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Marks 8.20/9.00

Grade **9.11** out of 10.00 (**91.11%**)

Question 1

Correct

Mark 1.00 out of 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>	<code>[2, 4, 1]</code>

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

Reset answer

```
1 ▾ LLNode* addLinkedList(LLNode* l0, LLNode* l1) {  
2     LLNode* dummy = new LLNode();  
3     LLNode* curr = dummy;  
4     int carry = 0;  
5     while (l0 || l1 || carry) {  
6         int sum = carry;  
7         if (l0) {  
8             sum += l0->val;  
9             l0 = l0->next;  
10        }  
11        if (l1) {  
12            sum += l1->val;  
13            l1 = l1->next;  
14        }  
15        carry = sum / 10;  
16        curr->next = new LLNode(sum % 10);  
17        curr = curr->next;
```

```
18     }
19     return dummy->next;
20 }
```

	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! ✓

Correct

Marks for this submission: 1.00/1.00.

Question 2

Correct

Mark 1.00 out of 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 {
3     // Check if the coefficient is non-zero
4     if (term.coeff != 0)
5     {
6         int i = 0;
7         SLinkedList<Term>::Iterator it;
8         bool termInserted = false; // Flag to track if the term has been inserted
9
10        // Iterate through the list to find the correct position to insert
11        for (it = this->terms->begin(); it != this->terms->end(); it++)
12        {
13            if (term.exp > (*it).exp)
14            {
15                this->terms->add(i, term); // Insert before the current element
16                termInserted = true;
17                break;
18            }
19        }
20        else if (term.exp == (*it).exp)
21        {
22            // If terms have the same exponent, add their coefficients
23            double newCoeff = term.coeff + (*it).coeff;
24
25            // Check if the sum of coefficients is non-zero
26            if (newCoeff != 0)
27            {
28                Term newTerm(newCoeff, term.exp);
29                this->terms->set(i, newTerm); // Update the current element
30            }
31            else
32            {
33                this->terms->removeAt(i); // Remove the current element
34            }
35
36            termInserted = true;
37            break;
38        }
39        i++;
40    }
41
42    if (!termInserted)
43    {
44        // If term has the lowest exponent, add it to the end of the list
45    }
46}
```

```

46     }
47 }
48 }
49
50
51 void Polynomial::insertTerm(double coeff, int exp)
52 {
53     Term term(coeff, exp);
54     this->insertTerm(term);
55 }
```

	Test	Expected	Got	
✓	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();	[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]	[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]	✓
✓	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();	[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]	[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Question 3

Partially correct

Mark 0.80 out of 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

```
95     Get data stored in current node
96     * Exception: throw std::out_of_range("Segmentation fault!") if current is NULL
97 */
98 if (current == NULL){
99     throw std::out_of_range("Segmentation fault!");
100 }else{
101     return current->data;
102 }
103 }
104 }

105

106 template <class T>
107 bool SLinkedList<T>::Iterator::operator!=(const Iterator &iterator)
108 {
109     /*
110         Operator not equals
111         * Returns false if two iterators points the same node and index
112     */
113 }
```

```

113     if (this->pList == iterator.pList && this->current == iterator.current && this->index == iterator.index)
114         return true;
115     return false;
116 }
117 // Prefix ++ overload
118 template <class T>
119 typename SLinkedList<T>::Iterator &SLinkedList<T>::Iterator::operator++()
120 {
121     /*
122     Prefix ++ overload
123     * Set current to the next node
124     * If iterator corresponds to the previous "node" of head, set it to head
125     * Exception: throw std::out_of_range("Segmentation fault!") if iterator corresponds to the end
126     */
127     if (this->current == nullptr)
128         throw std::out_of_range("");
129     current = current->next;
130     index++;
131     if (current == nullptr)
132         current = pList->head;
133     return *this;
134 }
135 // Postfix ++ overload
136 template <class T>
137 typename SLinkedList<T>::Iterator SLinkedList<T>::Iterator::operator++(int)
138 {
139     /*
140     Postfix ++ overload
141     * Set current to the next node
142     * If iterator corresponds to the previous "node" of head, set it to head
143     * Exception: throw std::out_of_range("Segmentation fault!") if iterator corresponds to the end
144     */
145     Iterator it = *this;
146
147     if (this->current == nullptr && index == pList->size())
148         throw std::out_of_range("");
149     if (current == nullptr && index == -1)
150         current = pList->head;
151     else
152         current = current->next;
153     index++;
154     return it;
155 }

```

	Test	Got	
✓	<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>	✓	✓

Test	Got
✓ <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>	✓

Your code failed one or more hidden tests.

Partially correct

Marks for this submission: 0.80/1.00.

Question 4

Partially correct

Mark 0.40 out of 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](#)

```

24         Smaller->head = newNode;
25         Smaller->tail = newNode;
26     }
27     else
28     {
29         Smaller->tail->next = newNode;
30         Smaller->tail = newNode;
31     }
32 }
33 else if (temp->value == k)
34 {
35     Node *newNode = new Node(temp->value);
36     if (Equal->head == NULL)
37     {
38         Equal->head = newNode;
39         Equal->tail = newNode;
40     }
41     else
42     {
43         Equal->tail->next = newNode;
44         Equal->tail = newNode;
45     }
46 }
47 else
48 {
49     Node *newNode = new Node(temp->value);
50     if (Larger->head == NULL)
51     {
52         Larger->head = newNode;
53         Larger->tail = newNode;
54     }
55     else
56     {
57         Larger->tail->next = newNode;
58         Larger->tail = newNode;
59     }
60 }
61 temp = temp->next;
62 }
63 if (Smaller->head != nullptr && Equal->head != nullptr && Larger->head != nullptr)
64 {
65     Smaller->tail->next = Equal->head;
66     Equal->tail->next = Larger->head;
67     head = Smaller->head;
68     tail = Larger->tail;
69 }
70 else if (Smaller->head == nullptr && Equal->head != nullptr && Larger->head != nullptr)
71 {
72     Equal->tail->next = Larger->head;
73     head = Equal->head;
74     tail = Larger->tail;
75 }
76 else if (Smaller->head != nullptr && Equal->head == nullptr && Larger->head != nullptr)
77 {
78     Smaller->tail->next = Larger->head;
79     head = Smaller->head;
80     tail = Larger->tail;
81 }
82 else if (Smaller->head != nullptr && Equal->head != nullptr && Larger->head == nullptr)
83 {

```

```

84     Smaller->tail->next = Equal->head;
85     head = Smaller->head;
86     tail = Equal->tail;
87 }
88 else if (Smaller->head == nullptr && Equal->head == nullptr && Larger->head != nullptr)
89 {
90     head = Larger->head;
91     tail = Larger->tail;
92 }
93 else
94 {
95     head = tail = nullptr;
96 }
97 };

```

	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]	✓

Testing was aborted due to error.

[Hide differences](#)

Partially correct

Marks for this submission: 0.40/1.00.

Question 5

Correct

Mark 1.00 out of 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
<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]
<pre>SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(0, index); } cout << list.toString();</pre>	[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     Node *newNode = new Node(e);
5     if (head == NULL) {
6         head = newNode;
7         tail = newNode;
8     } else {
9         tail->next = newNode;
10        tail = newNode;
11    }
12    count++;
13 }
14
15 template<class T>
16 void SLinkedList<T>::add(int index, const T& e) {
17     /* Insert an element into the list at given index. */
18     if (index < 0 || index > count) {
19         throw std::out_of_range("Index out of range");
20     }
21     if (index == count) {
22         add(e);
23         return;
24     }
25     Node *newNode = new Node(e);
26     if (index == 0) {
27         newNode->next = head;
28         head = newNode;
29     } else {
30         Node *prev = head;
31         for (int i = 0; i < index - 1; i++) {
32             prev = prev->next;
33         }
34         newNode->next = prev->next;
35         prev->next = newNode;
36     }
37     count++;
38 }
39
40 template<class T>
41 int SLinkedList<T>::size() {
42     /* Return the length (size) of list */
43     return count;
44 }
```

	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! ✓

Correct

Marks for this submission: 1.00/1.00.

Question 6

Correct

Mark 1.00 out of 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
<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 < 0 || index >= count) {
5         throw std::out_of_range("Index out of range");
6     }
7     Node *current = head;
8     for (int i = 0; i < index; i++) {
9         current = current->next;
10    }
11    return current->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 < 0 || index >= count) {
18         throw std::out_of_range("Index out of range");
19     }
20     Node *current = head;
21     for (int i = 0; i < index; i++) {
22         current = current->next;
23     }
24     current->data = e;
25 }
26
27 template<class T>
28 bool SLinkedList<T>::empty() {
29     /* Check if the list is empty or not. */
30     return count == 0;
31 }
32
33 template<class T>
34 int SLinkedList<T>::indexOf(const T& item) {
35     /* Return the first index wheter item appears in list, otherwise return -1 */
36     Node *current = head;
37     for (int i = 0; i < count; i++) {
38         if (current->data == item) {
39             return i;
40         }
41         current = current->next;
42     }

```

```

43     return -1;
44 }
45
46 template<class T>
47 bool SLinkedList<T>::contains(const T& item) {
48     /* Check if item appears in the list */
49     return indexOf(item) != -1;
50 }

```

	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! ✓

Correct

Marks for this submission: 1.00/1.00.

Question 7

Correct

Mark 1.00 out of 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](#)

