 8, 4, 4, 2, 8, 4, 6, 9, 8, 6, 7, 7, 8, 1, 7, 3, 7, 1, 3, 0, 9, 2, 5, 3, 5, 3, 8, 1, 8, 6, 7, 6, 7, 5, 6, 2, 7, 7, 4, 2, 0, 1, 5, 2, 2, 6, 7, 2, 6, 0, 6, 3, 1, 3, 0, 4, 7, 5, 6, 5, 1, 9, 6, 8, 2, 5, 2, 7, 7, 8, 1, 8, 2, 8, 5, 3, 4, 8, 9, 4, 7, 8, 5, 8, 3, 9, 7, 4, 0, 2, 2, 1, 8, 3, 2, 6, 9, 9, 4, 1, 4, 7, 5, 0, 3, 0, 4, 2, 4, 2, 2, 4, 6, 0, 2, 9, 6, 2, 9, 1, 6, 3, 5, 5, 6, 7, 7, 8, 8, 0, 2, 6, 5, 1, 2, 7, 5, 3, 0, 0, 8, 4, 2, 0, 7, 7, 0, 4, 0, 3, 2, 8, 5, 7, 4, 7, 0, 0, 2, 2, 8, 9, 3, 2, 3, 9, 5, 5, 2, 0, 6, 6, 9, 9, 5, 8, 7, 3, 0, 7, 2, 2, 4, 9, 9, 3, 3, 0, 1, 5, 8, 4, 2, 9, 6, 5, 0, 7, 2, 5, 1, 2, 7, 4, 5, 1, 6, 8, 7, 5, 4, 9, 2, 6, 8, 4, 9, 6, 3, 3, 0, 1, 4, 4, 0}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> 12, 8, 9, 15, 11, 7, 8, 7, 3, 13, 8, 4, 13, 2, 11, 9, 6, 2, 6, 13, 10, 6, 5, 8, 13, 11, 10, 10, 10, 15, 16, 7, 11, 9, 13, 6, 7, 10, 8, 2, 12, 2, 8, 7, 12, 10, 5, 14, 12, 9, 11, 13, 7, 16, 4, 14, 10, 8, 18, 15, 12, 4, 7, 0, 7, 10, 8, 8, 6, 4, 3, 7, 6, 1, 13, 5, 3, 8, 7, 11, 13, 14, 8, 6, 9, 8, 8, 1, 4, 11, 13, 7, 2, 14, 16, 3, 2, 18, 10, 9, 13, 6, 12, 7, 5, 7, 8, 11, 13, 9, 5, 14, 11, 1, 4, 17, 11, 9, 13, 10, 8, 9, 6, 8, 9, 11, 12, 1, 12, 9, 11, 5, 2, 12, 10, 3, 8, 6, 5, 8, 11, 18, 11, 2, 7, 7, 0, 2, 10, 13, 7, 11, 12, 6, 9, 7, 13, 12, 6, 11, 12, 13, 10, 13, 14, 5, 13, 2, 10, 9, 10, 7, 11, 6, 16, 2, 2, 9, 3, 8, 16, 6, 9, 17, 15, 12, 13, 12, 7, 8, 7, 14, 9, 2, 10, 2, 5, 5, 13, 11, 7, 5, 16, 15, 16, 8, 6, 12, 10, 4, 4, 8, 8, 10, 10, 9, 9, 13, 13, 10, 8, 14, 15, 5, 3, 15, 7, 4, 5, 17, 16, 14, 17, 3, 14, 8, 14, 6, 13, 11, 11, 18, 3, 6, 17, 1, 15, 12, 2, 6, 7, 8, 17, 6, 7, 12, 11, 3, 3, 7, 15, 2, 14, 10, 7, 6, 6, 11, 7, 7, 6, 11, 6, 1, 17, 5, 16, 8, 8, 9, 12, 12, 14, 12, 14, 6, 4, 12, 1, 10, 13, 3, 15, 7, 14, 12, 9, 8, 7, 9, 6, 8, 8, 12, 10, 17, 5, 6, 3, 9, 11, 8, 18, 17, 15, 13, 11, 11, 9, 13, 11, 12, 2, 6, 1, 16, 10, 9, 8, 13, 5, 9, 10, 15, 8, 10, 8, 9, 5, 14, 8, 8, 15, 12, 9, 3, 1, 7, 6, 9, 12, 8, 7, 8, 2, 15, 3, 10, 12, 7, 6, 10, 9, 12, 14, 4, 16, 13, 11, 2, 10, 8, 15, 14, 11, 4, 14, 3, 12, 10, 11, 6, 8, 18, 9, 11, 13, 6, 17, 4, 16, 11, 10, 4, 3, 3, 1, 17, 11, 5, 10, 17, 10, 8, 9, 13, 11, 8, 8, 4, 7, 13, 11, 7, 2, 8, 11, 14, 8, 11, 17, 8, 11, 10, 7, 14, 7, 6, 14, 7, 14, 12, 11, 10, 1, 7, 12, 5, 3, 6, 13, 11, 4, 7, 3, 13, 9, 10, 2, 16, 8, 7, 5, 3, 10, 10, 16, 6, 10, 8, 12, 8, 7, 6, 5, 16, 11, 12, 3, 6, 18, 13, 9, 4, 3, 8, 15, 12, 12, 10, 8, 10, 9, 9, 16, 6, 11, 8, 18, 11, 11, 3, 0, 8, 12, 15, 11, 6, 10, 13, 12, 1, 14, 5, 10, 3, 6, 11, 10, 8, 4, 10, 17, 8, 7, 8, 17, 6, 10, 8, 13, 16, 13, 6, 4, 3, 3, 12, 9, 6] </pre>	<pre> 12, 8, 9, 15, 11, 7, 8, 7, 3, 13, 8, 4, 13, 2, 11, 9, 6, 2, 6, 13, 10, 6, 5, 8, 13, 11, 10, 10, 10, 15, 16, 7, 11, 9, 13, 6, 7, 10, 8, 2, 12, 2, 8, 7, 12, 10, 5, 14, 12, 9, 11, 13, 7, 16, 4, 14, 10, 8, 18, 15, 12, 4, 7, 0, 7, 10, 8, 8, 6, 4, 3, 7, 6, 1, 13, 5, 3, 8, 7, 11, 13, 14, 8, 6, 9, 8, 8, 1, 4, 11, 13, 7, 2, 14, 16, 3, 2, 18, 10, 9, 13, 6, 12, 7, 5, 7, 8, 11, 13, 9, 5, 14, 11, 1, 4, 17, 11, 9, 13, 10, 8, 9, 6, 8, 9, 11, 12, 1, 12, 9, 11, 5, 2, 12, 10, 3, 8, 6, 5, 8, 11, 18, 11, 2, 7, 7, 0, 2, 10, 13, 7, 11, 12, 6, 9, 7, 13, 12, 6, 11, 12, 13, 10, 13, 14, 5, 13, 2, 10, 9, 10, 7, 11, 6, 16, 2, 2, 9, 3, 8, 16, 6, 9, 17, 15, 12, 13, 12, 7, 8, 7, 14, 9, 2, 10, 2, 5, 5, 13, 11, 7, 5, 16, 15, 16, 8, 6, 12, 10, 4, 4, 8, 8, 10, 10, 9, 9, 13, 13, 10, 8, 14, 15, 5, 3, 15, 7, 4, 5, 17, 16, 14, 17, 3, 14, 8, 14, 6, 13, 11, 11, 18, 3, 6, 17, 1, 15, 12, 2, 6, 7, 8, 17, 6, 7, 12, 11, 3, 3, 7, 15, 2, 14, 10, 7, 6, 6, 11, 7, 7, 6, 11, 6, 1, 17, 5, 16, 8, 8, 9, 12, 12, 14, 12, 14, 6, 4, 12, 1, 10, 13, 3, 15, 7, 14, 12, 9, 8, 7, 9, 6, 8, 8, 12, 10, 17, 5, 6, 3, 9, 11, 8, 18, 17, 15, 13, 11, 11, 9, 13, 11, 12, 2, 6, 1, 16, 10, 9, 8, 13, 5, 9, 10, 15, 8, 10, 8, 9, 5, 14, 8, 8, 15, 12, 9, 3, 1, 7, 6, 9, 12, 8, 7, 8, 2, 15, 3, 10, 12, 7, 6, 10, 9, 12, 14, 4, 16, 13, 11, 2, 10, 8, 15, 14, 11, 4, 14, 3, 12, 10, 11, 6, 8, 18, 9, 11, 13, 6, 17, 4, 16, 11, 10, 4, 3, 3, 1, 17, 11, 5, 10, 17, 10, 8, 9, 13, 11, 8, 8, 4, 7, 13, 11, 7, 2, 8, 11, 14, 8, 11, 17, 8, 11, 10, 7, 14, 7, 6, 14, 7, 14, 12, 11, 10, 1, 7, 12, 5, 3, 6, 13, 11, 4, 7, 3, 13, 9, 10, 2, 16, 8, 7, 5, 3, 10, 10, 16, 6, 10, 8, 12, 8, 7, 6, 5, 16, 11, 12, 3, 6, 18, 13, 9, 4, 3, 8, 15, 12, 12, 10, 8, 10, 9, 9, 16, 6, 11, 8, 18, 11, 11, 3, 0, 8, 12, 15, 11, 6, 10, 13, 12, 1, 14, 5, 10, 3, 6, 11, 10, 8, 4, 10, 17, 8, 7, 8, 17, 6, 10, 8, 13, 16, 13, 6, 4, 3, 3, 12, 9, 6] </pre>

Passed all tests! 

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 11

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
}
```

Given a singly linked list head node.

Your task is to implement a function with following prototype:

```
LLNode* replaceFirstGreater(LLNode* head);
```

The function returns head node of the singly linked list after replacing every node's value with the first greater node's value to its right. If a node doesn't have a next greater node, set its value to 0.

Note:

- The `iostream` and `stack` libraries have been included and `namespace std` is being used. No other libraries are allowed.
- The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
- You can write helper functions.

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* replaceFirstGreater(LLNode* head) {
2     // STUDENT ANSWER
3     LLNode* temp1=head,*temp2;
4     while(temp1!=nullptr){
5         bool changed=0;
6         temp2=temp1->next;
7         while(temp2!=nullptr){
8             if(temp1->val<temp2->val){
9                 temp1->val=temp2->val;
10                changed=1;
11                break;
12            }
13            temp2=temp2->next;
14        }
15        if(!changed){
16            temp1->val=0;
17        }
18        temp1=temp1->next;
19    }
20    return head;
21 }
```




