Write Doubly Link List code with functions perform on it.

Code:

```
#include<iostream>
using namespace std;

class Node{
   public:
   int data;
   Node* prev;
   Node* next;

   //constructor
   Node(int d){
      this -> data = d;
      this -> prev = NULL;
      this -> next = NULL;
   }
   //desturctor
   ~Node(){
      int val = this ->data;
      if(next != NULL){
         delete next;
         next = NULL;
      }
      cout<< "Memory free for Node with data"<<endl;
   }
};
//Data in the doubly linked list
void printLIST(Node* head){
   Node* temp=head;
   cout << " [  ";
   while (temp!=NULL){
      cout<< temp -> data<<"  ";
      temp = temp -> next;
   }
   cout << "] " << endl;
}
//Length of the doubly linlked List
int getLength(Node* head){
   int len = 0;
   Node* temp=head;
   while (temp!=NULL){
      len++;
      temp = temp -> next;
   }
   return len;
}
void insertAtheadLL(Node* &tail,Node* &head,int d){
   //Empty List
   if(head == NULL){
      Node* temp = new Node(d);
      head = temp;
      tail = head;
```

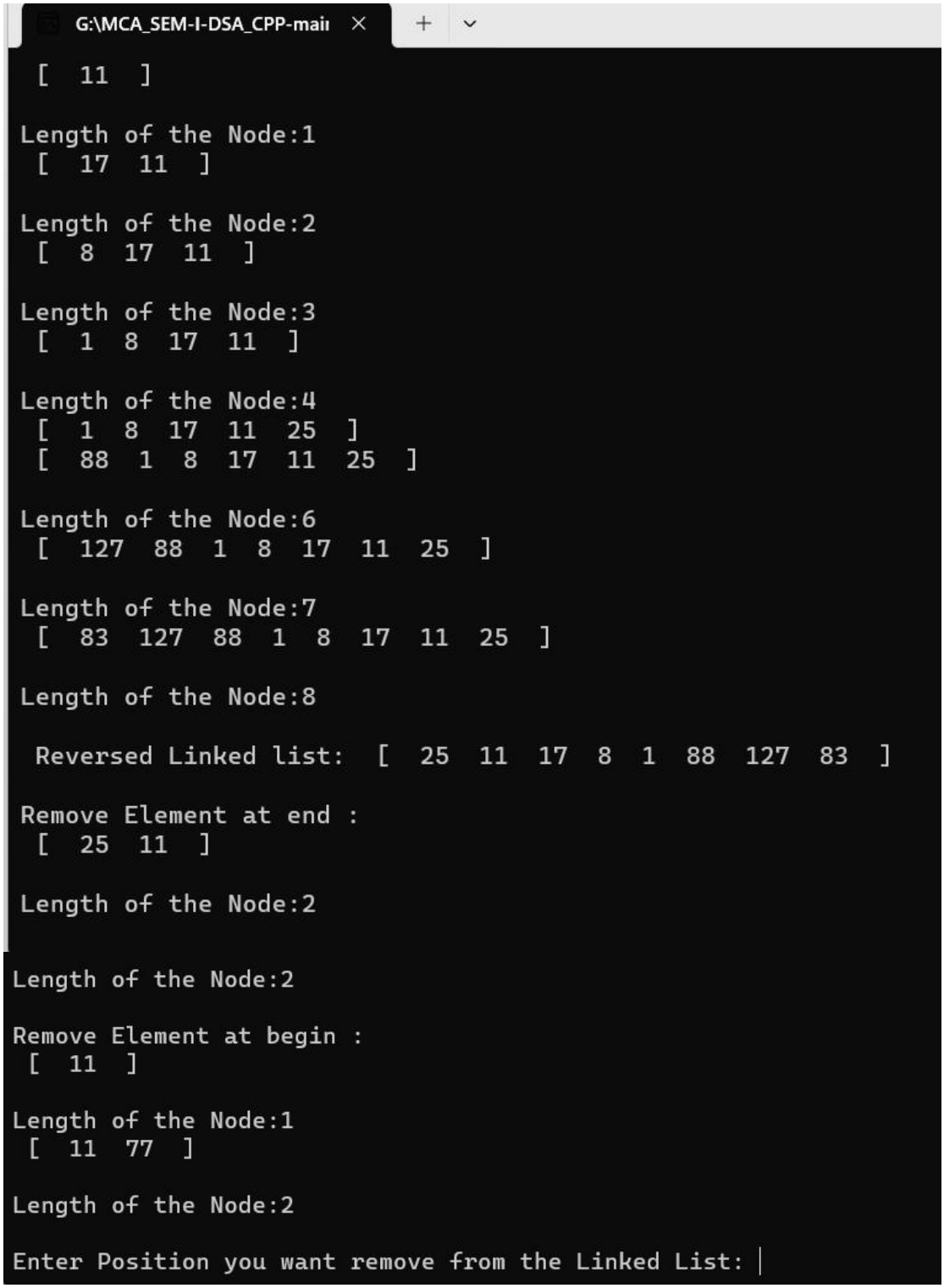
```
    }
    else{
    Node* temp = new Node(d);
    temp -> next =head;
    head -> prev = temp;
    head = temp;
    }
}
void insertAttail(Node* &tail,int d){
    Node* temp= new Node(d);
    tail -> next = temp;
    temp -> prev = tail;
    tail = temp;
}
void insertAtposition(Node* &tail,Node* &head,int position,int d){
    if(position==1){
        insertAtheadLL(tail,head,d);
        return;
    }
    if(position>((getLength(head))+1)){
        position= (getLength(head))+1;
        insertAtposition(tail,head,position,d);
        return;
    }
    Node * temp = head;
    int count = 1;
    while(count < position-1){
        temp = temp-> next;
        count++;
    }
    if(temp -> next == NULL){
        insertAttail(tail,d);
        return;
    }
    //create nodeTo Insert
    Node* nodeToinsert = new Node(d);

    nodeToinsert -> next = temp -> next;

    temp -> next -> prev = nodeToinsert;

    temp -> next = nodeToinsert;

    nodeToinsert -> prev = temp;
}
void delatbegin(Node* &head)
{
        head = head->next;
}

void delatend(Node* &tail)
{
        tail = tail->prev;
        tail->next = NULL;
}
```

```
void deleteNode(int position,Node* &head){
   if(position == 1)//for deleting the first Node
   {
      Node* temp = head;
      temp -> next -> prev = NULL;
      head = temp -> next;
      //memory free node
      temp -> next = NULL;
      delete temp;
   }
   else{//delete other node with last Node
      Node* curr = head;