```

5 ▾    if (index < 0 || index >= count) {
6        throw std::out_of_range("Index out of range");
7    }
8    Node *current = head;
9    Node *prev = NULL;
10   ▾ for (int i = 0; i < index; i++) {
11        prev = current;
12        current = current->next;
13    }
14    T removedValue = current->data;
15   ▾ if (prev == NULL) {
16        head = current->next;
17    } else {
18        prev->next = current->next;
19    }
20   ▾ if (current == tail) {
21        tail = prev;
22    }
23    delete current;
24    count--;
25    return removedValue;
26 }
27
28 template <class T>
29 bool SLinkedList<T>::removeItem(const T& item)
30 {
31    /* Remove the first appearance of item in list and return true, otherwise return false */
32    Node *current = head;
33    Node *prev = NULL;
34   ▾ while (current != NULL) {
35        if (current->data == item) {
36            if (prev == NULL) {
37                head = current->next;
38            } else {
39                prev->next = current->next;
40            }
41            if (current == tail) {
42                tail = prev;
43            }
44            delete current;
45            count--;
46            return true;
47        }
48        prev = current;
49        current = current->next;
50    }
51    return false;

```

```

52 }
53
54 template<class T>
55 void SLinkedList<T>::clear(){
56     /* Remove all elements in list */
57     Node *current = head;
58     while (current != NULL) {
59         Node *next = current->next;
60         delete current;
61         current = next;
62     }
63     head = NULL;
64     tail = NULL;
65     count = 0;
66 }
```

	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! ✓

Correct

Marks for this submission: 1.00/1.00.

Question 8

Correct

Mark 1.00 out of 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
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();	[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* reverseLinkedList(LLNode* head) {
2     LLNode* prev = nullptr;
3     LLNode* curr = head;
4     while (curr != nullptr) {
5         LLNode* next = curr->next;
6         curr->next = prev;
7         prev = curr;
8         curr = next;
9     }
10    return prev;
11 }
```

	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>	[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]	[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]	✓
✓	<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>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>	[31, 22, 46, 152, 14, 87, 196, 97, 5, 93] [93, 5, 97, 196, 87, 14, 152, 46, 22, 31]	[31, 22, 46, 152, 14, 87, 196, 97, 5, 93] [93, 5, 97, 196, 87, 14, 152, 46, 22, 31]	✓
✓	<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>	[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]	[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]	✓

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>	✓

Test	Expected	Got	
<pre> ✓ int arr[] = {106, 14, 71, 71, 166, 172, 128, 128, 52, 113, 58, 184, 70, 73, 37, 83, 71, 46, 133, 100, 37, 186, 199, 69, 79, 71, 70, 13, 155, 90, 60, 82, 180, 125, 108, 160, 74, 93, 72, 152, 106, 11, 174, 164, 168, 6, 9, 41, 58, 65, 141, 22, 103, 49, 114, 197, 175, 131, 109, 135, 124, 19, 76, 109, 130, 15, 120, 12, 11, 77, 88, 56, 127, 162, 67, 133, 162, 22, 94, 122, 53, 132, 167, 111, 138, 61, 169, 64, 98, 159, 58, 147, 137, 50, 193, 190, 173, 28, 35, 108, 138, 110, 184, 82, 114, 199, 137, 156, 155, 167, 165, 134, 193, 22, 173, 176, 46, 61, 196, 137, 151, 69, 67, 87, 161, 72, 60, 70, 67, 109, 149, 16, 38, 127, 15, 12, 107, 48, 184, 185, 43, 178, 14, 188, 61, 79, 189, 144, 27, 41, 114, 182, 118, 76, 89, 126, 124, 195, 180, 133, 118, 96, 61, 95, 127, 40, 62, 102, 130, 174, 47, 131, 187, 103, 88, 109, 153, 110, 184, 72, 178, 41, 93, 112, 24, 156, 180, 150, 114, 172, 43, 170, 46, 166, 109, 193, 13, 17, 190, 153, 80, 106, 199, 163, 106, 39, 85, 56, 174, 189, 61, 72, 154, 149, 59, 110, 139, 189, 99, 40, 84, 180, 23, 13, 9, 192, 163, 88, 1, 3, 149, 132, 36, 34, 120, 40, 48, 32, 91, 166, 42, 155, 30, 111, 140, 6, 189, 169, 50, 15, 144, 67, 145, 169, 49, 135, 49, 76, 0, 105, 90, 60, 75, 88, 150, 88, 122, 11, 158, 12, 43, 182, 152, 112, 65, 149, 14, 194, 146, 120, 114, 178, 177, 159, 105, 45, 169, 152, 150, 60, 99, 39, 73, 101, 162, 173, 127, 122, 157, 116, 139, 57, 101, 121, 45, 133, 151, 171, 186, 186, 116, 4, 173, 118, 103, 70, 133, 158, 119, 47, 142, 111, 110, 110, 96, 68, 118, 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}; 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> [106, 14, 71, 71, 166, 172, 128, 128, 52, 113, 58, 184, 70, 73, 37, 83, 71, 46, 133, 100, 37, 186, 199, 69, 79, 71, 70, 13, 155, 90, 60, 82, 180, 125, 108, 160, 74, 93, 72, 152, 106, 11, 174, 164, 168, 6, 9, 41, 58, 65, 141, 22, 103, 49, 114, 197, 175, 131, 109, 135, 124, 19, 76, 109, 130, 15, 120, 12, 11, 77, 88, 56, 127, 162, 67, 133, 162, 22, 94, 122, 53, 132, 167, 111, 138, 61, 169, 64, 98, 159, 58, 147, 137, 50, 193, 190, 173, 28, 35, 108, 138, 110, 184, 82, 114, 199, 137, 156, 155, 167, 156, 155, 167, 165, 134, 193, 22, 173, 176, 46, 61, 196, 137, 151, 69, 67, 87, 161, 72, 60, 70, 67, 109, 149, 16, 38, 127, 15, 12, 107, 48, 184, 185, 43, 178, 14, 188, 61, 79, 189, 144, 27, 41, 114, 182, 118, 76, 89, 126, 124, 195, 180, 133, 118, 96, 61, 95, 127, 40, 62, 102, 130, 174, 47, 131, 187, 103, 88, 109, 153, 110, 184, 72, 178, 41, 93, 112, 24, 156, 180, 150, 114, 172, 43, 170, 46, 166, 109, 193, 13, 17, 190, 153, 80, 106, 199, 163, 106, 39, 85, 56, 174, 189, 61, 72, 154, 149, 59, 110, 139, 189, 99, 40, 84, 180, 23, 13, 9, 192, 163, 88, 1, 3, 149, 132, 36, 34, 120, 40, 48, 32, 91, 166, 42, 155, 30, 111, 140, 6, 189, 169, 50, 15, 144, 67, 145, 169, 49, 135, 49, 76, 0, 105, 90, 60, 75, 88, 150, 88, 122, 11, 158, 12, 43, 182, 152, 112, 65, 149, 14, 194, 146, 120, 114, 178, 177, 159, 105, 45, 133, 151, 171, 186, 186, 116, 4, 173, 118, 103, 70, 133, 158, 119, 47, 142, 111, 110, 96, 68, 118, 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}; 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> [106, 14, 71, 71, 166, 172, 128, 128, 52, 113, 58, 184, 70, 73, 37, 83, 71, 46, 133, 100, 37, 186, 199, 69, 79, 71, 70, 13, 155, 90, 60, 82, 180, 125, 108, 160, 74, 93, 72, 152, 106, 11, 174, 164, 168, 6, 9, 41, 58, 65, 141, 22, 103, 49, 114, 197, 175, 131, 109, 135, 124, 19, 76, 109, 130, 15, 120, 12, 11, 77, 88, 56, 127, 162, 67, 133, 162, 22, 94, 122, 53, 132, 167, 111, 138, 61, 169, 64, 98, 159, 58, 147, 137, 50, 193, 190, 173, 28, 35, 108, 138, 110, 184, 82, 114, 199, 137, 156, 155, 167, 156, 155, 167, 165, 134, 193, 22, 173, 176, 46, 61, 196, 137, 151, 69, 67, 87, 161, 72, 60, 70, 67, 109, 149, 16, 38, 127, 15, 12, 107, 48, 184, 185, 43, 178, 14, 188, 61, 79, 189, 144, 27, 41, 114, 182, 118, 76, 89, 126, 124, 195, 180, 133, 118, 96, 61, 95, 127, 40, 62, 102, 130, 174, 47, 131, 187, 103, 88, 109, 153, 110, 184, 72, 178, 41, 93, 112, 24, 156, 180, 150, 114, 172, 43, 170, 46, 166, 109, 193, 13, 17, 190, 153, 80, 106, 199, 163, 106, 39, 85, 56, 174, 189, 61, 72, 154, 149, 59, 110, 139, 189, 99, 40, 84, 180, 23, 13, 9, 192, 163, 88, 1, 3, 149, 132, 36, 34, 120, 40, 48, 32, 91, 166, 42, 155, 30, 111, 140, 6, 189, 169, 50, 15, 144, 67, 145, 169, 49, 135, 49, 76, 0, 105, 90, 60, 75, 88, 150, 88, 122, 11, 158, 12, 43, 182, 152, 112, 65, 149, 14, 194, 146, 120, 114, 178, 177, 159, 105, 45, 133, 151, 171, 186, 186, 116, 4, 173, 118, 103, 70, 133, 158, 119, 47, 142, 111, 110, 96, 68, 118, 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}; 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>	✓