	Test	Expected	Got	
✓	<pre>int arr[] = {0, 3, 2, 1, 5}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead);</pre>	<pre>[0, 3, 2, 1, 5] [3, 5, 5, 5, 0]</pre>	<pre>[0, 3, 2, 1, 5] [3, 5, 5, 5, 0]</pre>	✓
✓	<pre>int arr[] = {5, 4, 2, 8, 6, 7}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead);</pre>	<pre>[5, 4, 2, 8, 6, 7] [8, 8, 8, 0, 7, 0]</pre>	<pre>[5, 4, 2, 8, 6, 7] [8, 8, 8, 0, 7, 0]</pre>	✓
✓	<pre>int arr[] = {}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead);</pre>	<pre>[] []</pre>	<pre>[] []</pre>	✓
✓	<pre>int arr[] = {8, 3, 5, 0, 8, 7, 1, 6, 5, 4}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead);</pre>	<pre>[8, 3, 5, 0, 8, 7, 1, 6, 5, 4] [0, 5, 8, 8, 0, 0, 6, 0, 0, 0]</pre>	<pre>[8, 3, 5, 0, 8, 7, 1, 6, 5, 4] [0, 5, 8, 8, 0, 0, 6, 0, 0, 0]</pre>	✓
✓	<pre>int arr[] = {8, 1, 8, 1, 6, 9, 7, 8, 4, 0, 7, 6, 1, 0, 3, 4, 3, 7, 3, 3, 5, 0, 3, 7, 3, 8, 4, 9, 9, 0, 9, 7, 2, 5, 2, 5, 0, 1, 7, 4, 9, 1, 2, 2, 4, 2, 9, 7, 0, 0, 7, 3, 8, 8, 1, 7, 7, 7, 8, 1, 0, 7, 6, 3, 7, 3, 0, 3, 0, 2, 2, 7, 7, 2, 2, 4, 5, 2, 2, 1, 1, 8, 6, 8, 1, 4, 7, 1, 5, 5, 7, 5, 5, 3, 0, 0, 5, 4, 1, 8, 4, 7, 1, 7, 8}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead);</pre>	<pre>[8, 1, 8, 1, 6, 9, 7, 8, 4, 0, 7, 6, 1, 0, 3, 4, 3, 7, 3, 3, 5, 0, 3, 7, 3, 8, 4, 9, 9, 0, 9, 7, 2, 5, 2, 5, 0, 1, 7, 4, 9, 1, 2, 2, 4, 2, 9, 7, 0, 0, 7, 3, 8, 8, 1, 7, 7, 7, 8, 1, 0, 7, 6, 3, 7, 3, 0, 3, 0, 2, 2, 7, 7, 2, 2, 4, 5, 2, 2, 1, 1, 8, 6, 8, 1, 4, 7, 1, 5, 5, 7, 5, 5, 3, 0, 0, 5, 4, 1, 8, 4, 7, 1, 7, 8] [9, 8, 9, 6, 9, 0, 8, 9, 7, 7, 8, 7, 3, 3, 4, 7, 7, 8, 5, 5, 7, 3, 7, 8, 8, 9, 9, 0, 0, 9, 0, 9, 5, 7, 5, 7, 1, 7, 9, 9, 0, 2, 4, 4, 9, 9, 0, 8, 7, 7, 8, 8, 0, 0, 7, 8, 8, 8, 0, 7, 7, 8, 7, 7, 8, 7, 3, 7, 2, 7, 7, 8, 8, 4, 4, 5, 8, 8, 8, 8, 8, 0, 8, 0, 4, 7, 8, 5, 7, 7, 8, 8, 8, 5, 5, 5, 8, 8, 8, 0, 7, 8, 7, 8, 0]</pre>	<pre>[8, 1, 8, 1, 6, 9, 7, 8, 4, 0, 7, 6, 1, 0, 3, 4, 3, 7, 3, 3, 5, 0, 3, 7, 3, 8, 4, 9, 9, 0, 9, 7, 2, 5, 2, 5, 0, 1, 7, 4, 9, 1, 2, 2, 4, 2, 9, 7, 0, 0, 7, 3, 8, 8, 1, 7, 7, 7, 8, 1, 0, 7, 6, 3, 7, 3, 0, 3, 0, 2, 2, 7, 7, 2, 2, 4, 5, 2, 2, 1, 1, 8, 6, 8, 1, 4, 7, 1, 5, 5, 7, 5, 5, 3, 0, 0, 5, 4, 1, 8, 4, 7, 1, 7, 8] [9, 8, 9, 6, 9, 0, 8, 9, 7, 7, 8, 7, 3, 3, 4, 7, 7, 8, 5, 5, 7, 3, 7, 8, 8, 9, 9, 0, 0, 9, 0, 9, 5, 7, 5, 7, 1, 7, 9, 9, 0, 2, 4, 4, 9, 9, 0, 8, 7, 7, 8, 8, 0, 0, 7, 8, 8, 8, 0, 7, 7, 8, 7, 7, 8, 7, 3, 7, 2, 7, 7, 8, 8, 4, 4, 5, 8, 8, 8, 8, 8, 0, 8, 0, 4, 7, 8, 5, 7, 7, 8, 8, 8, 5, 5, 5, 8, 8, 8, 0, 7, 8, 7, 8, 0]</pre>	✓
✓	<pre>int arr[] = {1, 8, 9, 0, 6, 3, 5, 1, 0, 9, 0, 6, 9, 4, 8, 7, 9, 7, 1, 4, 9, 4, 2, 6, 0, 9, 6, 5, 1, 5, 6, 7, 0, 3, 3, 3, 4, 8, 3, 0, 6, 8, 1, 2, 2, 4, 7,</pre>	<pre>[1, 8, 9, 0, 6, 3, 5, 1, 0, 9, 0, 6, 9, 4, 8, 7, 9, 7, 1, 4, 9, 4, 2, 6, 0, 9, 6, 5, 1, 5, 6, 7, 0, 3, 3, 3, 4, 8, 3, 0, 6, 8, 1, 2, 2, 4, 7, 4,</pre>	<pre>[1, 8, 9, 0, 6, 3, 5, 1, 0, 9, 0, 6, 9, 4, 8, 7, 9, 7, 1, 4, 9, 4, 2, 6, 0, 9, 6, 5, 1, 5, 6, 7, 0, 3, 3, 3, 4, 8, 3, 0, 6, 8, 1, 2, 2, 4, 7, 4,</pre>	✓

Test	Expected	Got
<pre> 4, 3, 4, 5, 4, 2, 1, 7, 7, 7, 2, 2, 0, 0, 6, 8, 5, 2, 1, 1, 9, 3, 8, 1, 6, 5, 2, 6, 4, 2, 9, 6, 1, 8, 1, 9, 9, 3, 4, 7, 7, 3, 3, 5, 7, 7, 5, 9, 3, 5, 0, 1, 4, 2, 2, 5, 0, 7, 6, 5, 8, 8, 6, 7, 6, 5, 3, 3, 5, 3, 3, 2, 2, 6, 0, 5, 0, 3, 1, 5, 9, 9, 3, 6, 2, 6, 8, 5, 0, 4, 2, 8, 2, 3, 0, 3, 5, 5, 1, 1, 7, 3, 8, 0, 8, 1, 1, 9, 9, 1, 6, 5, 9, 2, 1, 2, 8, 9, 3, 8, 6, 7, 9, 1, 4, 9, 0, 6, 8, 1, 8, 5, 3, 2, 2, 1, 5, 0, 2, 7, 0, 0, 6, 9, 9, 9, 3, 6, 0, 4, 4, 0, 9, 9, 8, 0, 9, 7, 8, 3, 7, 1, 8, 7, 5, 7, 4, 2, 8, 2, 8, 5, 8, 1, 5, 6, 7, 1, 5, 2, 3, 8, 9, 1, 1, 4, 4, 3, 7, 3, 1, 4, 6, 0, 1, 0, 4, 9, 2, 1, 9, 5, 8, 5, 6, 1, 5, 5, 5, 5, 3, 5, 6, 0, 8, 5, 8, 4, 7, 8, 4, 7, 4, 2, 1, 6, 6, 6, 3, 6, 1, 8, 2, 7, 4, 9, 8, 9, 8, 2, 1, 4, 9, 3, 6, 3, 6, 2, 7, 6, 3, 5, 1, 6, 1, 3, 3, 1, 0, 3, 6, 7, 2, 7, 0, 9, 0, 2, 4, 4, 8, 1, 0, 4, 1, 6, 7, 7, 2, 6, 4, 4, 1, 8, 3, 7, 2, 5, 7, 2, 5, 7, 1, 3, 5, 8, 8, 2, 4, 8, 4, 8, 5, 6, 1, 1, 1, 2, 0, 1, 9, 9, 7, 7, 4, 8, 4, 6, 4, 5, 6, 8, 6, 6, 4, 5, 3, 1, 0, 8, 7, 2, 5, 6, 1, 7, 0, 6, 5, 9, 2, 1, 4, 9, 3, 8, 2, 3, 8, 3, 0, 5, 6, 0, 0, 4, 9, 8, 5, 8, 2, 9, 1, 9, 8, 7, 4, 5, 3, 1, 3, 3, 1, 0, 1, 2, 5, 6, 6, 6, 8, 7, 7, 4, 2, 5, 7, 1, 7, 2, 1, 2, 7, 8, 0, 1, 3, 8, 8, 4, 9, 1, 7, 8, 5, 0, 8, 0, 9, 2, 1, 2, 4, 0, 3, 8, 0, 9, 9, 2, 3, 0, 7, 9, 3, 7, 7, 6, 0, 4, 1, 3, 6, 9, 0, 5, 5, 8, 2, 0, 5, 1, 5, 3, 6, 9, 4, 8, 2, 6, 5, 1, 1}; 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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead); </pre>	<pre> 6, 3, 2, 9, 2, 1, 0, 5, 9, 4, 3, 7, 9, 7, 4, 4, 2, 8, 0, 1, 8, 7, 2, 1, 2, 2, 7, 3, 5, 7, 2, 6, 8, 3, 3, 3, 1, 5, 9, 8, 9, 1, 0, 4, 3, 3, 9, 7, 1, 4, 2, 1, 3, 0, 6, 5, 0, 6, 2, 1, 9, 3, 5, 4, 7, 8, 6, 5, 6, 4, 7, 2, 1, 5, 2, 0, 6, 3, 7, 6, 6, 5, 3, 8, 5, 2, 3, 1, 3, 3, 9, 1, 5, 2, 6, 4, 5, 6, 5, 5, 9, 9, 3, 5, 0, 8, 7, 3, 0, 4, 3, 5, 5, 9, 1, 3, 0, 9, 7, 3, 6, 3, 7, 8, 8, 1, 9, 1, 1, 0, 9, 0, 9, 7, 3, 1, 0, 0, 2, 2, 2, 2, 9, 3, 6, 6, 7, 6, 8, 2, 1, 9, 0, 9, 2, 6, 3, 3, 4, 5, 5, 5, 0, 0, 6, 6, 8, 3, 4, 7, 7, 4, 2, 3, 4, 5, 2, 7, 3, 1, 1, 4, 3, 6, 6, 6, 6, 5, 0, 6, 5, 4, 3, 8, 0, 0, 3, 7, 2, 0, 0, 4, 0, 9, 5, 2, 8, 5, 6, 2, 7, 3, 3, 7, 8, 9, 1, 6, 7, 6, 6, 0, 0, 5, 4, 1, 9, 2, 9, 3, 8, 7, 4, 3, 5, 5, 0, 4, 8, 7, 9, 5, 3, 0, 7, 4, 8, 8, 8, 8, 1, 0, 9, 2, 4, 5, 5, 6, 9, 2, 6, 0, 9, 4, 1, 4, 4, 0, 9, 4, 8, 1, 7, 8, 7, 9, 8, 8, 3, 9, 2, 7, 0, 1, 1, 5, 5, 8, 0, 2, 4, 3, 4, 1, 8, 5, 6, 7, 3, 6, 6, 2, 5, 6, 1, 4, 2, 4, 5, 9, 4, 0, 1, 9, 4, 9, 1, 7, 4, 0, 3, 4, 8, 1, 1, 3, 0, 3, 1, 7, 0, 2, 6, 2, 9, 1, 6, 9, 7, 7, 0, 8, 4, 0, 8, 4, 3, 8, 0, 3, 4, 2, 9, 9, 8, 8, 5, 8, 7, 4, 6, 2, 2, 7, 9, 2, 7, 8, 7, 7, 4, 1, 0, 0, 3, 8, 4, 8, 6, 0, 7, 8, 7, 4, 2, 7, 4, 3, 1, 7, 2, 6, 6, 4, 9, 1, 0, 6, 4, 5, 7, 6, 8, 8, 6] [3, 3, 5, 5, 9, 0, 9, 0, 9, 2, 5, 5, 5, 9, 9, 0, 0, 8, 9, 7, 7, 7, 9, 9, 0, 6, 9, 0, 6, 6, 8, 8, 2, 2, 4, 8, 4, 4, 4, 4, 8, 9, 9, 7, 5, 5, 7, 9, 9, 7, 7, 7, 9, 9, 9, 0, 0, 7, 5, 7, 7, 8, 7, 5, 7, 8, 4, 8, 9, 6, 6, 8, 8, 9, 0, 9, 0, 8, 8, 9, 7, 4, 5, 7, 7, 7, 8, 8, 9, 9, 9, 9, 0, 7, 5, 7, 3, 7, 8, 8, 6, 6, 8, 8, 9, 9, 9, 0, 6, 6, 6, 6, 6, 9, 4, 4, 5, 5, 9, 2, 4, 4, 4, 5, 5, 5, 9, 5, 9, 9, 9, 0, 9, 0, 8, 8, 9, 9, 9, 4, 5, 3, 5, 5, 9, 9, 0, 0, 9, 9, 9, 0, 1, 4, 7, 8, 4, 4, 5, 6, 6, 6, 7, 8, 8, 9, 5, 9, 9, 0, 6, 9, 0, 7, 9, 9, 4, 5, 9, 9, 0, 9, 0, 7, 3, 3, 6, 7, 7, 8, 8, 8, 8, 9, 6, 6, 9, 9, 0, 8, 9, 9, 9, 0, 8, 8, 9, 5, 7, 3, 7, 8, 8, 9, 7, 8, 9, 9, 0, 9, 0, 8, 2, 3, 8, 8, 9, 9, 6, 9, 9, 9, 0, 9, 4, 4, 7, 7, 9, 9, 0, 4, 4, 9, 0, 8, 9, 8, 5, 8, 9, 9, 7, 7, 1, 7, 9, 3, 9, 9, 0, 8, 8, 9, 6, 7, 9, 7, 7, 9, 9, 9, 0, 3, 4, 7, 8, 9, 7, 8, 9, 8, 9, 5, 8, 8, 8, 8, 9, 2, 9, 0, 9, 0, 0, 7, 8, 5, 5, 5, 6, 3, 6, 8, 8, 9, 9, 0, 7, 8, 8, 8, 9, 9, 9, 9, 5, 5, 6, 6, 4, 6, 9, 0, 8, 2, 8, 9, 7, 7, 1, 7, 7, 7, 9, 9, 9, 0, 8, 9, 0, 9, 9, 7, 7, 9, 0, 9, 0, 5, 8, 4, 8, 2, 8, 9, 7, 8, 3, 5, 5, 8, 8, 4, 8, 9, 9, 3, 5, 5, 3, </pre>	<pre> 6, 3, 2, 9, 2, 1, 0, 5, 9, 4, 3, 7, 9, 7, 4, 4, 2, 8, 0, 1, 8, 7, 2, 1, 2, 2, 7, 3, 5, 7, 2, 6, 8, 3, 3, 3, 1, 5, 9, 8, 9, 1, 0, 4, 3, 3, 9, 7, 1, 4, 2, 1, 3, 0, 6, 5, 0, 6, 2, 1, 9, 3, 5, 4, 7, 8, 6, 5, 6, 4, 7, 2, 1, 5, 2, 0, 6, 3, 7, 6, 6, 5, 3, 8, 5, 2, 3, 1, 3, 3, 9, 1, 5, 2, 6, 4, 5, 6, 5, 5, 9, 9, 3, 5, 0, 8, 7, 3, 0, 4, 3, 5, 5, 9, 1, 3, 0, 9, 7, 3, 6, 3, 7, 8, 8, 1, 9, 1, 1, 0, 9, 0, 9, 7, 3, 1, 0, 0, 2, 2, 2, 2, 9, 3, 6, 6, 7, 6, 8, 2, 1, 9, 0, 9, 2, 6, 3, 3, 4, 5, 5, 5, 0, 0, 6, 6, 8, 3, 4, 7, 7, 4, 2, 3, 4, 5, 2, 7, 3, 1, 1, 4, 3, 6, 6, 6, 6, 5, 0, 6, 5, 4, 3, 8, 0, 0, 3, 7, 2, 0, 0, 4, 0, 9, 5, 2, 8, 5, 6, 2, 7, 3, 3, 7, 8, 9, 1, 6, 7, 6, 6, 0, 0, 5, 4, 1, 9, 2, 9, 3, 8, 7, 4, 3, 5, 5, 0, 4, 8, 7, 9, 5, 3, 0, 7, 4, 8, 8, 8, 8, 1, 0, 9, 2, 4, 5, 5, 6, 9, 2, 6, 0, 9, 4, 1, 4, 4, 0, 9, 4, 8, 1, 7, 8, 7, 9, 8, 8, 3, 9, 2, 7, 0, 1, 1, 5, 5, 8, 0, 2, 4, 3, 4, 1, 8, 5, 6, 7, 3, 6, 6, 2, 5, 6, 1, 4, 2, 4, 5, 9, 4, 0, 1, 9, 4, 9, 1, 7, 4, 0, 3, 4, 8, 1, 1, 3, 0, 3, 1, 7, 0, 2, 6, 2, 9, 1, 6, 9, 7, 7, 0, 8, 4, 0, 8, 4, 3, 8, 0, 3, 4, 2, 9, 9, 8, 8, 5, 8, 7, 4, 6, 2, 2, 7, 9, 2, 7, 8, 7, 7, 4, 1, 0, 0, 3, 8, 4, 8, 6, 0, 7, 8, 7, 4, 2, 7, 4, 3, 1, 7, 2, 6, 6, 4, 9, 1, 0, 6, 4, 5, 7, 6, 8, 8, 6] [3, 3, 5, 5, 9, 0, 9, 0, 9, 2, 5, 5, 5, 9, 9, 0, 0, 8, 9, 7, 7, 7, 9, 9, 0, 6, 9, 0, 6, 6, 8, 8, 2, 2, 4, 8, 4, 4, 4, 4, 8, 9, 9, 7, 5, 5, 7, 9, 9, 7, 7, 7, 9, 9, 9, 0, 0, 7, 5, 7, 7, 8, 7, 5, 7, 8, 4, 8, 9, 6, 6, 8, 8, 9, 0, 9, 0, 8, 8, 9, 7, 4, 5, 7, 7, 7, 8, 8, 9, 9, 9, 9, 0, 7, 5, 7, 3, 7, 8, 8, 6, 6, 8, 8, 9, 9, 9, 0, 6, 6, 6, 6, 6, 9, 4, 4, 5, 5, 9, 2, 4, 4, 4, 5, 5, 5, 9, 5, 9, 9, 9, 0, 9, 0, 8, 8, 9, 9, 9, 4, 5, 3, 5, 5, 9, 9, 0, 0, 9, 9, 9, 0, 1, 4, 7, 8, 4, 4, 5, 6, 6, 6, 7, 8, 8, 9, 5, 9, 9, 0, 6, 9, 0, 7, 9, 9, 4, 5, 9, 9, 0, 9, 0, 7, 3, 3, 6, 7, 7, 8, 8, 8, 8, 9, 6, 6, 9, 9, 0, 8, 9, 9, 9, 0, 8, 8, 9, 5, 7, 3, 7, 8, 8, 9, 7, 8, 9, 9, 0, 9, 0, 8, 2, 3, 8, 8, 9, 9, 6, 9, 9, 9, 0, 9, 4, 4, 7, 7, 9, 9, 0, 4, 4, 9, 0, 8, 9, 8, 5, 8, 9, 9, 7, 7, 1, 7, 9, 3, 9, 9, 0, 8, 8, 9, 6, 7, 9, 7, 7, 9, 9, 9, 0, 3, 4, 7, 8, 9, 7, 8, 9, 8, 9, 5, 8, 8, 8, 8, 9, 2, 9, 0, 9, 0, 0, 7, 8, 5, 5, 5, 6, 3, 6, 8, 8, 9, 9, 0, 7, 8, 8, 8, 9, 9, 9, 9, 5, 5, 6, 6, 4, 6, 9, 0, 8, 2, 8, 9, 7, 7, 1, 7, 7, 7, 9, 9, 9, 0, 8, 9, 0, 9, 9, 7, 7, 9, 0, 9, 0, 5, 8, 4, 8, 2, 8, 9, 7, 8, 3, 5, 5, 8, 8, 4, 8, 9, 9, 3, 5, 5, 3, </pre>