Test	Expected	Got	
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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> 134, 107, 181, 177, 141, 147, 136, 52, 107, 30, 37, 157, 174, 108, 90, 187, 13, 125, 172, 7, 13, 48, 52, 198, 177, 26, 9, 34, 56, 91, 166, 187, 130, 55, 94, 178, 10, 1 ...snip... , 10, 178, 94, 55, 130, 187, 166, 91, 56, 34, 9, 26, 177, 198, 52, 48, 13, 7, 172, 125, 13, 187, 90, 108, 174, 157, 37, 30, 107, 52, 136, 147, 141, 177, 181, 107, 134, 164, 34, 176, 46, 168, 75, 167, 181, 44, 136, 111, 106, 12, 89, 90, 131, 104, 38, 11, 6, 148, 107, 135, 119, 81, 20, 71, 67, 67, 173, 54, 108, 99, 134, 183, 158, 175, 61, 97, 49, 167, 11, 87, 159, 49, 99, 18, 0, 128, 40, 160, 132, 97, 14, 65, 185, 120, 195, 160, 38, 170, 79, 88, 174, 114, 42, 169, 32, 136, 5, 186, 94, 31, 156, 95, 45, 199, 122, 93, 172, 12, 157, 180, 0, 93, 131, 165, 136, 16, 149, 86, 52, 20, 66, 122, 82, 160, 143, 29, 60, 179, 149, 87, 100, 68, 132, 32, 58, 52, 111, 92, 103, 138, 199, 39, 82, 134, 92, 171, 75, 16, 112, 32, 29, 171, 198, 60, 90, 53, 68, 36, 121, 112, 93, 51, 155, 7, 41, 97, 142, 122, 41, 14, 185, 91, 149, 144, 97, 5, 96, 74, 107, 98, 62, 150, 179, 53, 100, 61, 92, 8, 193, 165, 17, 96, 196, 180, 114, 110, 101, 67, 35, 64, 184, 148, 145, 119, 7, 176, 191, 75, 167, 59, 40, 109, 86, 105, 125, 20, 91, 46, 185, 11, 103, 137, 130, 169, 146, 170, 139, 2, 104, 157, 119, 85, 109, 142, 185, 71, 150, 158, 122, 190, 26, 133, 186, 89, 17, 33, 114, 135, 19, 23, 0, 173, 28, 176, 133, 125, 63, 174, 124, 12, 57, 24, 3, 11, 174, 99, 167, 193, 129, 51, 42, 184, 152, 193, 192, 182, 166, 77, 147, 45, 61, 159, 75, 6, 83, 81, 186, 98, 92, 136, 38, 130, 40, 132, 111, 145, 174, 84, 100, 199, 176, 126, 185, 199, 57, 94, 12, 164, 189, 22, 8, 48, 120, 110, 48, 158, 17, 61, 64, 146, 72, 55, 81, 182, 149, 184, 91, 175, 122, 144, 23, 63, 4, 160, 174, 69, 78, 117, 28, 139, 118, 59, 169, 87, 60, 157, 64, 37, 32, 27, 169, 4, 139, 188, 92, 23, 192, 60, 39, 5, 68, 160, 82, 99, 132, 105, 80, 169, 46, 198, 169, 115, 2, 53, </pre>	<pre> 134, 107, 181, 177, 141, 147, 136, 52, 107, 30, 37, 157, 174, 108, 90, 187, 13, 125, 172, 7, 13, 48, 52, 198, 177, 26, 9, 34, 56, 91, 166, 187, 130, 55, 94, 178, 10, 1 ...snip... , 10, 178, 94, 55, 130, 187, 166, 91, 56, 34, 9, 26, 177, 198, 52, 48, 13, 7, 172, 125, 13, 187, 90, 108, 174, 157, 37, 30, 107, 52, 136, 147, 141, 177, 181, 107, 134, 164, 34, 176, 46, 168, 75, 167, 181, 44, 136, 111, 106, 12, 89, 90, 131, 104, 38, 11, 6, 148, 107, 135, 119, 81, 20, 71, 67, 67, 173, 54, 108, 99, 134, 183, 158, 175, 61, 97, 49, 167, 11, 87, 159, 49, 99, 18, 0, 128, 40, 160, 132, 97, 14, 65, 185, 120, 195, 160, 38, 170, 79, 88, 174, 114, 42, 169, 32, 136, 5, 186, 94, 31, 156, 95, 45, 199, 122, 93, 172, 12, 157, 180, 0, 93, 131, 165, 136, 16, 149, 86, 52, 20, 66, 122, 82, 160, 143, 29, 60, 179, 149, 87, 100, 68, 132, 32, 58, 52, 111, 92, 103, 138, 199, 39, 82, 134, 92, 171, 75, 16, 112, 32, 29, 171, 198, 60, 90, 53, 68, 36, 121, 112, 93, 51, 155, 7, 41, 97, 142, 122, 41, 14, 185, 91, 149, 144, 97, 5, 96, 74, 107, 98, 62, 150, 179, 53, 100, 61, 92, 8, 193, 165, 17, 96, 196, 180, 114, 110, 101, 67, 35, 64, 184, 148, 145, 119, 7, 176, 191, 75, 167, 59, 40, 109, 86, 105, 125, 20, 91, 46, 185, 11, 103, 137, 130, 169, 146, 170, 139, 2, 104, 157, 119, 85, 109, 142, 185, 71, 150, 158, 122, 190, 26, 133, 186, 89, 17, 33, 114, 135, 19, 23, 0, 173, 28, 176, 133, 125, 63, 174, 124, 12, 57, 24, 3, 11, 174, 99, 167, 193, 129, 51, 42, 184, 152, 193, 192, 182, 166, 77, 147, 45, 61, 159, 75, 6, 83, 81, 186, 98, 92, 136, 38, 130, 40, 132, 111, 145, 174, 84, 100, 199, 176, 126, 185, 199, 57, 94, 12, 164, 189, 22, 8, 48, 120, 110, 48, 158, 17, 61, 64, 146, 72, 55, 81, 182, 149, 184, 91, 175, 122, 144, 23, 63, 4, 160, 174, 69, 78, 117, 28, 139, 118, 59, 169, 87, 60, 157, 64, 37, 32, 27, 169, 4, 139, 188, 92, 23, 192, 60, 39, 5, 68, 160, 82, 99, 132, 105, 80, 169, 46, 198, 169, 115, 2, 53, </pre>	

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	157, 26, 9, 172, 99, 156, 71, 36, 83, 191, 21, 86, 17, 108, 18, 145, 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,	157, 26, 9, 172, 99, 156, 71, 36, 83, 191, 21, 86, 17, 108, 18, 145, 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,	

Test	Expected	Got	
	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]	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]	

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Question 9

Correct

Mark 1.00 out of 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     if (head == nullptr || head->next == nullptr || k == 0) {
3         return head;
4     }
5     int len = 1;
6     LLNode* tail = head;
7     while (tail->next != nullptr) {
8         len++;
9         tail = tail->next;
10    }
11    k %= len;
12    if (k == 0) {
13        return head;
14    }
15    LLNode* newTail = head;
16    for (int i = 0; i < len - k - 1; i++) {
17        newTail = newTail->next;
18    }
19    LLNode* newHead = newTail->next;
20    newTail->next = nullptr;
21    tail->next = head;
22    return newHead;
```

	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>	[2, 4, 6, 6, 3] [6, 6, 3, 2, 4]	[2, 4, 6, 6, 3] [6, 6, 3, 2, 4]	✓
✓	<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>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>	[0, 4, 2, 5, 1, 0, 6, 4, 8, 6] [6, 0, 4, 2, 5, 1, 0, 6, 4, 8]	[0, 4, 2, 5, 1, 0, 6, 4, 8, 6] [6, 0, 4, 2, 5, 1, 0, 6, 4, 8]	✓
✓	<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>	[6, 1, 3, 2, 6, 0, 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]	[6, 1, 3, 2, 6, 0, 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]	✓

Test	Expected	Got	
	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, 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]	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, 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]	

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Test	Expected	Got	
<pre> 4, 6, 9, 8, 5, 5, 5, 9, 1, 7, 8, 3, 3, 0, 8, 9, 6, 6, 2, 8, 1, 6, 1, 2, 5, 4, 7, 9, 5, 0, 6, 2, 3, 7, 7, 3, 4, 7, 6, 8, 9, 9, 0, 5, 7, 5, 0, 6, 2, 4, 4, 3, 7, 4, 1, 7, 4, 6, 8, 1, 2, 9, 9, 3, 7, 7, 6, 7, 2, 8, 5, 2, 8, 4, 2, 9, 6, 5, 4, 1, 3, 7, 8, 4, 4, 7, 0, 2, 2, 2, 0, 2, 4, 9, 5, 3, 1, 1, 1, 3, 6, 2, 3, 2, 4, 0, 3, 0, 0, 0, 9, 6, 7, 5, 6, 7, 8, 1, 9, 1, 2, 4, 2, 4, 3, 3, 1, 0, 5, 8, 6, 7, 6, 1, 4, 7, 5, 4, 4, 0, 6, 7, 1, 8, 9, 9, 8, 8, 6, 4, 6, 8, 1, 2, 2, 7, 9, 6, 8, 6, 4, 9, 2, 3, 0, 5, 7, 2, 3, 1, 9, 7, 1, 7, 0, 3, 9, 5, 7, 2, 1, 5, 6, 1, 5, 3, 8, 0, 1, 1, 0, 6, 1, 5, 1, 5, 5, 9, 8, 9, 0, 5, 5, 8, 8, 2, 6, 6, 7, 7, 9, 5, 6, 4, 2, 3, 3, 0, 5, 8, 4, 7, 1, 5, 2, 3, 4, 3, 8, 6, 4, 0, 9, 8, 3, 8, 4, 3, 7, 9, 4, 3, 1, 7, 8, 6, 5, 8, 5, 6, 4, 0, 6, 6, 2, 9, 3, 9, 8, 5, 4, 7, 3, 7, 8, 9, 7, 9, 5, 3, 2, 4, 1, 2, 2, 9, 1, 9, 0, 4, 3, 6, 1, 6, 1, 1, 5, 2, 8, 6, 0, 9, 0, 6, 9, 0, 3, 0, 9, 8, 7, 3, 3, 1, 0, 7, 2, 1, 3, 3, 7, 7, 6, 9, 1, 3, 8, 5, 6, 2, 8, 8, 3, 7, 3, 4, 7, 6, 6, 8, 5, 1, 7, 8, 1, 5, 3, 7, 9, 6, 3, 8, 4, 8, 0, 4, 7, 7, 2, 9, 2, 6, 2, 8, 7, 7, 5, 9, 4, 4, 3, 0, 6, 2, 2, 6, 5, 4, 4, 7, 8, 0, 7, 5, 8, 5, 6, 7, 2, 5, 3, 4, 6, 4, 4};</pre> <pre> int k = 1000; 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> 7, 5, 8, 5, 5, 4, 5, 2, 2, 4, 2, 0, 2, 5, 3, 1, 2, 3, 6, 8, 0, 0, 3, 4, 5, 2, 8, 6, 8, 9, 2, ...snip... 7, 8, 2, 8, 6, 3, 4, 1, 0, 2, 4, 7, 0, 2, 4, 8, 2, 6, 2, 1, 0, 5, 1, 5, 0, 6, 1, 0, 9, 8, 6, 9, 5, 7, 5, 3, 6, 0, 5, 9, 0, 9, 9, 0, 3, 0, 9, 3, 9, 6, 5, 3, 2, 8, 9, 0, 0, 7, 5, 1, 1, 2, 1, 4, 0, 2, 0, 7, 1, 4, 5, 5, 6, 2, 6, 1, 0, 4, 0, 7, 1, 3, 3, 4, 5, 0, 7, 1, 0, 9, 8, 7, 0, 0, 8, 2, 5, 3, 2, 7, 4, 9, 0, 6, 0, 7, 4, 7, 2, 8, 6, 3, 9, 7, 0, 6, 3, 9, 6, 7, 7, 4, 6, 9, 7, 5, 9, 9, 4, 8, 3, 3, 6, 6, 6, 7, 5, 4, 7, 0, 6, 2, 9, 7, 4, 2, 3, 9, 3, 9, 6, 0, 7, 8, 0, 0, 7, 9, 1, 6, 0, 7, 1, 6, 1, 0, 9, 1, 0, 9, 1, 8, 3, 6, 8, 1, 2, 8, 5, 9, 7, 1, 1, 5, 4, 5, 7, 5, 9, 4, 9, 5, 4, 2, 4, 4, 1, 1, 3, 1, 9, 8, 6, 4, 1, 2, 2, 4, 2, 9, 8, 2, 4, 9, 0, 3, 6, 1, 1, 8, 4, 2, 0, 7, 6, 7, 3, 9, 7, 0, 9, 8, 6, 0, 5, 1, 8, 0, 2, 9, 5, 5, 8, 5, 3, 9, 8, 7, 0, 4, 8, 2, 2, 6, 8, 4, 1, 4, 7, 2, 2, 1, 0, 6, 4, 8, 9, 5, 1, 0, 2, 6, 3, 9, 1, 2, 0, 1, 3, 6, 4, 7, 0, 0, 5, 6, 7, 3, 2, 6, 8, 8, 5, 4, 8, 4, 5, 0, 2, 8, 1, 2, 9, 9, 5, 1, 4, 8, 8, 1, 3, 9, 2, 8, 6, 1, 0, 8, 7, 3, 7, 3, 6, 9, 7, 1, 7, 9, 3, 3, 8, 7, 9, 1, 9, 1, 9, 4, 1, 1, 0, 3, 6, 7, 5, 3, 7, 8, 8, 1, 4, 9, 0, 3, 9, 9, 6, 4, 8, 2, 6, 7, 9, 0, 3, 9, 0, 6, 8, 9, 2, 1, 2, 5, 0, 8, 8, 4, 5, 6, 3, 7, 5, 2, 0, 0, 2, 1, 2, 4, 7, 8, 3, 0, 8, 2, 1, 4, 5, 1, 7, 6, 4, 1, 3, 5, 3, 7, 3, 9, 2, 8, 8, 0, 6, 1, 0, 2, 5, 3, 2, 1, 4, 4, 1, 6, 2, 8, 7, 2, 8, 1, 4, 7, 0, 6, 0, 5, 5, 0, 9, 6, 0, 6, 8, 6, 7, 7, 3, 9, 0, 2, 9, 0, 6, 7, 4, 7, 3, 3, 1, 1, 3, 7, 0, 3, 2, 4, 1, 6, 4, 2, 9, 3, 8, 3, 1, 3, 4, 8, 4, 3, 6, 3, 4, 6, 7, 8, 3, 0, 7, 2, 3, 3, 9, 6, 8, 3, 0, 3, 1, 2, 2, 7, 7, 1, 9, 7, 8, 0, 6, 1, 7, 4, 2, 1, 5, 5, 1, 4, 7, 7, 8, 6, 3, 2, 4, 7, 4, 3, 5, 0, 4, 5, 5, 9, 4, 1, 