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9, 8, 9, 3, 6, 3, 6, 9, 0, 7, 5, 2,


	Test	Expected	Got	
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	Test	Expected	Got	
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Test	Expected	Got
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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = replaceFirstGreater(head); LLNode::printList(newhead); </pre>	<pre> 2, 3, 4, 4, 6, 9, 0, 9, 6, 7, 5, 5, 5, 5, 7, 7, 9, 5, 9, 9, 0, 5, 9, 5, 9, 9, 9, 0, 9, 9, 9, 0, 8, 7, 5, 1, 5, 7, 8, 4, 6, 7, 7, 7, 8, 9, 8, 9, 8, 5, 5, 8, 9, 6, 9, 6, 6, 9, 9, 0, 7, 5, 5, 7, 3, 5, 7, 7, 7, 8, 7, 8, 3, 3, 3, 6, 8, 9, 8, 3, 8, 9, 9, 0, 9, 9, 9, 0, 8, 5, 8, 8, 9, 6, 9, 0, 2, 5, 7, 9, 9, 6, 9, 3, 9, 9, 0, 9, 0, 3, 9, 0, 8, 9, 7, 8, 5, 7, 8, 7, 8, 7, 8, 7, 7, 7, 7, 8, 7, 8, 8, 8, 8, 5, 8, 4, 4, 4, 5, 8, 8, 8, 8, 9, 4, 6, 6, 9, 9, 0, 1, 3, 3, 6, 7, 5, 7, 7, 7, 9, 4, 9, 0, 8, 9, 9, 9, 9, 0, 9, 9, 0, 7, 7, 8, 8, 9, 1, 5, 5, 7, 3, 3, 5, 7, 7, 9, 9, 0, 5, 5, 6, 4, 5, 6, 6, 8, 8, 8, 8, 9, 4, 7, 7, 9, 9, 6, 6, 9, 9, 0, 6, 8, 3, 8, 1, 8, 9, 7, 8, 8, 8, 9, 5, 9, 9, 3, 9, 9, 0, 1, 1, 4, 9, 0, 7, 8, 4, 8, 9, 7, 9, 4, 9, 9, 0, 9, 9, 0, 6, 6, 7, 9, 9, 2, 9, 9, 0, 8, 9, 6, 6, 8, 9, 7, 7, 9, 3, 4, 4, 6, 6, 7, 9, 9, 9, 0, 8, 9, 9, 0, 6, 8, 4, 6, 8, 6, 8, 8, 9, 7, 9, 7, 7, 9, 7, 9, 2, 6, 9, 9, 0, 8, 7, 5, 7, 8, 9, 8, 8, 4, 5, 8, 4, 4, 8, 8, 4, 8, 9, 8, 8, 4, 4, 8, 8, 9, 9, 9, 0, 2, 2, 5, 9, 0, 5, 8, 8, 9, 9, 9, 9, 9, 0, 4, 7, 7, 7, 8, 6, 8, 8, 9, 6, 8, 8, 5, 8, 8, 9, 9, 0, 7, 8, 8, 6, 6, 8, 6, 6, 8, 6, 6, 5, 6, 6, 8, 8, 8, 8, 9, 6, 9, 6, 9, 9, 6, 9, 0, 8, 8, 9, 9, 8, 8, 8, 9, 8, 9, 4, 7, 7, 9, 4, 5, 5, 5, 5, 6, 6, 9, 5, 9, 0, 9, 0, 6, 6, 6, 8, 9, 3, 3, 3, 4, 7, 8, 8, 9, 9, 0, 9, 0, 7, 7, 8, 9, 4, 8, 8, 9, 3, 5, 5, 8, 9, 7, 7, 5, 5, 7, 4, 4, 7, 1, 7, 8, 5, 7, 7, 8, 8, 8, 9, 8, 9, 9, 9, 4, 4, 9, 0, 0, 7, 8, 7, 8, 6, 8, 9, 5, 6, 8, 8, 9, 8, 9, 8, 8, 9, 7, 7, 9, 7, 9, 0, 9, 8, 8, 9, 7, 7, 8, 8, 4, 4, 4, 8, 8, 9, 9, 8, 8, 9, 6, 9, 9, 9, 0, 9, 9, 0, 3, 6, 6, 7, 5, 7, 7, 1, 7, 9, 5, 5, 7, 7, 9, 5, 9, 9, 0, 0, 8, 9, 8, 9, 9, 9, 9, 1, 1, 3, 9, 9, 9, 0, 7, 9, 7, 7, 9, 9, 0, 9, 9, 0, 9, 9, 9, 9, 0, 5, 5, 6, 9, 0, 3, 3, 6, 7, 8, 7, 8, 9, 9, 4, 1, 2, 2, 4, 9, 0, 9, 0, 6, 9, 5, 9, 2, 9, 9, 0, 5, 5, 9, 9, 9, 0, 9, 3, 7, 9, 7, 9, 4, 5, 2, 3, 5, 9, 5, 9, 0, 4, 7, 7, 9, 6, 6, 9, 9, 9, 0, 8, 4, 3, 4, 4, 8, 9, 3, 3, 4, 7, 7, 9, 9, 6, 6, 6, 7, 6, 7, 2, 1, 2, 6, 7, 5, 7, 9, 7, 7, 7, 9, 0, 8, 8, 8, 2, 3, 8, 8, 9, 5, 2, 5, 5, 5, 9, 0, 6, 6, 9, 9, 0, 1, 5, 5, 8, 9, 0, 7, 4, 7, 8, 8, 6, 6, 7, 7, 8, 8, 9, 9, 6, 6, 9, 9, 9, 0, 8, 8, 8, 9, 8, 8, 9, 4, 9, 0, 7, 8, 6, 6, 8, 8, 8, 8, 9, 9, 0, 7, 4, 7, 9, 0, 8, 9, 5, 5, 6, 2, 3, 6, 6, 7, 8, 4, 7, 8, 6, 8, 9, 7, 7, 7, 8, 7, 7, 8, 8, 9, 6, 7, 5, 5, 7, 8, 8, 9, 9, 0, 9, 4, 9, 2, 9, 0, </pre>	<pre> 2, 3, 4, 4, 6, 9, 0, 9, 6, 7, 5, 5, 5, 5, 7, 7, 9, 5, 9, 9, 0, 5, 9, 5, 9, 9, 9, 0, 9, 9, 9, 0, 8, 7, 5, 1, 5, 7, 8, 4, 6, 7, 7, 7, 8, 9, 8, 9, 8, 5, 5, 8, 9, 6, 9, 6, 6, 9, 9, 0, 7, 5, 5, 7, 3, 5, 7, 7, 7, 8, 7, 8, 3, 3, 3, 6, 8, 9, 8, 3, 8, 9, 9, 0, 9, 9, 9, 0, 8, 5, 8, 8, 9, 6, 9, 0, 2, 5, 7, 9, 9, 6, 9, 3, 9, 9, 0, 9, 0, 3, 9, 0, 8, 9, 7, 8, 5, 7, 8, 7, 8, 7, 8, 7, 7, 7, 7, 8, 7, 8, 8, 8, 8, 5, 8, 4, 4, 4, 5, 8, 8, 8, 8, 9, 4, 6, 6, 9, 9, 0, 1, 3, 3, 6, 7, 5, 7, 7, 7, 9, 4, 9, 0, 8, 9, 9, 9, 9, 0, 9, 9, 0, 7, 7, 8, 8, 9, 1, 5, 5, 7, 3, 3, 5, 7, 7, 9, 9, 0, 5, 5, 6, 4, 5, 6, 6, 8, 8, 8, 8, 9, 4, 7, 7, 9, 9, 6, 6, 9, 9, 0, 6, 8, 3, 8, 1, 8, 9, 7, 8, 8, 8, 9, 5, 9, 9, 3, 9, 9, 0, 1, 1, 4, 9, 0, 7, 8, 4, 8, 9, 7, 9, 4, 9, 9, 0, 9, 9, 0, 6, 6, 7, 9, 9, 2, 9, 9, 0, 8, 9, 6, 6, 8, 9, 7, 7, 9, 3, 4, 4, 6, 6, 7, 9, 9, 9, 0, 8, 9, 9, 0, 6, 8, 4, 6, 8, 6, 8, 8, 9, 7, 9, 7, 7, 9, 7, 9, 2, 6, 9, 9, 0, 8, 7, 5, 7, 8, 9, 8, 8, 4, 5, 8, 4, 4, 8, 8, 4, 8, 9, 8, 8, 4, 4, 8, 8, 9, 9, 9, 0, 2, 2, 5, 9, 0, 5, 8, 8, 9, 9, 9, 9, 9, 0, 4, 7, 7, 7, 8, 6, 8, 8, 9, 6, 8, 8, 5, 8, 8, 9, 9, 0, 7, 8, 8, 6, 6, 8, 6, 6, 8, 6, 6, 5, 6, 6, 8, 8, 8, 8, 9, 6, 9, 6, 9, 9, 6, 9, 0, 8, 8, 9, 9, 8, 8, 8, 9, 8, 9, 4, 7, 7, 9, 4, 5, 5, 5, 5, 6, 6, 9, 5, 9, 0, 9, 0, 6, 6, 6, 8, 9, 3, 3, 3, 4, 7, 8, 8, 9, 9, 0, 9, 0, 7, 7, 8, 9, 4, 8, 8, 9, 3, 5, 5, 8, 9, 7, 7, 5, 5, 7, 4, 4, 7, 1, 7, 8, 5, 7, 7, 8, 8, 8, 9, 8, 9, 9, 9, 4, 4, 9, 0, 0, 7, 8, 7, 8, 6, 8, 9, 5, 6, 8, 8, 9, 8, 9, 8, 8, 9, 7, 7, 9, 7, 9, 0, 9, 8, 8, 9, 7, 7, 8, 8, 4, 4, 4, 8, 8, 9, 9, 8, 8, 9, 6, 9, 9, 9, 0, 9, 9, 0, 3, 6, 6, 7, 5, 7, 7, 1, 7, 9, 5, 5, 7, 7, 9, 5, 9, 9, 0, 0, 8, 9, 8, 9, 9, 9, 9, 1, 1, 3, 9, 9, 9, 0, 7, 9, 7, 7, 9, 9, 0, 9, 9, 0, 9, 9, 9, 9, 0, 5, 5, 6, 9, 0, 3, 3, 6, 7, 8, 7, 8, 9, 9, 4, 1, 2, 2, 4, 9, 0, 9, 0, 6, 9, 5, 9, 2, 9, 9, 0, 5, 5, 9, 9, 9, 0, 9, 3, 7, 9, 7, 9, 4, 5, 2, 3, 5, 9, 5, 9, 0, 4, 7, 7, 9, 6, 6, 9, 9, 9, 0, 8, 4, 3, 4, 4, 8, 9, 3, 3, 4, 7, 7, 9, 9, 6, 6, 6, 7, 6, 7, 2, 1, 2, 6, 7, 5, 7, 9, 7, 7, 7, 9, 0, 8, 8, 8, 2, 3, 8, 8, 9, 5, 2, 5, 5, 5, 9, 0, 6, 6, 9, 9, 0, 1, 5, 5, 8, 9, 0, 7, 4, 7, 8, 8, 6, 6, 7, 7, 8, 8, 9, 9, 6, 6, 9, 9, 9, 0, 8, 8, 8, 9, 8, 8, 9, 4, 9, 0, 7, 8, 6, 6, 8, 8, 8, 8, 9, 9, 0, 7, 4, 7, 9, 0, 8, 9, 5, 5, 6, 2, 3, 6, 6, 7, 8, 4, 7, 8, 6, 8, 9, 7, 7, 7, 8, 7, 7, 8, 8, 9, 6, 7, 5, 5, 7, 8, 8, 9, 9, 0, 9, 4, 9, 2, 9, 0, </pre>

Test	Expected	Got
	5, 7, 5, 7, 4, 7, 8, 7, 8, 8, 8, 9, 0, 8, 9, 9, 9, 0, 3, 4, 3, 4, 4, 4, 4, 4, 5, 7, 8, 8, 8, 9, 6, 9, 9, 9, 0, 8, 8, 9, 4, 7, 1, 7, 9, 5, 5, 7, 7, 7, 9, 6, 6, 7, 7, 9, 4, 4, 5, 5, 5, 7, 9, 3, 9, 9, 0, 1, 9, 9, 0, 0, 0, 0, 0]	5, 7, 5, 7, 4, 7, 8, 7, 8, 8, 8, 9, 0, 8, 9, 9, 9, 0, 3, 4, 3, 4, 4, 4, 4, 4, 5, 7, 8, 8, 8, 9, 6, 9, 9, 9, 0, 8, 8, 9, 4, 7, 1, 7, 9, 5, 5, 7, 7, 7, 9, 6, 6, 7, 7, 9, 4, 4, 5, 5, 5, 7, 9, 3, 9, 9, 0, 1, 9, 9, 0, 0, 0, 0, 0]

Passed all tests! 

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 12

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
}
```

Given a singly linked list head node.

Your task is to implement a function with following prototype:

```
LLNode* reverseLinkedList(LLNode* head);
```

The function returns head node of the reversed singly linked list.

Note:

- The `iostream` library has been included and `namespace std` is being used. No other libraries are allowed.
- The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
- You can write helper functions.

For example:

Test	Result
<pre>int arr[] = {13, 88, 60, 7, 192}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* reverseLinkedList(LLNode* head) {
2     // STUDENT ANSWER
3     if(head==nullptr) return nullptr;
4     LLNode*prev=nullptr;
5     LLNode*current=head;
6     LLNode*next=nullptr;
7     while(current!=nullptr){
8         next=current->next;
9         current->next=prev;
10        prev=current;
11        current=next;
12    }
13    head=prev;
14    return head;
15
16 }
```

	Test	Expected	Got	
✓	<pre>int arr[] = {13, 88, 60, 7, 192}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]</pre>	<pre>[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]</pre>	✓
✓	<pre>int arr[] = {}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[] []</pre>	<pre>[] []</pre>	✓
✓	<pre>int arr[] = {31, 22, 46, 152, 14, 87, 196, 97, 5, 93}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[31, 22, 46, 152, 14, 87, 196, 97, 5, 93] [93, 5, 97, 196, 87, 14, 152, 46, 22, 31]</pre>	<pre>[31, 22, 46, 152, 14, 87, 196, 97, 5, 93] [93, 5, 97, 196, 87, 14, 152, 46, 22, 31]</pre>	✓
✓	<pre>int arr[] = {115, 59, 178, 39, 109, 18, 154, 106, 94, 174, 51, 33, 132, 195, 161, 37, 61, 107, 120, 190}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[115, 59, 178, 39, 109, 18, 154, 106, 94, 174, 51, 33, 132, 195, 161, 37, 61, 107, 120, 190] [190, 120, 107, 61, 37, 161, 195, 132, 33, 51, 174, 94, 106, 154, 18, 109, 39, 178, 59, 115]</pre>	<pre>[115, 59, 178, 39, 109, 18, 154, 106, 94, 174, 51, 33, 132, 195, 161, 37, 61, 107, 120, 190] [190, 120, 107, 61, 37, 161, 195, 132, 33, 51, 174, 94, 106, 154, 18, 109, 39, 178, 59, 115]</pre>	✓

	Test	Expected	Got	
✓	<pre>int arr[] = {104, 50, 154, 40, 15, 171, 56, 114, 67, 90, 46, 179, 152, 177, 139, 45, 18, 55, 38, 158, 8, 157, 143, 37, 16, 83, 173, 82, 156, 51, 124, 25, 68, 51, 194, 105, 44, 17, 97, 0, 150, 66, 71, 81, 11, 180, 148, 160, 127, 93, 108, 13, 122, 172, 39, 88, 62, 38, 61, 156, 45, 131, 69, 191, 123, 42, 103, 56, 69, 138, 185, 162, 192, 147, 71, 80, 12, 36, 191, 121, 194, 86, 92, 183, 164, 97, 185, 130, 29, 174, 112, 194, 185, 132, 27, 197, 158, 151, 51, 174}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[104, 50, 154, 40, 15, 171, 56, 114, 67, 90, 46, 179, 152, 177, 139, 45, 18, 55, 38, 158, 8, 157, 143, 37, 16, 83, 173, 82, 156, 51, 124, 25, 68, 51, 194, 105, 44, 17, 97, 0, 150, 66, 71, 81, 11, 180, 148, 160, 127, 93, 108, 13, 122, 172, 39, 88, 62, 38, 61, 156, 45, 131, 69, 191, 123, 42, 103, 56, 69, 138, 185, 162, 192, 147, 71, 80, 12, 36, 191, 121, 194, 86, 92, 183, 164, 97, 185, 130, 29, 174, 112, 194, 185, 132, 27, 197, 158, 151, 51, 174] [174, 51, 151, 158, 197, 27, 132, 185, 194, 112, 174, 29, 130, 185, 97, 164, 183, 92, 86, 194, 121, 191, 36, 12, 80, 71, 147, 192, 162, 185, 138, 69, 56, 103, 42, 123, 191, 69, 131, 45, 156, 61, 38, 62, 88, 39, 172, 122, 13, 108, 93, 127, 160, 148, 180, 11, 81, 71, 66, 150, 0, 97, 17, 44, 105, 194, 51, 68, 25, 124, 51, 156, 82, 173, 83, 16, 37, 143, 157, 8, 158, 38, 55, 18, 45, 139, 177, 152, 179, 46, 90, 67, 114, 56, 171, 15, 40, 154, 50, 104]</pre>	<pre>[104, 50, 154, 40, 15, 171, 56, 114, 67, 90, 46, 179, 152, 177, 139, 45, 18, 55, 38, 158, 8, 157, 143, 37, 16, 83, 173, 82, 156, 51, 124, 25, 68, 51, 194, 105, 44, 17, 97, 0, 150, 66, 71, 81, 11, 180, 148, 160, 127, 93, 108, 13, 122, 172, 39, 88, 62, 38, 61, 156, 45, 131, 69, 191, 123, 42, 103, 56, 69, 138, 185, 162, 192, 147, 71, 80, 12, 36, 191, 121, 194, 86, 92, 183, 164, 97, 185, 130, 29, 174, 112, 194, 185, 132, 27, 197, 158, 151, 51, 174] [174, 51, 151, 158, 197, 27, 132, 185, 194, 112, 174, 29, 130, 185, 97, 164, 183, 92, 86, 194, 121, 191, 36, 12, 80, 71, 147, 192, 162, 185, 138, 69, 56, 103, 42, 123, 191, 69, 131, 45, 156, 61, 38, 62, 88, 39, 172, 122, 13, 108, 93, 127, 160, 148, 180, 11, 81, 71, 66, 150, 0, 97, 17, 44, 105, 194, 51, 68, 25, 124, 51, 156, 82, 173, 83, 16, 37, 143, 157, 8, 158, 38, 55, 18, 45, 139, 177, 152, 179, 46, 90, 67, 114, 56, 171, 15, 40, 154, 50, 104]</pre>	✓
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newhead->clear(); </pre>	<pre> 70, 133, 158, 119, 47, 142, 111, 110, 96, 68, 118, 153, 178, 174, 130, 176, 186, 23, 193, 40, 175, 107, 184, 168, 185, 56, 167, 169, 68, 42, 75, 26, 174, 92, 46, 18, 85, 131, 164, 15, 116, 197, 88, 143, 8, 115, 199, 173, 142, 139, 162, 62, 7, 33, 2, 4, 54, 22, 135, 194, 34, 17, 90, 154, 71, 6, 156, 76, 66, 172, 157, 39, 92, 68, 169, 117, 166, 86, 153, 106, 63, 142, 190, 149, 58, 31, 19, 114, 35, 110, 108, 103, 27, 139, 97, 166, 186, 164, 55, 19, 133, 194, 153, 38, 8, 87, 35, 179, 5, 32, 143, 104, 86, 184, 116, 70, 39, 22, 172, 28, 40, 72, 116, 192, 17, 159, 169, 143, 167, 77, 25, 128, 102, 140, 120, 140, 71, 56, 76, 16, 13, 144, 91, 166, 2, 74, 164, 153, 71, 37, 187, 104, 172, 122, 9, 109, 116, 173, 75, 70, 117, 57, 129, 171, 198, 194, 154, 177, 82, 103, 30, 174, 85, 191, 116, 30, 164, 155, 38, 38, 49, 84, 34, 111, 159] [159, 111, 34, 84, 49, 38, 38, 155, 164, 30, 116, 191, 85, 174, 30, 103, 82, 177, 154, 194, 198, 171, 129, 57, 117, 70, 75, 173, 116, 109, 9, 122, 172, 104, 187, 37, 71, 153, 164, 74, 2, 166, 91, 144, 13, 16, 76, 56, 71, 140, 120, 140, 102, 128, 25, 77, 167, 143, 169, 159, 17, 192, 116, 72, 40, 28, 172, 22, 39, 70, 116, 184, 86, 104, 143, 32, 5, 179, 35, 87, 8, 38, 153, 194, 133, 19, 55, 164, 186, 166, 97, 139, 27, 103, 108, 110, 35, 114, 19, 31, 58, 149, 190, 142, 63, 106, 153, 86, 166, 117, 169, 68, 92, 39, 157, 172, 66, 76, 156, 6, 71, 154, 90, 17, 34, 194, 135, 22, 54, 4, 2, 33, 7, 62, 162, 139, 142, 173, 199, 115, 8, 143, 88, 197, 116, 15, 164, 131, 85, 18, 46, 92, 174, 26, 75, 42, 68, 169, 167, 56, 185, 168, 184, 107, 175, 40, 193, 23, 186, 176, 130, 174, 178, 153, 118, 68, 96, 110, 111, 142, 47, 119, 158, 133, 70, 103, 118, 173, 4, 116, 186, 186, 171, 151, 133, 45, 121, 101, 57, 139, 116, 157, 122, 127, 173, 162, 101, 73, 39, 99, 60, 150, 152, 169, 45, 105, 159, 177, 178, 114, 120, 146, 194, 14, 149, 65, 112, 152, 182, 43, 12, 158, 11, 122, 88, 150, 88, 75, 60, 90, 105, 0, 76, 49, 135, 49, 169, 145, 67, 144, 15, 50, 169, 189, 6, 140, 111, 30, 155, 42, 166, 91, 32, 48, 40, 120, 34, 36, 132, 149, 3, 1, 88, 163, 192, 9, 13, 23, 180, 84, 40, 99, 189, 139, 110, 59, 149, 154, 72, 61, 189, 174, 56, 85, 39, 106, 163, 199, 106, 80, 153, 190, 17, 13, 193, 109, 166, 46, 170, 43, 172, 114, 150, 180, 156, 24, 112, 93, 41, 178, 72, 184, 110, 153, 109, 88, 103, 187, 131, 47, 174, 130, 102, 62, 40, 127, 95, 61, 96, 118, 133, </pre>	<pre> 70, 133, 158, 119, 47, 142, 111, 110, 96, 68, 118, 153, 178, 174, 130, 176, 186, 23, 193, 40, 175, 107, 184, 168, 185, 56, 167, 169, 68, 42, 75, 26, 174, 92, 46, 18, 85, 131, 164, 15, 116, 197, 88, 143, 8, 115, 199, 173, 142, 139, 162, 62, 7, 33, 2, 4, 54, 22, 135, 194, 34, 17, 90, 154, 71, 6, 156, 76, 66, 172, 157, 39, 92, 68, 169, 117, 166, 86, 153, 106, 63, 142, 190, 149, 58, 31, 19, 114, 35, 110, 108, 103, 27, 139, 97, 166, 186, 164, 55, 19, 133, 194, 153, 38, 8, 87, 35, 179, 5, 32, 143, 104, 86, 184, 116, 70, 39, 22, 172, 28, 40, 72, 116, 192, 17, 159, 169, 143, 167, 77, 25, 128, 102, 140, 120, 140, 71, 56, 76, 16, 13, 144, 91, 166, 2, 74, 164, 153, 71, 37, 187, 104, 172, 122, 9, 109, 116, 173, 75, 70, 117, 57, 129, 171, 198, 194, 154, 177, 82, 103, 30, 174, 85, 191, 116, 30, 164, 155, 38, 38, 49, 84, 34, 111, 159] [159, 111, 34, 84, 49, 38, 38, 155, 164, 30, 116, 191, 85, 174, 30, 103, 82, 177, 154, 194, 198, 171, 129, 57, 117, 70, 75, 173, 116, 109, 9, 122, 172, 104, 187, 37, 71, 153, 164, 74, 2, 166, 91, 144, 13, 16, 76, 56, 71, 140, 120, 140, 102, 128, 25, 77, 167, 143, 169, 159, 17, 192, 116, 72, 40, 28, 172, 22, 39, 70, 116, 184, 86, 104, 143, 32, 5, 179, 35, 87, 8, 38, 153, 194, 133, 19, 55, 164, 186, 166, 97, 139, 27, 103, 108, 110, 35, 114, 19, 31, 58, 149, 190, 142, 63, 106, 153, 86, 166, 117, 169, 68, 92, 39, 157, 172, 66, 76, 156, 6, 71, 154, 90, 17, 34, 194, 135, 22, 54, 4, 2, 33, 7, 62, 162, 139, 142, 173, 199, 115, 8, 143, 88, 197, 116, 15, 164, 131, 85, 18, 46, 92, 174, 26, 75, 42, 68, 169, 167, 56, 185, 168, 184, 107, 175, 40, 193, 23, 186, 176, 130, 174, 178, 153, 118, 68, 96, 110, 111, 142, 47, 119, 158, 133, 70, 103, 118, 173, 4, 116, 186, 186, 171, 151, 133, 45, 121, 101, 57, 139, 116, 157, 122, 127, 173, 162, 101, 73, 39, 99, 60, 150, 152, 169, 45, 105, 159, 177, 178, 114, 120, 146, 194, 14, 149, 65, 112, 152, 182, 43, 12, 158, 11, 122, 88, 150, 88, 75, 60, 90, 105, 0, 76, 49, 135, 49, 169, 145, 67, 144, 15, 50, 169, 189, 6, 140, 111, 30, 155, 42, 166, 91, 32, 48, 40, 120, 34, 36, 132, 149, 3, 1, 88, 163, 192, 9, 13, 23, 180, 84, 40, 99, 189, 139, 110, 59, 149, 154, 72, 61, 189, 174, 56, 85, 39, 106, 163, 199, 106, 80, 153, 190, 17, 13, 193, 109, 166, 46, 170, 43, 172, 114, 150, 180, 156, 24, 112, 93, 41, 178, 72, 184, 110, 153, 109, 88, 103, 187, 131, 47, 174, 130, 102, 62, 40, 127, 95, 61, 96, 118, 133, </pre>