2, 0, 4, 6, 3, 3, 2, 9, 4, 1, 4, 8, 3, 7, 2, 3, 3, 4, 5, 9, 0, 1, 0, 8, 5, 1, 1, 7, 4, 8, 6, 1, 0, 9, 5, 5, 3, 9, 8, 0, 0, 8, 1, 0, 8, 8, 7, 3, 6, 2, 3, 0, 8, 2, 5, 2, 2, 3, 3, 2, 2, 9, 4, 4, 4, 1, 0, 8, 3, 4, 8, 9, 1, 1, 0, 8, 2,</pre>	<pre> 7, 5, 8, 5, 5, 4, 5, 2, 2, 4, 2, 0, 2, 5, 3, 1, 2, 3, 6, 8, 0, 0, 3, 4, 5, 2, 8, 6, 8, 9, 2, ...snip... 7, 8, 2, 8, 6, 3, 4, 1, 0, 2, 4, 7, 0, 2, 4, 8, 2, 6, 2, 1, 0, 5, 1, 5, 0, 6, 1, 0, 9, 8, 6, 9, 5, 7, 5, 3, 6, 0, 5, 9, 0, 9, 9, 0, 3, 0, 9, 3, 9, 6, 5, 3, 2, 8, 9, 0, 0, 7, 5, 1, 1, 2, 1, 4, 0, 2, 0, 7, 1, 4, 5, 5, 6, 2, 6, 1, 0, 4, 0, 7, 1, 3, 3, 4, 5, 0, 7, 1, 0, 9, 8, 7, 0, 0, 8, 2, 5, 3, 2, 7, 4, 9, 0, 6, 0, 7, 4, 7, 2, 8, 6, 3, 9, 7, 0, 6, 3, 9, 6, 7, 7, 4, 6, 9, 7, 5, 9, 9, 4, 8, 3, 3, 6, 6, 6, 7, 5, 4, 7, 0, 6, 2, 9, 7, 4, 2, 3, 9, 3, 9, 6, 0, 7, 8, 0, 0, 7, 9, 1, 6, 0, 7, 1, 6, 1, 0, 9, 1, 0, 9, 1, 8, 3, 6, 8, 1, 2, 8, 5, 9, 7, 1, 1, 5, 4, 5, 7, 5, 9, 4, 9, 5, 4, 2, 4, 4, 1, 1, 3, 1, 9, 8, 6, 4, 1, 2, 2, 4, 2, 9, 8, 2, 4, 9, 0, 3, 6, 1, 1, 8, 4, 2, 0, 7, 6, 7, 3, 9, 7, 0, 9, 8, 6, 0, 5, 1, 8, 0, 2, 9, 5, 5, 8, 5, 3, 9, 8, 7, 0, 4, 8, 2, 2, 6, 8, 4, 1, 4, 7, 2, 2, 1, 0, 6, 4, 8, 9, 5, 1, 0, 2, 6, 3, 9, 1, 2, 0, 1, 3, 6, 4, 7, 0, 0, 5, 6, 7, 3, 2, 6, 8, 8, 5, 4, 8, 4, 5, 0, 2, 8, 1, 2, 9, 9, 5, 1, 4, 8, 8, 1, 3, 9, 2, 8, 6, 1, 0, 8, 7, 3, 7, 3, 6, 9, 7, 1, 7, 9, 3, 3, 8, 7, 9, 1, 9, 1, 9, 4, 1, 1, 0, 3, 6, 7, 5, 3, 7, 8, 8, 1, 4, 9, 0, 3, 9, 9, 6, 4, 8, 2, 6, 7, 9, 0, 3, 9, 0, 6, 8, 9, 2, 1, 2, 5, 0, 8, 8, 4, 5, 6, 3, 7, 5, 2, 0, 0, 2, 1, 2, 4, 7, 8, 3, 0, 8, 2, 1, 4, 5, 1, 7, 6, 4, 1, 3, 5, 3, 7, 3, 9, 2, 8, 8, 0, 6, 1, 0, 2, 5, 3, 2, 1, 4, 4, 1, 6, 2, 8, 7, 2, 8, 1, 4, 7, 0, 6, 0, 5, 5, 0, 9, 6, 0, 6, 8, 6, 7, 7, 3, 9, 0, 2, 9, 0, 6, 7, 4, 7, 3, 3, 1, 1, 3, 7, 0, 3, 2, 4, 1, 6, 4, 2, 9, 3, 8, 3, 1, 3, 4, 8, 4, 3, 6, 3, 4, 6, 7, 8, 3, 0, 7, 2, 3, 3, 9, 6, 8, 3, 0, 3, 1, 2, 2, 7, 7, 1, 9, 7, 8, 0, 6, 1, 7, 4, 2, 1, 5, 5, 1, 4, 7, 7, 8, 6, 3, 2, 4, 7, 4, 3, 5, 0, 4, 5, 5, 9, 4, 1, 2, 0, 4, 6, 3, 3, 2, 9, 4, 1, 4, 8, 3, 7, 2, 3, 3, 4, 5, 9, 0, 1, 0, 8, 5, 1, 1, 7, 4, 8, 6, 1, 0, 9, 5, 5, 3, 9, 8, 0, 0, 8, 1, 0, 8, 8, 7, 3, 6, 2, 3, 0, 8, 2, 5, 2, 2, 3, 3, 2, 2, 9, 4, 4, 4, 1, 0, 8, 3, 4, 8, 9, 1, 1, 0, 8, 2,</pre>	

Test	Expected	Got	
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Test	Expected	Got	
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Test	Expected	Got	
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int k = 990; 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> 7, 8, 4, 5, 7, 6, 4, 9, 7, 6, 1, 1, 1, 6, 0, 1, 0, 7, 5, 1, 9, 9, 2, 7, 4, 9, 9, 0, 6, 3, 1, ...snip... 2, 7, 3, 3, 1, 3, 7, 2, 1, 8, 4, 2, 6, 7, 2, 5, 3, 8, 6, 8, 4, 0, 7, 5, 6, 1, 4, 5, 2, 6, 5, 2, 9, 1, 5, 1, 3, 8, 9, 0, 7, 7, 4, 9, 4, 4, 7, 0, 0, 9, 0, 7, 9, 5, 4, 8, 5, 9, 1, 8, 8, 9, 7, 1, 6, 2, 8, 9, 0, 4, 1, 8, 1, 3, 3, 1, 6, 4, 7, 0, 0, 3, 2, 5, 9, 0, 5, 9, 7, 1, 1, 9, 6, 3, 4, 3, 6, 7, 4, 4, 7, 4, 7, 8, 6, 5, 5, 1, 5, 9, 8, 4, 6, 9, 6, 8, 5, 0, 8, 2, 9, 1, 3, 7, 9, 5, 2, 1, 8, 0, 5, 9, 4, 9, 5, 6, 3, 2, 8, 2, 8, 5, 8, 8, 7, 1, 4, 4, 6, 2, 6, 1, 7, 0, 4, 9, 9, 6, 3, 1, 3, 3, 3, 5, 8, 7, 2, 5, 1, 3, 8, 2, 8, 1, 5, 2, 0, 6, 6, 5, 5, 4, 5, 7, 9, 3, 5, 3, 1, 6, 9, 0, 9, 5, 8, 8, 4, 6, 0, 9, 4, 0, 8, 1, 2, 3, 9, 9, 6, 9, 2, 8, 6, 5, 4, 9, 2, 4, 2, 3, 1, 8, 6, 8, 3, 3, 5, 4, 7, 1, 1, 2, 7, 5, 8, 7, 7, 2, 3, 5, 3, 4, 7, 2, 8, 5, 6, 9, 7, 1, 4, 0, 0, 3, 6, 3, 0, 4, 4, 0, 4, 3, 7, 1, 8, 5, 1, 3, 0, 9, 0, 2, 2, 5, 3, 3, 8, 7, 9, 3, 9, 5, 9, 0, 7, 7, 0, 2, 9, 8, 4, 0, 6, 0, 4, 2, 3, 3, 4, 9, 7, 2, 8, 3, 1, 9, 2, 7, 9, 8, 7, 5, 7, 1, 9, 3, 9, 4, 2, 9, 1, 1, 0, 4, 6, 3, 8, 6, 9, 3, 9, 5, 1, 8, 0, 6, 7, 6, 4, 7, 7, 6, 7, 4, 3, 8, 4, 4, 3, 6, 8, 3, 7, 4, 5, 4, 7, 7, 5, 1, 6, 8, 2, 8, 0, 8, 0, 8, 8, 7, 3, 6, 5, 2, 4, 3, 9, 8, 7, 6, 3, 0, 4, 4, 6, 2, 3, 5, 6, 0, 9, 2, 1, 9, 4, 8, 9, 8, 9, 1, 1, 5, 7, 8, 0, 0, 1, 1, 2, 7, 8, 9, 7, 2, 3, 2, 8, 9, 5, 1, 8, 9, 9, 5, 2, 2, 0, 6, 5, 6, 9, 5, 2, 6, 2, 3, 7, 4, 2, 6, 1, 9, 8, 0, 0, 4, 7, 2, 1, 6, 1, 8, 6, 7, 1, 2, 6, 1, 4, 1, 6, 2, 1, 9, 5, 0, 0, 4, 6, 2, 5, 3, 3, 0, 5, 0, 2, 2, 7, 6, 1, 1, 3, 9, 5, 6, 0, 3, 4, 2, 8, 3, 7, 2, 9, 6, 1, 8, 3, 1, 3, 8, 5, 1, 9, 0, 0, 4, 3, 4, 6, 4, 6, 7, 8, 5, 2, 5, 6, 1, 6, 8, 5, 2, 1, 1, 0, 4, 7, 0, 4, 9, 1, 4, 2, 1, 4, 4, 5, 7, 2, 1, 2, 5, 3, 8, 0, 6, 6, 0, 5, 2, 7, 5, 7, 5, 7, 9, 0, 8, 3, 3, 4, 0, 3, 8, 4, 1, 4, 0, 8, 4, 8, 3, 1, 2, 5, 6, 8, 2, 9, 2, 6, 5, 5, 5, 1, 0, 5, 1, 9, 6, 2, 2, 3, 0, 7, 6, 8, 7, 7, 8, 2, 0, 9, 3, 1, 5, 3, 1, 4, 6, 7, 5, </pre>	<pre> 7, 8, 4, 5, 7, 6, 4, 9, 7, 6, 1, 1, 1, 6, 0, 1, 0, 7, 5, 1, 9, 9, 2, 7, 4, 9, 9, 0, 6, 3, 1, ...snip... 2, 7, 3, 3, 1, 3, 7, 2, 1, 8, 4, 2, 6, 7, 2, 5, 3, 8, 6, 8, 4, 0, 7, 5, 6, 1, 4, 5, 2, 6, 5, 2, 9, 1, 5, 1, 3, 8, 9, 0, 7, 7, 4, 9, 4, 4, 7, 0, 0, 9, 0, 7, 9, 5, 4, 8, 5, 9, 1, 8, 8, 9, 7, 1, 6, 2, 8, 9, 0, 4, 1, 8, 1, 3, 3, 1, 6, 4, 7, 0, 0, 3, 2, 5, 9, 0, 5, 9, 7, 1, 1, 9, 6, 3, 4, 3, 6, 7, 4, 4, 7, 4, 7, 8, 6, 5, 5, 1, 5, 9, 8, 4, 6, 9, 6, 8, 5, 0, 8, 2, 9, 1, 3, 7, 9, 5, 2, 1, 8, 0, 5, 9, 4, 9, 5, 6, 3, 2, 8, 2, 8, 5, 8, 8, 7, 1, 4, 4, 6, 2, 6, 1, 7, 0, 4, 9, 9, 6, 3, 1, 3, 3, 3, 5, 8, 7, 2, 5, 1, 3, 8, 2, 8, 1, 5, 2, 0, 6, 6, 5, 5, 4, 5, 7, 9, 3, 5, 3, 1, 6, 9, 0, 9, 5, 8, 8, 4, 6, 0, 9, 4, 0, 8, 1, 2, 3, 9, 9, 6, 9, 2, 8, 6, 5, 4, 9, 2, 4, 2, 3, 1, 8, 6, 8, 3, 3, 5, 4, 7, 1, 1, 2, 7, 5, 8, 7, 7, 2, 3, 5, 3, 4, 7, 2, 8, 5, 6, 9, 7, 1, 4, 0, 0, 3, 6, 3, 0, 4, 4, 0, 4, 3, 7, 1, 8, 5, 1, 3, 0, 9, 0, 2, 2, 5, 3, 3, 8, 7, 9, 3, 9, 5, 9, 0, 7, 7, 0, 2, 9, 8, 4, 0, 6, 0, 4, 2, 3, 3, 4, 9, 7, 2, 8, 3, 1, 9, 2, 7, 9, 8, 7, 5, 7, 1, 9, 3, 9, 4, 2, 9, 1, 1, 0, 4, 6, 3, 8, 6, 9, 3, 9, 5, 1, 8, 0, 6, 7, 6, 4, 7, 7, 6, 7, 4, 3, 8, 4, 4, 3, 6, 8, 3, 7, 4, 5, 4, 7, 7, 5, 1, 6, 8, 2, 8, 0, 8, 0, 8, 8, 7, 3, 6, 5, 2, 4, 3, 9, 8, 7, 6, 3, 0, 4, 4, 6, 2, 3, 5, 6, 0, 9, 2, 1, 9, 4, 8, 9, 8, 9, 1, 1, 5, 7, 8, 0, 0, 1, 1, 2, 7, 8, 9, 7, 2, 3, 2, 8, 9, 5, 1, 8, 9, 9, 5, 2, 2, 0, 6, 5, 6, 9, 5, 2, 6, 2, 3, 7, 4, 2, 6, 1, 9, 8, 0, 0, 4, 7, 2, 1, 6, 1, 8, 6, 7, 1, 2, 6, 1, 4, 1, 6, 2, 1, 9, 5, 0, 0, 4, 6, 2, 5, 3, 3, 0, 5, 0, 2, 2, 7, 6, 1, 1, 3, 9, 5, 6, 0, 3, 4, 2, 8, 3, 7, 2, 9, 6, 1, 8, 3, 1, 3, 8, 5, 1, 9, 0, 0, 4, 3, 4, 6, 4, 6, 7, 8, 5, 2, 5, 6, 1, 6, 8, 5, 2, 1, 1, 0, 4, 7, 0, 4, 9, 1, 4, 2, 1, 4, 4, 5, 7, 2, 1, 2, 5, 3, 8, 0, 6, 6, 0, 5, 2, 7, 5, 7, 5, 7, 9, 0, 8, 3, 3, 4, 0, 3, 8, 4, 1, 4, 0, 8, 4, 8, 3, 1, 2, 5, 6, 8, 2, 9, 2, 6, 5, 5, 5, 1, 0, 5, 1, 9, 6, 2, 2, 3, 0, 7, 6, 8, 7, 7, 8, 2, 0, 9, 3, 1, 5, 3, 1, 4, 6, 7, 5, </pre>	

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	9, 9, 3, 8, 5, 2, 3, 4, 0, 5, 9, 1, 7, 2, 9, 8, 2, 0, 7, 0, 9, 0, 2, 6, 6, 8, 5, 5, 6, 0, 1, 8, 0, 9, 2, 4, 9, 8, 3, 6, 3, 9, 2, 2, 6, 5, 7, 3, 5, 0, 6, 6, 8, 4, 6, 7, 8, 6, 9, 4, 1, 3, 2, 1, 8, 0, 0, 7, 2, 1, 5, 3, 4, 3, 2, 4, 1, 3, 0, 3, 9, 8, 6, 3, 5, 5, 9, 9, 3, 1, 2, 4, 7, 4, 0, 3, 7, 8, 4, 3, 4, 4, 3, 0, 5, 8, 0, 8, 2, 6, 0, 4, 0, 3, 4, 4, 8, 1, 2, 0, 0, 0, 1, 9, 2, 4, 6, 6, 9, 4, 8, 9, 5, 2, 2, 4, 9, 8, 6, 8, 5, 9, 5, 8, 1, 0, 5, 1, 4, 4, 6, 3, 6, 5, 2, 6, 2, 0, 7, 4, 1, 2, 7, 3, 4, 4, 9, 3, 9, 2, 9, 1, 3, 0, 4, 1, 0, 2, 4, 9, 3, 3, 1, 3, 0, 8, 8, 7, 4, 5, 9, 9, 9, 6, 6, 4, 4, 2, 5, 0, 1, 0, 8, 9, 0, 4, 8, 5, 6, 8, 1, 0, 9, 1, 8, 2, 6, 1, 0, 9, 9, 2, 5, 9, 4, 1, 7, 5, 6, 5, 4, 3, 9, 3, 9, 4, 1, 6, 7, 6, 3, 1, 6, 6, 5, 2, 5, 9, 7, 6, 9, 3, 3, 1, 2, 5, 0, 2, 5, 6, 7, 2, 3, 0, 7, 9, 0, 2, 2, 9, 5, 9, 1, 9, 6, 1, 7, 4, 1, 6, 7, 0, 5, 9, 8, 1, 2, 2, 5, 6, 3, 3, 4, 8, 8, 1, 0, 5, 2, 7, 1, 6, 7, 3, 1, 1, 8, 9, 7, 6, 3, 3, 4, 0, 0, 9, 2, 6, 2, 4, 2, 2, 1, 3, 6, 6, 6, 8, 5, 8, 8, 1, 3, 6, 9, 6, 5, 2, 3, 0, 2, 2, 1, 0, 1, 9, 1, 4, 4, 9, 3, 2, 3, 4, 0, 3, 4, 5, 8, 3, 6, 3, 5, 6, 8, 4, 1, 1, 5, 1, 2, 8, 2, 5, 0, 2, 8, 9, 1, 2, 5, 4, 9, 2, 7, 0, 5, 1, 5, 6, 2, 2, 9, 3, 9, 3, 9, 6, 9, 8, 3, 3, 1, 8, 8, 5, 4, 3, 5, 7, 5, 8, 5, 5, 8, 0, 2, 5, 4, 0, 7, 8, 9, 0, 2, 6, 4, 4, 2, 3, 8, 3, 0, 3, 8, 4, 2, 6, 6, 6, 4, 2, 3, 0, 2, 6, 9, 2, 8, 3, 8, 0, 6, 8, 3, 5, 0, 9, 6, 0, 7, 2, 5, 0, 3, 2, 8, 8, 2, 5, 5, 3, 6, 9, 4, 9, 2, 2, 9, 6, 6, 7, 5, 7, 4, 6, 9, 8, 9, 7, 9, 2, 7, 0, 4, 9, 0, 6, 2, 8, 1, 3, 0, 3, 4, 7, 0, 7, 2, 1, 7, 4, 2, 0, 6, 5, 6, 3, 6, 6, 9, 1, 3, 0, 8, 4, 9, 7, 1, 6, 8, 4, 9, 8, 3, 4, 0, 2, 2, 4, 6, 2, 7, 9, 0, 3, 8, 0, 6, 0, 6, 7, 7, 9, 6, 0, 4, 7, 8, 4, 4, 2, 7, 0, 0, 8, 0, 8, 8, 5, 7, 6, 2, 8, 5, 5, 3, 7, 1, 2, 8, 8, 4, 1, 8, 1, 8, 7, 8, 4, 0, 1, 6, 3, 0, 2, 3, 6, 0, 8, 2, 0, 7, 8, 7, 1, 3, 3, 5, 0, 0, 1, 5, 2, 7, 5, 2, 5, 1, 6, 4, 9, 9, 7, 2, 1, 3, 3, 3, 2, 2, 5, 9, 0, 7, 0, 0, 1, 0, 6, 2, 1, 1, 9, 4, 3, 3, 4, 9, 9,	9, 9, 3, 8, 5, 2, 3, 4, 0, 5, 9, 1, 7, 2, 9, 8, 2, 0, 7, 0, 9, 0, 2, 6, 6, 8, 5, 5, 6, 0, 1, 8, 0, 9, 2, 4, 9, 8, 3, 6, 3, 9, 2, 2, 6, 5, 7, 3, 5, 0, 6, 6, 8, 4, 6, 7, 8, 6, 9, 4, 1, 3, 2, 1, 8, 0, 0, 7, 2, 1, 5, 3, 4, 3, 2, 4, 1, 3, 0, 3, 9, 8, 6, 3, 5, 5, 9, 9, 3, 1, 2, 4, 7, 4, 0, 3, 7, 8, 4, 3, 4, 4, 3, 0, 5, 8, 0, 8, 2, 6, 0, 4, 0, 3, 4, 4, 8, 1, 2, 0, 0, 0, 1, 9, 2, 4, 6, 6, 9, 4, 8, 9, 5, 2, 2, 4, 9, 8, 6, 8, 5, 9, 5, 8, 1, 0, 5, 1, 4, 4, 6, 3, 6, 5, 2, 6, 2, 0, 7, 4, 1, 2, 7, 3, 4, 4, 9, 3, 9, 2, 9, 1, 3, 0, 4, 1, 0, 2, 4, 9, 3, 3, 1, 3, 0, 8, 8, 7, 4, 5, 9, 9, 9, 6, 6, 4, 4, 2, 5, 0, 1, 0, 8, 9, 0, 4, 8, 5, 6, 8, 1, 0, 9, 1, 8, 2, 6, 