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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear(); </pre>	<pre> 42, 19, 51, 132, 155, 50, 192, 152, 0, 59, 89, 128, 27, 196, 160, 44, 149, 105, 24, 18, 137, 121, 22, 151, 111, 109, 111, 86, 30, 159, 59, 135, 6, 185, 40, 147, 27, 188, 33, 165, 14, 82, 95, 28, 97, 87, 65, 79, 146, 52, 152, 80, 130, 173, 54, 5, 77, 109, 128, 51, 148, 63, 185, 93, 153, 55, 33, 189, 50, 88, 174, 153, 58, 64, 49, 105, 117, 122, 91, 110, 130, 108, 74, 69, 197, 120, 110, 78, 124, 23, 153, 70, 91, 4, 150, 28, 163, 125, 89, 163, 16, 24, 15, 28, 115, 44, 94, 24, 85, 71, 0, 35, 5, 95, 125, 18, 99, 35, 47, 185, 118, 99, 161, 119, 10, 134, 17, 156, 134, 11, 61, 101, 117, 99, 4, 46, 163, 46, 71, 176, 10, 68, 160, 19, 165, 54, 177, 87, 28, 188, 167, 118, 73, 33, 88, 133, 99, 37, 163, 132, 17, 178, 63, 18, 48, 153, 198, 133, 160, 174, 115, 106, 68, 179, 17, 41, 184, 137, 22, 123, 152, 149, 48, 142, 62, 73, 102, 137, 52, 161, 171, 52, 147, 136, 6, 163, 10, 154, 196, 28, 19, 149, 186, 53, 170, 2, 165, 82, 64, 17, 53, 198, 135, 189, 49, 97, 5, 147, 60, 82, 198, 122, 41, 85, 117, 15, 26, 168, 172, 71, 15, 169, 172, 73, 44, 178, 134, 35, 108, 1, 51, 12, 21, 10, 48, 139, 139, 94, 14, 0, 153, 73, 73, 0, 149, 111, 103, 125, 92, 24, 3, 38, 110, 77, 75, 131, 106, 33, 110, 109, 92, 28, 49, 124, 38, 12, 132, 137, 197, 190, 17, 22, 62, 141, 13, 107, 48, 113, 169, 92, 163, 115, 50, 56, 185, 7, 63, 59, 187, 193, 155, 183, 111, 67, 84, 104, 81, 151, 131, 14, 15, 177, 197, 190, 65, 143, 25, 156, 137, 116, 98, 90, 127, 114, 88, 189, 88, 23, 65, 106, 95, 27, 93, 155, 4, 199, 99, 151, 53, 192, 125, 2, 98, 158, 155, 129, 100, 55, 119, 89, 128, 88, 60, 145, 169, 85, 132, 70, 76, 167, 25, 70, 199, 190, 52, 184, 188, 144, 53, 147, 50, 162, 130, 197, 125, 173, 147, 45, 71, 180, 173, 83, 174, 68, 77, 96, 199, 115, 167, 193, 156, 148, 175, 33, 98, 99, 96, 62, 54, 125, 131, 155, 64, 179, 66, 63, 192, 7, 149, 60, 136, 78, 172, 115, 10, 168, 158, 63, 28, 117, 81, 24, 40, 89, 67, 57, 184, 89, 160, 13, 10, 15, 37, 23, 152, 147, 188, 96, 99, 116, 88, 13, 121, 167, 67, 24, 180, 45, 199, 86, 85, 58, 98, 121, 25, 148, 172, 24, 146, 193, 149, 61, 72, 117, 59, 79, 162, 100, 89, 88, 167, 99, 14, 55, 178, 20, 116, 49, 173, 27, 183, 117, 4, 99, 145, 46, 46, 61, 116, 125, 31, 195, 103, 30, 137, 184, 36, 67, 68] </pre>	<pre> 42, 19, 51, 132, 155, 50, 192, 152, 0, 59, 89, 128, 27, 196, 160, 44, 149, 105, 24, 18, 137, 121, 22, 151, 111, 109, 111, 86, 30, 159, 59, 135, 6, 185, 40, 147, 27, 188, 33, 165, 14, 82, 95, 28, 97, 87, 65, 79, 146, 52, 152, 80, 130, 173, 54, 5, 77, 109, 128, 51, 148, 63, 185, 93, 153, 55, 33, 189, 50, 88, 174, 153, 58, 64, 49, 105, 117, 122, 91, 110, 130, 108, 74, 69, 197, 120, 110, 78, 124, 23, 153, 70, 91, 4, 150, 28, 163, 125, 89, 163, 16, 24, 15, 28, 115, 44, 94, 24, 85, 71, 0, 35, 5, 95, 125, 18, 99, 35, 47, 185, 118, 99, 161, 119, 10, 134, 17, 156, 134, 11, 61, 101, 117, 99, 4, 46, 163, 46, 71, 176, 10, 68, 160, 19, 165, 54, 177, 87, 28, 188, 167, 118, 73, 33, 88, 133, 99, 37, 163, 132, 17, 178, 63, 18, 48, 153, 198, 133, 160, 174, 115, 106, 68, 179, 17, 41, 184, 137, 22, 123, 152, 149, 48, 142, 62, 73, 102, 137, 52, 161, 171, 52, 147, 136, 6, 163, 10, 154, 196, 28, 19, 149, 186, 53, 170, 2, 165, 82, 64, 17, 53, 198, 135, 189, 49, 97, 5, 147, 60, 82, 198, 122, 41, 85, 117, 15, 26, 168, 172, 71, 15, 169, 172, 73, 44, 178, 134, 35, 108, 1, 51, 12, 21, 10, 48, 139, 139, 94, 14, 0, 153, 73, 73, 0, 149, 111, 103, 125, 92, 24, 3, 38, 110, 77, 75, 131, 106, 33, 110, 109, 92, 28, 49, 124, 38, 12, 132, 137, 197, 190, 17, 22, 62, 141, 13, 107, 48, 113, 169, 92, 163, 115, 50, 56, 185, 7, 63, 59, 187, 193, 155, 183, 111, 67, 84, 104, 81, 151, 131, 14, 15, 177, 197, 190, 65, 143, 25, 156, 137, 116, 98, 90, 127, 114, 88, 189, 88, 23, 65, 106, 95, 27, 93, 155, 4, 199, 99, 151, 53, 192, 125, 2, 98, 158, 155, 129, 100, 55, 119, 89, 128, 88, 60, 145, 169, 85, 132, 70, 76, 167, 25, 70, 199, 190, 52, 184, 188, 144, 53, 147, 50, 162, 130, 197, 125, 173, 147, 45, 71, 180, 173, 83, 174, 68, 77, 96, 199, 115, 167, 193, 156, 148, 175, 33, 98, 99, 96, 62, 54, 125, 131, 155, 64, 179, 66, 63, 192, 7, 149, 60, 136, 78, 172, 115, 10, 168, 158, 63, 28, 117, 81, 24, 40, 89, 67, 57, 184, 89, 160, 13, 10, 15, 37, 23, 152, 147, 188, 96, 99, 116, 88, 13, 121, 167, 67, 24, 180, 45, 199, 86, 85, 58, 98, 121, 25, 148, 172, 24, 146, 193, 149, 61, 72, 117, 59, 79, 162, 100, 89, 88, 167, 99, 14, 55, 178, 20, 116, 49, 173, 27, 183, 117, 4, 99, 145, 46, 46, 61, 116, 125, 31, 195, 103, 30, 137, 184, 36, 67, 68] </pre>

Passed all tests! 

(Chính xác)

Điểm cho bài nộp này: 1,00/1,00.

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
}
```

Given a singly linked list head node and a integer `k`.
Your task is to implement a function with following prototype:

```
LLNode* rotateLinkedList(LLNode* head, int k);
```

The function returns head node of the rotated singly linked list obtained after rotate the linked list to the right by `k` places.

- Note:**
- The `iostream` library has been used and `namespace std` is being used. No other libraries are allowed.
 - The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
 - You can write helper functions.

For example:

Test	Result
<pre>int arr[] = {2, 4, 6, 6, 3}; int k = 3; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[2, 4, 6, 6, 3] [6, 6, 3, 2, 4]</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* rotateLinkedList(LLNode* head, int k) {
2     // STUDENT ANSWER
3     if(head==nullptr){
4         return nullptr;
5     }
6     if(head->next==nullptr){
7         LLNode* ret=new LLNode(head->val,nullptr);
8         return ret;
9     }
10    int length=0;
11    LLNode*temp=head;
12    while(temp!=nullptr){
13        temp=temp->next;
14        length++;
15    }
16    temp=head;
17    k=k%length;
18    LLNode*tail_part=nullptr,*temp_tail=nullptr;
19    for(int i=0;i<length-k;i++){
20        if(i==0){
21            tail_part=new LLNode(temp->val,temp->next);
22            temp_tail=tail_part;
23        }
24        else{
25            temp_tail->next=new LLNode(temp->val,nullptr);
```

```

26     temp_tail=temp_tail->next;
27     }
28     temp=temp->next;
29 }
30 LLNode*head_part,*temp_head;
31 head_part=new LLNode(temp->val,nullptr);
32 temp_head=head_part;
33 temp=temp->next;
34 //int cnt=0;
35 while(temp!=nullptr){
36     temp_head->next=new LLNode(temp->val,nullptr);
37     //temp_head->next->val=temp_head->val=temp->val;
38     temp=temp->next;
39     //if(temp!=nullptr)
40     temp_head=temp_head->next;
41     //cnt++;
42 }
43 temp_head->next=temp_tail;
44 //cout<<"temp_headptr"<<temp_head<<endl;
45 //cout<<"temp_headval="<<temp_head->val<<endl;
46 //LLNode*read=head_part;
47 while(read!=nullptr){
48     // cout<<read->val<<endl;
49     // cout<<read<<endl;
50     /// read=read->next;
51     //}
52     return head_part;
53 }

```

	Test	Expected	Got	
✓	<pre> int arr[] = {2, 4, 6, 6, 3}; int k = 3; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> [2, 4, 6, 6, 3] [6, 6, 3, 2, 4] </pre>	<pre> [2, 4, 6, 6, 3] [6, 6, 3, 2, 4] </pre>	✓
✓	<pre> int arr[] = {}; int k = 2; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> [] [] </pre>	<pre> [] [] </pre>	✓

	Test	Expected	Got	
✓	<pre>int arr[] = {0, 4, 2, 5, 1, 0, 6, 4, 8, 6}; int k = 11; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[0, 4, 2, 5, 1, 0, 6, 4, 8, 6] [6, 0, 4, 2, 5, 1, 0, 6, 4, 8]</pre>	<pre>[0, 4, 2, 5, 1, 0, 6, 4, 8, 6] [6, 0, 4, 2, 5, 1, 0, 6, 4, 8]</pre>	✓
✓	<pre>int arr[] = {6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9, 0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9}; int k = 35; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9, 0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9] [0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9, 6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9]</pre>	<pre>[6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9, 0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9] [0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9, 6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9]</pre>	✓
✓	<pre>int arr[] = {9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 9, 4, 0, 6, 8, 7, 1, 6, 9, 6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8,</pre>	<pre>[9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 9, 4, 0, 6, 8, 7, 1, 6, 9, 6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7,</pre>	<pre>[9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 9, 4, 0, 6, 8, 7, 1, 6, 9, 6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7,</pre>	✓

	Test	Expected	Got	
	<pre> 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3}; int k = 196; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3] [6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3, 9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9] </pre>	<pre> 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3] [6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3, 9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9] </pre>	
✓	<pre> int arr[] = {8, 0, 8, 8, 9, 3, 3, 5, 4, 9, 7, 9, 5, 3, 8, 6, 1, 0, 6, 4, 5, 1, 1, 5, 3, 8, 6, 1, 1, 1, 0, 1, 4, 9, 0, 1, 8, 0, 2, 7, 1, 5, 7, 6, 7, 7, 9, 5, 0, 9, 6, 3, 7, 6, 6, 4, 6, 2, 9, 1, 5, 0, 8, 6, 0, 8, 6, 3, 0, 3, 6, 8, 5, 0, 1, 9, 9, 6, 3, 3, 2, 9, 2, 0, 0, 5, 0, 4, 6, 7, 2, 6, 5, 2, 8, 8, 7, 1, 0, 9, 7, 7, 1, 5, 8, 7, 5, 7, 8, 7, 8, 7, 1, 7, 9, 7, 1, 3, 0, 5, 5, 1, 0, 2, 1, 0, 1, 5, 3, 7, 7, 9, 6, 1, 6, 4, 8, 9, 8, 6, 0, 0, 3, 6, 2, 3, 4, 9, 7, 4, 2, 2, 9, 7, 7, 4, 9, 9, 7, 5, 6, 2, 4, 0, 1, 9, 9, 8, 4, 6, 1, 2, 9, 6, 7, 9, 4, 7, 5, 2, 9, 4, 2, 5, 9, 4, 1, 6, 0, 0, 5, 0, 0, 6, 1, 7, 8, 6, 9, 5, 4, 7, 0, </pre>	<pre> [8, 0, 8, 8, 9, 3, 3, 5, 4, 9, 7, 9, 5, 3, 8, 6, 1, 0, 6, 4, 5, 1, 1, 5, 3, 8, 6, 1, 1, 1, 0, 1, 4, 9, 0, 1, 8, 0, 2, 7, 1, 5, 7, 6, 7, 7, 9, 5, 0, 9, 6, 3, 7, 6, 6, 4, 6, 2, 9, 1, 5, 0, 8, 6, 0, 8, 6, 3, 0, 3, 6, 8, 5, 0, 1, 9, 9, 6, 3, 3, 2, 9, 2, 0, 0, 5, 0, 4, 6, 7, 2, 6, 5, 2, 8, 8, 7, 1, 0, 9, 7, 7, 1, 5, 8, 7, 5, 7, 8, 7, 8, 7, 1, 7, 9, 7, 1, 3, 0, 5, 5, 1, 0, 2, 1, 0, 1, 5, 3, 7, 7, 9, 6, 1, 6, 4, 8, 9, 8, 6, 0, 0, 3, 6, 2, 3, 4, 9, 7, 4, 2, 2, 9, 7, 7, 4, 9, 9, 7, 5, 6, 2, 4, 0, 1, 9, 9, 8, 4, 6, 1, 2, 9, 6, 7, 9, 4, 7, 5, 2, 9, 4, 2, 5, 9, 4, 1, 6, 0, 0, 5, 0, </pre>	<pre> [8, 0, 8, 8, 9, 3, 3, 5, 4, 9, 7, 9, 5, 3, 8, 6, 1, 0, 6, 4, 5, 1, 1, 5, 3, 8, 6, 1, 1, 1, 0, 1, 4, 9, 0, 1, 8, 0, 2, 7, 1, 5, 7, 6, 7, 7, 9, 5, 0, 9, 6, 3, 7, 6, 6, 4, 6, 2, 9, 1, 5, 0, 8, 6, 0, 8, 6, 3, 0, 3, 6, 8, 5, 0, 1, 9, 9, 6, 3, 3, 2, 9, 2, 0, 0, 5, 0, 4, 6, 7, 2, 6, 5, 2, 8, 8, 7, 1, 0, 9, 7, 7, 1, 5, 8, 7, 5, 7, 8, 7, 8, 7, 1, 7, 9, 7, 1, 3, 0, 5, 5, 1, 0, 2, 1, 0, 1, 5, 3, 7, 7, 9, 6, 1, 6, 4, 8, 9, 8, 6, 0, 0, 3, 6, 2, 3, 4, 9, 7, 4, 2, 2, 9, 7, 7, 4, 9, 9, 7, 5, 6, 2, 4, 0, 1, 9, 9, 8, 4, 6, 1, 2, 9, 6, 7, 9, 4, 7, 5, 2, 9, 4, 2, 5, 9, 4, 1, 6, 0, 0, 5, 0, </pre>	✓

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	Test	Expected	Got	
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✓	<pre> int arr[] = {2, 2, 6, 2, 6, 9, 8, 0, 5, 7, 5, 2, 0, 3, 3, 5, 1, 0, 6, 0, 0, 4, 3, 8, 1, 0, 7, 7, 9, 8, 7, 8, 5, 5, 2, 4, 4, 6, 1, 2, 8, 5, 8, 1, 6, 3, 0, 6, 8, 7, 4, 0, 2, 2, 5, 6, 7, 3, 3, 2, 5, 7, 0, 2, 2, 9, 8, 5, 8, 2, 7, 2, 2, 6, 1, 0, 4, 2, 2, 7, 6, 8, 5, 5, 7, 7, 7, 7, 0, 0, 6, 6, 6, 2, 7, 0, 9, 8, 7, 2, 9, 3, 0, 0, 4, 6, 2, 5, 1, 3, 1, 7, 2, 0, 9, 8, 4, 8, 5, 3, 7, 8, 8, 7, 1, 5, 4, 1, 5, 1, 1, 5, 8, 4, 2, 2, 6, 0, 7, 8, 6, 7, 9, 9, 0, 5, 6, 1, 4, 9, 9, 0, 3, 2, 6, 5, 6, 1, 7, 8, 8, 9, 0, 0, 2, 6, 9, 3, 7, 3, 7, 4, 9, 1, 9, 2, 7, 8, 2, 8, 2, 7, 7, 9, 1, 4, 4, 0, 4, 7, </pre>	<pre> [2, 2, 6, 2, 6, 9, 8, 0, 5, 7, 5, 2, 0, 3, 3, 5, 1, 0, 6, 0, 0, 4, 3, 8, 1, 0, 7, 7, 9, 8, 7, 8, 5, 5, 2, 4, 4, 6, 1, 2, 8, 5, 8, 1, 6, 3, 0, 6, 8, 7, 4, 0, 2, 2, 5, 6, 7, 3, 3, 2, 5, 7, 0, 2, 2, 9, 8, 5, 8, 2, 7, 2, 2, 6, 1, 0, 4, 2, 2, 7, 6, 8, 5, 5, 7, 7, 7, 7, 0, 0, 6, 6, 6, 2, 7, 0, 9, 8, 7, 2, 9, 3, 0, 0, 4, 6, 2, 5, 1, 3, 1, 7, 2, 0, 9, 8, 4, 8, 5, 3, 7, 8, 8, 7, 1, 5, 4, 1, 5, 1, 1, 5, 8, 4, 2, 2, 6, 0, 7, 8, 6, 7, 9, 9, 0, 5, 6, 1, 4, 9, 9, 0, 3, 2, 6, 5, 6, 1, 7, 8, 8, 9, 0, 0, 2, 6, 9, 3, 7, 3, 7, 4, 9, 1, 9, 2, 7, 8, 2, 8, </pre>	<pre> [2, 2, 6, 2, 6, 9, 8, 0, 5, 7, 5, 2, 0, 3, 3, 5, 1, 0, 6, 0, 0, 4, 3, 8, 1, 0, 7, 7, 9, 8, 7, 8, 5, 5, 2, 4, 4, 6, 1, 2, 8, 5, 8, 1, 6, 3, 0, 6, 8, 7, 4, 0, 2, 2, 5, 6, 7, 3, 3, 2, 5, 7, 0, 2, 2, 9, 8, 5, 8, 2, 7, 2, 2, 6, 1, 0, 4, 2, 2, 7, 6, 8, 5, 5, 7, 7, 7, 7, 0, 0, 6, 6, 6, 2, 7, 0, 9, 8, 7, 2, 9, 3, 0, 0, 4, 6, 2, 5, 1, 3, 1, 7, 2, 0, 9, 8, 4, 8, 5, 3, 7, 8, 8, 7, 1, 5, 4, 1, 5, 1, 1, 5, 8, 4, 2, 2, 6, 0, 7, 8, 6, 7, 9, 9, 0, 5, 6, 1, 4, 9, 9, 0, 3, 2, 6, 5, 6, 1, 7, 8, 8, 9, 0, 0, 2, 6, 9, 3, 7, 3, 7, 4, 9, 1, 9, 2, 7, 8, 2, 8, </pre>	✓