1, 0, 9, 9, 2, 5, 9, 4, 1, 7, 5, 6, 5, 4, 3, 9, 3, 9, 4, 1, 6, 7, 6, 3, 1, 6, 6, 5, 2, 5, 9, 7, 6, 9, 3, 3, 1, 2, 5, 0, 2, 5, 6, 7, 2, 3, 0, 7, 9, 0, 2, 2, 9, 5, 9, 1, 9, 6, 1, 7, 4, 1, 6, 7, 0, 5, 9, 8, 1, 2, 2, 5, 6, 3, 3, 4, 8, 8, 1, 0, 5, 2, 7, 1, 6, 7, 3, 1, 1, 8, 9, 7, 6, 3, 3, 4, 0, 0, 9, 2, 6, 2, 4, 2, 2, 1, 3, 6, 6, 6, 8, 5, 8, 8, 1, 3, 6, 9, 6, 5, 2, 3, 0, 2, 2, 1, 0, 1, 9, 1, 4, 4, 9, 3, 2, 3, 4, 0, 3, 4, 5, 8, 3, 6, 3, 5, 6, 8, 4, 1, 1, 5, 1, 2, 8, 2, 5, 0, 2, 8, 9, 1, 2, 5, 4, 9, 2, 7, 0, 5, 1, 5, 6, 2, 2, 9, 3, 9, 3, 9, 6, 9, 8, 3, 3, 1, 8, 8, 5, 4, 3, 5, 7, 5, 8, 5, 5, 8, 0, 2, 5, 4, 0, 7, 8, 9, 0, 2, 6, 4, 4, 2, 3, 8, 3, 0, 3, 8, 4, 2, 6, 6, 6, 4, 2, 3, 0, 2, 6, 9, 2, 8, 3, 8, 0, 6, 8, 3, 5, 0, 9, 6, 0, 7, 2, 5, 0, 3, 2, 8, 8, 2, 5, 5, 3, 6, 9, 4, 9, 2, 2, 9, 6, 6, 7, 5, 7, 4, 6, 9, 8, 9, 7, 9, 2, 7, 0, 4, 9, 0, 6, 2, 8, 1, 3, 0, 3, 4, 7, 0, 7, 2, 1, 7, 4, 2, 0, 6, 5, 6, 3, 6, 6, 9, 1, 3, 0, 8, 4, 9, 7, 1, 6, 8, 4, 9, 8, 3, 4, 0, 2, 2, 4, 6, 2, 7, 9, 0, 3, 8, 0, 6, 0, 6, 7, 7, 9, 6, 0, 4, 7, 8, 4, 4, 2, 7, 0, 0, 8, 0, 8, 8, 5, 7, 6, 2, 8, 5, 5, 3, 7, 1, 2, 8, 8, 4, 1, 8, 1, 8, 7, 8, 4, 0, 1, 6, 3, 0, 2, 3, 6, 0, 8, 2, 0, 7, 8, 7, 1, 3, 3, 5, 0, 0, 1, 5, 2, 7, 5, 2, 5, 1, 6, 4, 9, 9, 7, 2, 1, 3, 3, 3, 2, 2, 5, 9, 0, 7, 0, 0, 1, 0, 6, 2, 1, 1, 9, 4, 3, 3, 4, 9, 9,	

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int k = 11111; 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, 8, 7, 0, 1, 4, 4, 8, 9, 7, 4, 1, 1, 9, 4, 1, 0, 9, 5, 8, 6, 6, 9, 1, 5, 6, 0, 8, 0, 3, 3, ...snip... 3, 0, 7, 6, 6, 4, 1, 7, 5, 1, 2, 9, 2, 6, 3, 8, 7, 6, 7, 2, 9, 1, 3, 0, 2, 5, 8, 1, 1, 8, 9, 9, 7, 5, 9, 9, 4, 7, 5, 1, 5, 2, 0, 0, 5, 9, 8, 0, 4, 1, 1, 6, 7, 5, 6, 3, 4, 0, 5, 9, 8, 4, 0, 9, 8, 8, 8, 2, 3, 7, 5, 5, 5, 5, 7, 2, 6, 1, 0, 2, 3, 1, 1, 9, 5, 1, 4, 5, 9, 1, 9, 6, 5, 1, 7, 4, 1, 3, 0, 7, 6, 6, 3, 8, 8, 9, 3, 8, 6, 5, 4, 1, 7, 3, 5, 8, 0, 9, 8, 5, 3, 2, 6, 4, 4, 1, 6, 3, 1, 5, 9, 9, 7, 9, 4, 4, 2, 8, 3, 6, 0, 9, 8, 5, 1, 2, 3, 3, 7, 5, 7, 0, 1, 2, 8, 3, 4, 4, 9, 3, 0, 2, 7, 3, 2, 6, 4, 5, 3, 4, 9, 7, 1, 5, 8, 7, 9, 9, 1, 7, 3, 1, 3, 5, 4, 4, 5, 4, 4, 8, 2, 1, 0, 5, 2, 3, 8, 2, 9, 2, 4, 3, 3, 7, 8, 1, 5, 5, 0, 4, 5, 2, 7, 7, 0, 8, 0, 4, 1, 9, 2, 0, 1, 6, 3, 9, 8, 3, 8, 3, 7, 1, 2, 5, 9, 1, 2, 9, 7, 4, 2, 4, 5, 5, 7, 9, 6, 9, 0, 6, 8, 0, 5, 3, 9, 1, 9, 9, 5, 6, 1, 0, 6, 2, 0, 8, 1, 1, 2, 3, 5, 6, 8, 6, 6, 4, 8, 7, 5, 4, 2, 7, 6, 8, 0, 9, 2, 9, 5, 3, 3, 0, 6, 4, 8, 8, 1, 6, 0, 5, 8, 6, 6, 1, 1, 0, 3, 7, 4, 3, 0, 0, 3, 4, 0, 7, 0, 7, 1, 3, 7, 5, 7, 5, 8, 9, 3, 5, 8, 8, 8, 4, 5, 1, 2, 8, 6, 9, 6, 9, 2, 7, 6, 9, 9, 4, 0, 8, 0, 4, 3, 5, 2, 0, 3, 2, 6, 5, 8, 5, 2, 9, 8, 6, 9, 8, 1, 7, 4, 9, 0, 2, 6, 8, 1, 9, 9, 1, 3, 4, 5, 4, 1, 1, 7, 5, 2, 0, 4, 3, 5, 3, 1, 4, 0, 7, 7, 9, 1, 8, 6, 3, 9, 0, 7, 7, 4, 7, 4, 3, 8, 2, 6, 4, 0, 5, 8, 8, 7, 2, 7, 3, 2, 3, 8, 7, 1, 3, 3, 7, 2, 2, 1, 6, 3, 4, 6, 5, 3, 4, 0, 2, 1, 2, 5, 1, 2, 6, 9, 6, 8, 0, 9, 7, 7, 8, 8, 6, 9, 7, 8, 1, 5, 3, 3, 8, 8, 4, 7, 6, 2, 2, 7, 0, 6, 8, 1, 5, 2, 5, 6, 2, 1, 2, 4, 9, 2, 6, 0, 2, 8, 0, 9, 9, 4, 7, 5, 4, 6, 6, 5, 2, 3, 9, 2, 7, 0, 6, 7, 1, 5, 4, 9, 8, 3, 2, 1, 4, 7, 9, 9, 6, 9, 6, 6, 6, 0, 9, 8, 5, 7, 3, 4, 8, 0, 4, 1, 1, 0, 9, 8, 4, 1, 7, 3, 1, 1, 2, 5, 4, 4, 6, 2, 7, 4, 5, 8, 5, 3, 0, 7, 1, 7, 3, 8, 5, 1, 1, 7, 2, 2, 4, 3, 4, 5, 4, 3, 0, 3, 7, 2, 0, 9, 3, 4, 2, 4, 3, 5, 7, 8, 4, 7, 4, 9, 5, 6, 4, 5, 0, 5, 2, 9, 6, 9, 3, 5, 6, 9, 9, 0, 5, 2, 1, </pre>	<pre> 2, 8, 7, 0, 1, 4, 4, 8, 9, 7, 4, 1, 1, 9, 4, 1, 0, 9, 5, 8, 6, 6, 9, 1, 5, 6, 0, 8, 0, 3, 3, ...snip... 3, 0, 7, 6, 6, 4, 1, 7, 5, 1, 2, 9, 2, 6, 3, 8, 7, 6, 7, 2, 9, 1, 3, 0, 2, 5, 8, 1, 1, 8, 9, 9, 7, 5, 9, 9, 4, 7, 5, 1, 5, 2, 0, 0, 5, 9, 8, 0, 4, 1, 1, 6, 7, 5, 6, 3, 4, 0, 5, 9, 8, 4, 0, 9, 8, 8, 8, 2, 3, 7, 5, 5, 5, 5, 7, 2, 6, 1, 0, 2, 3, 1, 1, 9, 5, 1, 4, 5, 9, 1, 9, 6, 5, 1, 7, 4, 1, 3, 0, 7, 6, 6, 3, 8, 8, 9, 3, 8, 6, 5, 4, 1, 7, 3, 5, 8, 0, 9, 8, 5, 3, 2, 6, 4, 4, 1, 6, 3, 1, 5, 9, 9, 7, 9, 4, 4, 2, 8, 3, 6, 0, 9, 8, 5, 1, 2, 3, 3, 7, 5, 7, 0, 1, 2, 8, 3, 4, 4, 9, 3, 0, 2, 7, 3, 2, 6, 4, 5, 3, 4, 9, 7, 1, 5, 8, 7, 9, 9, 1, 7, 3, 1, 3, 5, 4, 4, 5, 4, 4, 8, 2, 1, 0, 5, 2, 3, 8, 2, 9, 2, 4, 3, 3, 7, 8, 1, 5, 5, 0, 4, 5, 2, 7, 7, 0, 8, 0, 4, 1, 9, 2, 0, 1, 6, 3, 9, 8, 3, 8, 3, 7, 1, 2, 5, 9, 1, 2, 9, 7, 4, 2, 4, 5, 5, 7, 9, 6, 9, 0, 6, 8, 0, 5, 3, 9, 1, 9, 9, 5, 6, 1, 0, 6, 2, 0, 8, 1, 1, 2, 3, 5, 6, 8, 6, 6, 4, 8, 7, 5, 4, 2, 7, 6, 8, 0, 9, 2, 9, 5, 3, 3, 0, 6, 4, 8, 8, 1, 6, 0, 5, 8, 6, 6, 1, 1, 0, 3, 7, 4, 3, 0, 0, 3, 4, 0, 7, 0, 7, 1, 3, 7, 5, 7, 5, 8, 9, 3, 5, 8, 8, 8, 4, 5, 1, 2, 8, 6, 9, 6, 9, 2, 7, 6, 9, 9, 4, 0, 