Test	Expected	Got
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✓	<pre> int arr[] = {4, 3, 0, 1, 8, 3, 3, 8, 6, 8, 6, 6, 4, 4, 9, 4, 6, 0, 6, 5, 2, 2, 9, 9, 1, 6, 2, 8, 1, 5, 8, 6, 5, 4, 0, 9, 9, 6, 2, 8, 1, 7, 2, 6, 4, 9, 8, 1, 7, 6, 6, 2, 4, 5, 5, 0, 6, 8, 9, 3, 6, 2, 7, 3, 0, 2, 6, 8, 9, 9, 6, 8, 2, 5, 0, 8, 0, 9, 7, 5, 6, 4, 5, 3, 1, 5, 5, 1, 4, 4, 9, 1, 0, 2, 3, 5, 4, 9, 3, 2, 2, 3, 9, 7, 8, 6, 7, 7, 4, 4, 8, 0, 6, 6, 2, 5, 8, 7, 6, 8, 7, 1, 7, 6, 1, 9, 2, 0, 3, 7, 1, 0, 0, 4, 5, 4, 4, 2, 9, 4, 6, 4, 5, 0, 8, 3, 9, 8, 2, 4, 9, 2, 4, 2, 6, 5, 2, 3, 5, 3, 8, 7, 6, 1, 2, 7, 9, 8, 7, 4, 8, 5, 4, 3, 1, 6, 0, 6, 6, 9, 4, 0, 4, 0, 0, 7, 8, 9, 4, 6, 7, 4, 3, 3, 7, 8, 7, 5, 7, 7, 9, 6, 1, 9, 4, 4, 1, 0, 9, 1, 2, 4, 8, 3, 1, 1, 7, 1, 7, 5, 5, 7, 1, 1, 1, 0, 0, 6, 7, 2, 3, 6, 6, 1, 4, 6, 8, 9, 7, 0, 8, 7, 8, 8, 0, 9, 0, 0, 2, 0, 5, 4, 6, 2, 3, 2, 1, 7, 5, 5, 7, 6, 3, 4, 2, 0, 1, 7, 7, 0, 5, 9, 3, 0, 6, 6, 1, 0, 2, 1, 6, 2, 4, 9, 8, 5, 4, 5, 3, 2, 9, 9, 8, 4, 0, 0, 7, 3, 1, 2, 0, 3, 8, 1, 2, 0, 6, </pre>	<pre> [4, 3, 0, 1, 8, 3, 3, 8, 6, 8, 6, 6, 4, 4, 9, 4, 6, 0, 6, 5, 2, 2, 9, 9, 1, 6, 2, 8, 1, 5, 8, 6, 5, 4, 0, 9, 9, 6, 2, 8, 1, 7, 2, 6, 4, 9, 8, 1, 7, 6, 6, 2, 4, 5, 5, 0, 6, 8, 9, 3, 6, 2, 7, 3, 0, 2, 6, 8, 9, 9, 6, 8, 2, 5, 0, 8, 0, 9, 7, 5, 6, 4, 5, 3, 1, 5, 5, 1, 4, 4, 9, 1, 0, 2, 3, 5, 4, 9, 3, 2, 2, 3, 9, 7, 8, 6, 7, 7, 4, 4, 8, 0, 6, 6, 2, 5, 8, 7, 6, 8, 7, 1, 7, 6, 1, 9, 2, 0, 3, 7, 1, 0, 0, 4, 5, 4, 4, 2, 9, 4, 6, 4, 5, 0, 8, 3, 9, 8, 2, 4, 9, 2, 4, 2, 6, 5, 2, 3, 5, 3, 8, 7, 6, 1, 2, 7, 9, 8, 7, 4, 8, 5, 4, 3, 1, 6, 0, 6, 6, 9, 4, 0, 4, 0, 0, 7, 8, 9, 4, 6, 7, 4, 3, 3, 7, 8, 7, 5, 7, 7, 9, 6, 1, 9, 4, 4, 1, 0, 9, 1, 2, 4, 8, 3, 1, 1, 7, 1, 7, 5, 5, 7, 1, 1, 1, 0, 0, 6, 7, 2, 3, 6, 6, 1, 4, 6, 8, 9, 7, 0, 8, 7, 8, 8, 0, 9, 0, 0, 2, 0, 5, 4, 6, 2, 3, 2, 1, 7, 5, 5, 7, 6, 3, 4, 2, 0, 1, 7, 7, 0, 5, 9, 3, 0, 6, 6, 1, 0, 2, 1, 6, 2, 4, 9, 8, 5, 4, 5, </pre>	<pre> [4, 3, 0, 1, 8, 3, 3, 8, 6, 8, 6, 6, 4, 4, 9, 4, 6, 0, 6, 5, 2, 2, 9, 9, 1, 6, 2, 8, 1, 5, 8, 6, 5, 4, 0, 9, 9, 6, 2, 8, 1, 7, 2, 6, 4, 9, 8, 1, 7, 6, 6, 2, 4, 5, 5, 0, 6, 8, 9, 3, 6, 2, 7, 3, 0, 2, 6, 8, 9, 9, 6, 8, 2, 5, 0, 8, 0, 9, 7, 5, 6, 4, 5, 3, 1, 5, 5, 1, 4, 4, 9, 1, 0, 2, 3, 5, 4, 9, 3, 2, 2, 3, 9, 7, 8, 6, 7, 7, 4, 4, 8, 0, 6, 6, 2, 5, 8, 7, 6, 8, 7, 1, 7, 6, 1, 9, 2, 0, 3, 7, 1, 0, 0, 4, 5, 4, 4, 2, 9, 4, 6, 4, 5, 0, 8, 3, 9, 8, 2, 4, 9, 2, 4, 2, 6, 5, 2, 3, 5, 3, 8, 7, 6, 1, 2, 7, 9, 8, 7, 4, 8, 5, 4, 3, 1, 6, 0, 6, 6, 9, 4, 0, 4, 0, 0, 7, 8, 9, 4, 6, 7, 4, 3, 3, 7, 8, 7, 5, 7, 7, 9, 6, 1, 9, 4, 4, 1, 0, 9, 1, 2, 4, 8, 3, 1, 1, 7, 1, 7, 5, 5, 7, 1, 1, 1, 0, 0, 6, 7, 2, 3, 6, 6, 1, 4, 6, 8, 9, 7, 0, 8, 7, 8, 8, 0, 9, 0, 0, 2, 0, 5, 4, 6, 2, 3, 2, 1, 7, 5, 5, 7, 6, 3, 4, 2, 0, 1, 7, 7, 0, 5, 9, 3, 0, 6, 6, 1, 0, 2, 1, 6, 2, 4, 9, 8, 5, 4, 5, </pre>	✓

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Test	Expected	Got
<pre> 5, 8, 3, 7, 8, 0, 6, 5, 3, 5, 9, 6, 8, 6, 6, 0, 6, 3, 8, 0, 3, 4, 9, 7, 0, 9, 0, 4, 6, 3, 6, 1, 1, 5, 8, 7, 8, 2, 1, 1, 2, 7, 1, 2, 8, 7, 5, 1, 7, 9, 3, 7, 0, 0, 3, 8, 0, 7, 9, 6, 8, 7, 4, 0, 3, 0, 5, 8, 6, 4, 2, 0, 0, 8, 0, 7, 8, 0, 2, 7, 8, 4, 0, 6, 5, 9, 2, 2, 8, 4, 5, 6, 0, 1, 5, 2, 6, 2, 3, 4, 2, 6, 7, 1, 1, 2, 7, 2, 3, 9, 2, 2, 2, 1, 6, 5, 0, 0, 8, 2, 1, 8, 9, 8, 5, 1, 2, 0, 7, 1, 7, 4, 3, 7, 7, 2, 6, 7, 2, 4, 4, 9, 3, 9, 5, 3, 0, 0, 2, 7, 4, 9, 3, 9, 9, 6, 2, 8, 0, 4, 9, 6, 3, 0, 2, 5, 2, 2, 6, 3, 6, 0, 3, 4, 3, 9, 0, 6, 4, 3, 0, 3, 5, 8, 9, 5, 6, 5, 1, 7, 0, 1, 0, 9, 7, 9, 5, 0, 3, 4, 3, 4, 1, 1, 2, 0, 1, 0, 7, 7, 5, 0, 3, 3, 7, 1, 0, 7, 4, 2, 5, 4, 9, 4, 3, 4, 9, 3, 6, 8, 6, 3, 5, 9, 5, 9, 6, 9, 7, 2, 1, 6, 5, 4, 5, 3, 8, 3, 2, 0, 1, 8, 1, 9, 4, 6, 2, 3, 6, 5, 8, 3, 5, 8, 3, 3, 1, 9, 0, 9, 1, 6, 1, 9, 2, 6, 4, 7, 6, 0, 2, 8, 0, 8, 7, 7, 4, 8, 4, 8, 5, 4, 4, 5, 9, 6, 3, 6, 1, 0, 7, 2, 8, 2, 9, 8, 7, 9, 1, 8, 4, 7, 5, 2, 1, 4, 4, 3, 2, 3, 8, 3, 0, 5, 1, 2, 4, 2, 1, 3, 9, 9, 8, 2, 2, 5, 6, 2, 4, 1, 7, 0, 1, 6, 1, 0, 9, 4, 7, 9, 9, 8, 8, 8, 9, 3, 5, 7, 7, 2, 5, 0, 3, 9, 9, 4, 2, 5, 0, 9, 9, 9, 5, 0, 7, 9, 2, 2, 6, 3, 4, 6, 1, 6, 9, 6, 6, 2, 0, 8, 0, 7, 0, 7, 8, 7, 0, 2, 8, 6, 0, 4, 8, 6, 7, 8, 0, 2, 5, 0, 2, 5, 4, 4, 8, 2, 7, 9, 8, 1, 2, 4, 5, 4, 5, 6, 7, 6, 2, 0, 2, 5, 9, 5, 0, 5, 4, 3, 6, 2, 5, 0, 4, 5, 9, 7, 4, 4, 5, 0, 3, 7, 5, 4, 5, 0, 0, 5, 2, 0, 8, 0, 3, 5, 2, 9, 8, 5, 6, 3, 0, 3, 5, 6, 2, 2, 8, 1, 4, 9, 8, 8, 7, 7, 1, 4, 8, 2, 1, 3, 9, 8, 8, 0, 5, 0, 5, 2, 4, 0, 4, 6, 0, 8, 5, 7, 2, 9, 6, 4, 2, 0, 0, 7, 7, 1, 2, 4, 4, 3, 6, 2, 0, 2, 9, 8, 0, 8, 0, 2, 2, 5, 3, 2, 2, 8, 5, 7, 5, 5, 7, 4, 2, 4, 2, 9, 4, 1, 4, 1, 8, 8, 4, 1, 0, 3, 4, 0, 5, 8, 8, 4, 4, 2, 7, 0, 3, 1, 3, 3, 1, 4, 4, 1, 7, 4, 9, 3, 2, 3, 7, 0, 8, 1, 9, 7, 2, 1, 9, 3, 7, 6, 0, 5, 1, 4}; int k = 5555; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> 1, 0, 2, 2, 6, 7, 9, 0, 7, 0, 5, 0, 4, 0, 1, 4, 0, 1, 0, 9, 9, 9, 1, 9, 7, 1, 5, 9, 2, 9, 9, 7, 0, 6, 0, 5, 5, 9, 7, 6, 4, 0, 4, 4, 4, 1, 5, 6, 9, 3, 1, 8, 3, 0, 0, 4, 5, 6, 3, 6, 9, 2, 1, 0, 4, 6, 3, 6, 5, 9, 0, 5, 5, 8, 4, 0, 2, 4, 3, 5, 2, 9, 3, 9, 9, 6, 4, 1, 1, 2, 9, 1, 8, 4, 3, 9, 7, 6, 9, 4, 3, 5, 3, 7, 0, 7, 7, 9, 4, 8, 7, 5, 7, 2, 6, 1, 6, 6, 2, 2, 2, 6, 4, 5, 1, 4, 5, 6, 5, 7, 5, 5, 9, 7, 8, 6, 1, 1, 8, 1, 2, 8, 9, 4, 8, 3, 0, 6, 9, 1, 6, 7, 7, 1, 6, 6, 6, 7, 4, 3, 2, 9, 2, 5, 5, 8, 9, 4, 7, 5, 0, 1, 9, 2, 0, 0, 8, 9, 0, 8, 7, 8, 3, 6, 6, 2, 6, 5, 2, 0, 5, 6, 1, 9, 2, 1, 7, 2, 7, 1, 6, 5, 4, 3, 1, 0, 3, 4, 1, 1, 3, 4, 9, 8, 1, 6, 9, 4, 7, 1, 8, 4, 4, 9, 4, 3, 4, 0, 6, 0, 5, 9, 4, 4, 2, 8, 4, 3, 5, 8, 7, 4, 1, 7, 4, 6, 3, 1, 5, 6, 4, 2, 6, 4, 6, 1, 1, 2, 3, 4, 5, 6, 5, 3, 8, 1, 8, 8, 9, 5, 4, 3, 3, 5, 4, 3, 7, 7, 0, 2, 8, 2, 5, 0, 4, 1, 6, 0, 9, 5, 5, 6, 3, 8, 4, 9, 8, 8, 0, 9, 6, 3, 8, 8, 2, 4, 1, 5, 2, 1, 2, 3, 4, 1, 2, 9, 4, 8, 6, 6, 9, 9, 0, 8, 5, 8, 5, 0, 2, 4, 8, 8, 6, 4, 9, 5, 5, 8, 9, 1, 5, 7, 8, 5, 5, 4, 0, 3, 3, 2, 2, 3, 5, 1, 1, 6, 4, 4, 9, 3, 7, 3, 6, 0, 9, 3, 3, 4, 4, 7, 9, 9, 8, 0, 1, 2, 4, 6, 6, 1, 9, 7, 5, 3, 1, 6, 3, 6, 3, 3, 8, 1, 3, 4, 7, 9, 7, 3, 4, 3, 7, 1, 4, 9, 8, 3, 6, 2, 2, 8, 9, 5, 6, 6, 6, 2, 2, 9, 5, 8, 3, 2, 0, 9, 1, 9, 4, 4, 1, 7, 6, 4, 0, 1, 4, 3, 8, 7, 1, 4, 1, 4, 1, 0, 1, 0, 4, 6, 0, 8, 6, 0, 5, 8, 8, 9, 9, 7, 6, 7, 5, 8, 3, 2, 3, 2, 7, 3, 8, 3, 6, 2, 3, 3, 1, 4, 3, 4, 1, 5, 5, 8, 0, 2, 1, 5, 7, 0, 7, 1, 9, 2, 6, 6, 7, 6, 9, 0, 6, 3, 0, 0, 8, 1, 2, 5, 4, 2, 6, 5, 3, 8, 5, 8, 3, 0, 9, 8, 0, 1, 4, 4, 7, 9, 4, 2, 9, 6, 2, 3, 4, 4, 4, 5, 0, 1, 7, 9, 2, 6, 0, 4, 2, 5, 1, 3, 6, 9, 6, 8, 9, 0, 2, 5, 5, 8, 3, 2, 4, 9, 2, 4, 6, 8, 1, 9, 4, 9, 5, 5, 7, 4, 3, 2, 4, 1, 8, 0, 2, 3, 8, 0, 1, 6, 3, 6, 2, 5, 6, 0, 3, 1, 7, 7, 4, 6, 5, 6, 3, 7, 1, 4, 0, 9, 3, 2, 7, 3, 1, 2, 3, 7, 9, 5, 4, 1, 6, 6, 5, 6, 7, 7, 2, 4, 6, 9, 8, 1, 6, 3, 8, 5, 2, 9, 8, 5, 8, 5, 7, 1, 5, 0, 0, 8, 2, 1, 9, 7, 2, 9, 3, 7, 6, 2, 5, 2, 7, 3, 4, 3, 7, 5, 3, 9, 9, 9, 3, 7, 6, 5, 6, 9, 9, 2, 0, 8, 1, 9, 1, 8, 8, 8, 6, 9, 2, 3, 3, 5, 2, 8, 0, 0, 3, 5, 5, 1, 3, 3, 2, 1, 7, 7, 2, 2, 0, 5, 9, 5, 6, 7, 8, 5, 9, 5, 8, 6, 7, 0, 9, 9, 6, 3, 8, 1, 4, 8, 7, 2, 1, 1, 2, 0, 3, 6, 7, 3, 5, 9, 2, 2, 2, 2, 7, 8, 2, 5, 8, 8, 7, 0, 0, 3, 4, 1, 5, 9, 6, 3, 7, 6, 6, 8, 1, 8, 0, 3, 1, 2, 9, 6, 0, 2, 2, 2, 4, 0, 0, 5, 1, 1, </pre>	<pre> 1, 0, 2, 2, 6, 7, 9, 0, 7, 0, 5, 0, 4, 0, 1, 4, 0, 1, 0, 9, 9, 9, 1, 9, 7, 1, 5, 9, 2, 9, 9, 7, 0, 6, 0, 5, 5, 9, 7, 6, 4, 0, 4, 4, 4, 1, 5, 6, 9, 3, 1, 8, 3, 0, 0, 4, 5, 6, 3, 6, 9, 2, 1, 0, 4, 6, 3, 6, 5, 9, 0, 5, 5, 8, 4, 0, 2, 4, 3, 5, 2, 9, 3, 9, 9, 6, 4, 1, 1, 2, 9, 1, 8, 4, 3, 9, 7, 6, 9, 4, 3, 5, 3, 7, 0, 7, 7, 9, 4, 8, 7, 5, 7, 2, 6, 1, 6, 6, 2, 2, 2, 6, 4, 5, 1, 4, 5, 6, 5, 7, 5, 5, 9, 7, 8, 6, 1, 1, 8, 1, 2, 8, 9, 4, 8, 3, 0, 6, 9, 1, 6, 7, 7, 1, 6, 6, 6, 7, 4, 3, 2, 9, 2, 5, 5, 8, 9, 4, 7, 5, 0, 1, 9, 2, 0, 0, 8, 9, 0, 8, 7, 8, 3, 6, 6, 2, 6, 5, 2, 0, 5, 6, 1, 9, 2, 1, 7, 2, 7, 1, 6, 5, 4, 3, 1, 0, 3, 4, 1, 1, 3, 4, 9, 8, 1, 6, 9, 4, 7, 1, 8, 4, 4, 9, 4, 3, 4, 0, 6, 0, 5, 9, 4, 4, 2, 8, 4, 3, 5, 8, 7, 4, 1, 7, 4, 6, 3, 1, 5, 6, 4, 2, 6, 4, 6, 1, 1, 2, 3, 4, 5, 6, 5, 3, 8, 1, 8, 8, 9, 5, 4, 3, 3, 5, 4, 3, 7, 7, 0, 2, 8, 2, 5, 0, 4, 1, 6, 0, 9, 5, 5, 6, 3, 8, 4, 9, 8, 8, 0, 9, 6, 3, 8, 8, 2, 4, 1, 5, 2, 1, 2, 3, 4, 1, 2, 9, 4, 8, 6, 6, 9, 9, 0, 8, 5, 8, 5, 0, 2, 4, 8, 8, 6, 4, 9, 5, 5, 8, 9, 1, 5, 7, 8, 5, 5, 4, 0, 3, 3, 2, 2, 3, 5, 1, 1, 6, 4, 4, 9, 3, 7, 3, 6, 0, 9, 3, 3, 4, 4, 7, 9, 9, 8, 0, 1, 2, 4, 6, 6, 1, 9, 7, 5, 3, 1, 6, 3, 6, 3, 3, 8, 1, 3, 4, 7, 9, 7, 3, 4, 3, 7, 1, 4, 9, 8, 3, 6, 2, 2, 8, 9, 5, 6, 6, 6, 2, 2, 9, 5, 8, 3, 2, 0, 9, 1, 9, 4, 4, 1, 7, 6, 4, 0, 1, 4, 3, 8, 7, 1, 4, 1, 4, 1, 0, 1, 0, 4, 6, 0, 8, 6, 0, 5, 8, 8, 9, 9, 7, 6, 7, 5, 8, 3, 2, 3, 2, 7, 3, 8, 3, 6, 2, 3, 3, 1, 4, 3, 4, 1, 5, 5, 8, 0, 2, 1, 5, 7, 0, 7, 1, 9, 2, 6, 6, 7, 6, 9, 0, 6, 3, 0, 0, 8, 1, 2, 5, 4, 2, 6, 5, 3, 8, 5, 8, 3, 0, 9, 8, 0, 1, 4, 4, 7, 9, 4, 2, 9, 6, 2, 3, 4, 4, 4, 5, 0, 1, 7, 9, 2, 6, 0, 4, 2, 5, 1, 3, 6, 9, 6, 8, 9, 0, 2, 5, 5, 8, 3, 2, 4, 9, 2, 4, 6, 8, 1, 9, 4, 9, 5, 5, 7, 4, 3, 2, 4, 1, 8, 0, 2, 3, 8, 0, 1, 6, 3, 6, 2, 5, 6, 0, 3, 1, 7, 7, 4, 6, 5, 6, 3, 7, 1, 4, 0, 9, 3, 2, 7, 3, 1, 2, 3, 7, 9, 5, 4, 1, 6, 6, 5, 6, 7, 7, 2, 4, 6, 9, 8, 1, 6, 3, 8, 5, 2, 9, 8, 5, 8, 5, 7, 1, 5, 0, 0, 8, 2, 1, 9, 7, 2, 9, 3, 7, 6, 2, 5, 2, 7, 3, 4, 3, 7, 5, 3, 9, 9, 9, 3, 7, 6, 5, 6, 9, 9, 2, 0, 8, 1, 9, 1, 8, 8, 8, 6, 9, 2, 3, 3, 5, 2, 8, 0, 0, 3, 5, 5, 1, 3, 3, 2, 1, 7, 7, 2, 2, 0, 5, 9, 5, 6, 7, 8, 5, 9, 5, 8, 6, 7, 0, 9, 9, 6, 3, 8, 1, 4, 8, 7, 2, 1, 1, 2, 0, 3, 6, 7, 3, 5, 9, 2, 2, 2, 2, 7, 8, 2, 5, 8, 8, 7, 0, 0, 3, 4, 1, 5, 9, 6, 3, 7, 6, 6, 8, 1, 8, 0, 3, 1, 2, 9, 6, 0, 2, 2, 2, 4, 0, 0, 5, 1, 1, </pre>

Test	Expected	Got
	3, 3, 8, 3, 4, 7, 6, 0, 3, 3, 4, 8, 4, 0, 8, 1, 1, 3, 4, 8, 4, 3, 1, 5, 2, 2, 4, 0, 2, 9, 5, 7, 7, 2, 1, 0, 6, 9, 6]	3, 3, 8, 3, 4, 7, 6, 0, 3, 3, 4, 8, 4, 0, 8, 1, 1, 3, 4, 8, 4, 3, 1, 5, 2, 2, 4, 0, 2, 9, 5, 7, 7, 2, 1, 0, 6, 9, 6]

Passed all tests! 

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

- Class LinkedList is used to represent single linked list, described as the following:

```
class LinkedList {
    public:
        class Node;
    private:
        Node* head;
        Node* tail;
        int size;
    public:
        class Node {
            private:
                int value;
                Node* next;
                friend class LinkedList;
            public:
                Node() {
                    this->next = NULL;
                }
                Node(Node* node) {
                    this->value = node->value;
                    this->next = node->next;
                }
                Node(int value, Node* next = NULL) {
                    this->value = value;
                    this->next = next;
                }
        };
        LinkedList(): head(NULL), tail(NULL), size(0) {};
        void replace(LinkedList* linked_list, int low, int high);
};
```

- In this class; head, tail and size are the pointers of the first element, the last element and size of linked list.

- Request: Implement function 'replace(LinkedList* linked_list, int low, int high)' (low <= high and high >= 0) to delete all elements from position low to position high in the linked list (head's position is 0). After that, add linked_list to this linked list in the position after position (low - 1) (if low - 1 < 0, the head of this linked list will become the head of linked_list.

(If high >= size, delete all elements from low position to the last position of this linked list. If low < 0, delete all elements from the first position of this linked list to high position)

- Example:

+ The given linked list: 10->20->30->40->50

+ The linked_list: 55->45->42

+ low=1, high=3

In this case, delete all elements from position 1 (value 20) to position 3 (value 40). After that, add linked_list to this linked list to the position after position 0 (value 10), therefore, this linked list will become: 10->55->45->42->50 .

Note: In this exercise, library 'iostream' and 'sstream' and 'using namespace std;' has been used. You can add other functions, however, you are not allowed to add other libraries.

For example:

Test	Result
------	--------

Test	Result
<pre> LinkedList* l1 = new LinkedList(); LinkedList* l2 = new LinkedList(); l1->add(10); l1->add(20); l1->add(30); l1->add(40); l1->add(50); l2->add(55); l2->add(45); l2->add(42); l1->replace(l2, -1, 2); cout << l1->toString() << "\n"; </pre>	[55,45,42,40,50]

Answer: (penalty regime: 0 %)

Reset answer

```

1
2 void LinkedList::replace(LinkedList* linked_list, int low, int high) {
3     Node* temp = head;
4     Node* hold = nullptr;
5     if (low < 0) {
6         low = 0;
7     }
8     if (high >= size) {
9         high = size-1;
10    }
11    for (int i = 0; i < low; i++) {
12        if (i == (low - 1)) { hold = temp; } // giữ lại để lát nối với chuỗi
13        temp = temp->next;
14    }
15    Node* delete_node = temp; //delete các node
16    //cout << high << endl;
17    for (int i = low; i <= high; i++) {
18        //cout << i << endl;
19        temp = temp->next; //dời node trc khi xóa
20        delete delete_node;
21        delete_node = temp;
22    }
23    if (linked_list != nullptr && linked_list->head != nullptr) {
24        if (hold != nullptr) hold->next = linked_list->head; //nối chuỗi
25        else head = linked_list->head; //nếu ko có hold tức là xóa từ head trở đi nên ta sẽ cho head=linked_l
26        linked_list->tail->next = temp; //nối phần đuôi linked_list với phần còn lại node
27        if (linked_list->tail->next == nullptr) {
28            tail = linked_list->tail; //update cái tail
29        }
30        else {
31            while (temp->next != nullptr) {
32                temp = temp->next;
33            }
34            tail = temp; //update cái tail
35        }
36    }
37    else { //nếu linked_list là nullptr hoặc linked_head là nullptr thì chạy phần này
38        if (hold != nullptr) hold->next = temp;
39        else head = temp;
40    }
41 }

```

Test	Expected	Got	
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	Test	Expected	Got	
✓	<pre>LinkedList* l1 = new LinkedList(); LinkedList* l2 = new LinkedList(); l1->add(10); l1->add(20); l1->add(30); l1->add(40); l1->add(50); l2->add(55); l2->add(45); l2->add(42); l1->replace(12, -1, 2); cout << l1->toString() << "\n";</pre>	[55,45,42,40,50]	[55,45,42,40,50]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

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