8, 0, 4, 3, 5, 2, 0, 3, 2, 6, 5, 8, 5, 2, 9, 8, 6, 9, 8, 1, 7, 4, 9, 0, 2, 6, 8, 1, 9, 9, 1, 3, 4, 5, 4, 1, 1, 7, 5, 2, 0, 4, 3, 5, 3, 1, 4, 0, 7, 7, 9, 1, 8, 6, 3, 9, 0, 7, 7, 4, 7, 4, 3, 8, 2, 6, 4, 0, 5, 8, 8, 7, 2, 7, 3, 2, 3, 8, 7, 1, 3, 3, 7, 2, 2, 1, 6, 3, 4, 6, 5, 3, 4, 0, 2, 1, 2, 5, 1, 2, 6, 9, 6, 8, 0, 9, 7, 7, 8, 8, 6, 9, 7, 8, 1, 5, 3, 3, 8, 8, 4, 7, 6, 2, 2, 7, 0, 6, 8, 1, 5, 2, 5, 6, 2, 1, 2, 4, 9, 2, 6, 0, 2, 8, 0, 9, 9, 4, 7, 5, 4, 6, 6, 5, 2, 3, 9, 2, 7, 0, 6, 7, 1, 5, 4, 9, 8, 3, 2, 1, 4, 7, 9, 9, 6, 9, 6, 6, 6, 0, 9, 8, 5, 7, 3, 4, 8, 0, 4, 1, 1, 0, 9, 8, 4, 1, 7, 3, 1, 1, 2, 5, 4, 4, 6, 2, 7, 4, 5, 8, 5, 3, 0, 7, 1, 7, 3, 8, 5, 1, 1, 7, 2, 2, 4, 3, 4, 5, 4, 3, 0, 3, 7, 2, 0, 9, 3, 4, 2, 4, 3, 5, 7, 8, 4, 7, 4, 9, 5, 6, 4, 5, 0, 5, 2, 9, 6, 9, 3, 5, 6, 9, 9, 0, 5, 2, 1, </pre>	

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

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

Test	Expected	Got	
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int k = 55555; 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> 9, 0, 5, 2, 3, 6, 0, 6, 0, 6, 6, 8, 7, 3, 6, 3, 8, 3, 0, 4, 6, 5, 6, 4, 3, 4, 7, 8, 7, 8, 4, ...snip... 1, 9, 1, 5, 1, 5, 0, 2, 9, 5, 1, 7, 0, 2, 5, 3, 7, 9, 9, 6, 9, 5, 9, 3, 7, 3, 0, 4, 5, 7, 7, 0, 9, 4, 2, 2, 3, 5, 3, 5, 7, 1, 0, 1, 1, 2, 6, 9, 5, 2, 0, 6, 3, 5, 4, 3, 0, 6, 1, 4, 8, 7, 5, 3, 6, 1, 0, 4, 8, 7, 5, 1, 4, 6, 1, 0, 0, 2, 1, 9, 2, 3, 3, 5, 6, 8, 0, 3, 1, 1, 0, 6, 8, 9, 4, 8, 0, 5, 1, 0, 4, 0, 5, 6, 3, 6, 6, 1, 3, 5, 0, 0, 7, 9, 1, 7, 9, 1, 7, 3, 3, 4, 0, 2, 5, 0, 8, 7, 3, 9, 4, 9, 7, 7, 9, 0, 2, 1, 6, 8, 2, 0, 7, 9, 9, 4, 2, 2, 8, 8, 1, 7, 9, 7, 8, 7, 7, 6, 7, 2, 9, 4, 6, 2, 5, 1, 7, 3, 3, 1, 7, 5, 4, 9, 9, 4, 0, 4, 7, 4, 3, 5, 2, 9, 7, 5, 6, 9, 2, 0, 1, 9, 7, 2, 5, 0, 6, 2, 6, 4, 1, 5, 1, 7, 9, 0, 5, 2, 4, 1, 3, 9, 7, 2, 4, 0, 9, 2, 6, 6, 2, 9, 1, 1, 3, 4, 4, 9, 0, 5, 1, 7, 7, 4, 5, 0, 5, 4, 7, 1, 9, 1, 0, 5, 6, 3, 4, 2, 0, 1, 6, 6, 5, 4, 0, 0, 7, 8, 3, 4, 3, 7, 1, 3, 1, 9, 0, 4, 3, 5, 0, 9, 7, 9, 3, 0, 2, 9, 3, 0, 8, 0, 0, 5, 2, 8, 5, 8, 0, 6, 3, 8, 7, 3, 6, 2, 3, 7, 8, 5, 5, 4, 9, 5, 5, 3, 7, 7, 0, 0, 0, 0, 5, 4, 6, 1, 2, 3, 2, 2, 9, 1, 1, 5, 9, 8, 8, 9, 9, 4, 4, 1, 8, 2, 9, 9, 0, 8, 0, 2, 2, 3, 9, 3, 3, 0, 1, 4, 7, 6, 6, 0, 6, 4, 1, 2, 8, 7, 9, 2, 7, 0, 7, 9, 8, 0, 8, 7, 4, 4, 2, 3, 5, 0, 2, 7, 9, 5, 8, 5, 9, 9, 1, 1, 7, 7, 6, 3, 6, 3, 1, 3, 9, 8, 5, 6, 1, 3, 6, 1, 1, 7, 0, 4, 5, 7, 6, 2, 8, 8, 2, 7, 7, 1, 4, 4, 3, 7, 9, 0, 1, 6, 0, 3, 1, 2, 6, 8, 2, 2, 1, 1, 0, 6, 9, 1, 4, 7, 4, 3, 4, 6, 1, 6, 5, 8, 4, 1, 2, 8, 5, 7, 6, 7, 8, 5, 5, 7, 5, 4, 1, 4, 1, 8, 5, 8, 0, 2, 1, 1, 7, 2, 3, 4, 6, 3, 3, 5, 5, 5, 4, 1, 2, 3, 1, 6, 5, 5, 9, 6, 9, 0, 1, 5, 6, 8, 8, 5, 5, 9, 0, 1, 8, 4, 5, 8, 6, 4, 5, 1, 4, 0, 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, </pre>	<pre> 9, 0, 5, 2, 3, 6, 0, 6, 0, 6, 6, 8, 7, 3, 6, 3, 8, 3, 0, 4, 6, 5, 6, 4, 3, 4, 7, 8, 7, 8, 4, ...snip... 1, 9, 1, 5, 1, 5, 0, 2, 9, 5, 1, 7, 0, 2, 5, 3, 7, 9, 9, 6, 9, 5, 9, 3, 7, 3, 0, 4, 5, 7, 7, 0, 9, 4, 2, 2, 3, 5, 3, 5, 7, 1, 0, 1, 1, 2, 6, 9, 5, 2, 0, 6, 3, 5, 4, 3, 0, 6, 1, 4, 8, 7, 5, 3, 6, 1, 0, 4, 8, 7, 5, 1, 4, 6, 1, 0, 0, 2, 1, 9, 2, 3, 3, 5, 6, 8, 0, 3, 1, 1, 0, 6, 8, 9, 4, 8, 0, 5, 1, 0, 4, 0, 5, 6, 3, 6, 6, 1, 3, 5, 0, 0, 7, 9, 1, 7, 9, 1, 7, 3, 3, 4, 0, 2, 5, 0, 8, 7, 3, 9, 4, 9, 7, 7, 9, 0, 2, 1, 6, 8, 2, 0, 7, 9, 9, 4, 2, 2, 8, 8, 1, 7, 9, 7, 8, 7, 7, 6, 7, 2, 9, 4, 6, 2, 5, 1, 7, 3, 3, 1, 7, 5, 4, 9, 9, 4, 0, 4, 7, 4, 3, 5, 2, 9, 7, 5, 6, 9, 2, 0, 1, 9, 7, 2, 5, 0, 6, 2, 6, 4, 1, 5, 1, 7, 9, 0, 5, 2, 4, 1, 3, 9, 7, 2, 4, 0, 9, 2, 6, 6, 2, 9, 1, 1, 3, 4, 4, 9, 0, 5, 1, 7, 7, 4, 5, 0, 5, 4, 7, 1, 9, 1, 0, 5, 6, 3, 4, 2, 0, 1, 6, 6, 5, 4, 0, 0, 7, 8, 3, 4, 3, 7, 1, 3, 1, 9, 0, 4, 3, 5, 0, 9, 7, 9, 3, 0, 2, 9, 3, 0, 8, 0, 0, 5, 2, 8, 5, 8, 0, 6, 3, 8, 7, 3, 6, 2, 3, 7, 8, 5, 5, 4, 9, 5, 5, 3, 7, 7, 0, 0, 0, 0, 5, 4, 6, 1, 2, 3, 2, 2, 9, 1, 1, 5, 9, 8, 8, 9, 9, 4, 4, 1, 8, 2, 9, 9, 0, 8, 0, 2, 2, 3, 9, 3, 3, 0, 1, 4, 7, 6, 6, 0, 6, 4, 1, 2, 8, 7, 9, 2, 7, 0, 7, 9, 8, 0, 8, 7, 4, 4, 2, 3, 5, 0, 2, 7, 9, 5, 8, 5, 9, 9, 1, 1, 7, 7, 6, 3, 6, 3, 1, 3, 9, 8, 5, 6, 1, 3, 6, 1, 1, 7, 0, 4, 5, 7, 6, 2, 8, 8, 2, 7, 7, 1, 4, 4, 3, 7, 9, 0, 1, 6, 0, 3, 1, 2, 6, 8, 2, 2, 1, 1, 0, 6, 9, 1, 4, 7, 4, 3, 4, 6, 1, 6, 5, 8, 4, 1, 2, 8, 5, 7, 6, 7, 8, 5, 5, 7, 5, 4, 1, 4, 1, 8, 5, 8, 0, 2, 1, 1, 7, 2, 3, 4, 6, 3, 3, 5, 5, 5, 4, 1, 2, 3, 1, 6, 5, 5, 9, 6, 9, 0, 1, 5, 6, 8, 8, 5, 5, 9, 0, 1, 8, 4, 5, 8, 6, 4, 5, 1, 4, 0, 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, </pre>	

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