      Node* prev = NULL;

      int count = 1;
      while (count < position)
      {
         prev = curr;
         curr = curr -> next;
         count++;
         /* code */
      }
      curr -> prev = NULL;
      prev -> next = curr -> next;
      curr -> next = NULL;
      delete curr;
   }
}
//searching
int search(Node* &head,int data){
        Node* trav = head;
        bool flag = false;
        int count = 0;
        while(trav != NULL && flag == false){
                count++;
                if(trav -> data == data){
                        flag = true;
                        return count;
                        break;
                }
                else{
                        trav = trav -> next;
                }
        }
        if(flag == true){
                cout << "Element Found!" << endl;
        }
        else{
                cout << "Element Not Found!" << endl;
        }
        return 0;
}
//reverse
void reverseList(Node** head){
```

```
        Node* prev=NULL,*cur=*head,*tmp;
        while(cur!=NULL){
                tmp=cur->next;
                cur->next=prev;
                prev=cur;
                cur=tmp;
        }
        *head=prev;
}

int main(){
   Node* head = NULL;
   Node* tail = NULL;

   insertAtheadLL(tail,head,11);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   insertAtheadLL(tail,head,17);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   insertAtheadLL(tail,head,8);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   insertAtheadLL(tail,head,1);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   insertAttail(tail,25);
   printLIST(head);

   insertAtheadLL(tail,head,88);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   insertAtheadLL(tail,head,127);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   insertAtheadLL(tail,head,83);
   printLIST(head);

   cout<<"\nLength of the Node:"<< getLength(head)<<endl;

   cout<<"\n Reversed Linked list: ";
   reverseList(&head);
        printLIST(head);
```

```
    cout<<"\nRemove Element at end :"<<endl;
    delatend(tail);
    printLIST(head);
    cout<<"\nLength of the Node:"<< getLength(head)<<endl;

    cout<<"\nRemove Element at begin :"<<endl;
    delatbegin(head);
    printLIST(head);

    cout<<"\nLength of the Node:"<< getLength(head)<<endl;

    insertAtposition(tail,head,8,77);
    printLIST(head);

    cout<<"\nLength of the Node:"<< getLength(head)<<endl;

        int p;
        cout << "\nEnter Position you want remove from the Linked List: ";
        cin>>p;
    deleteNode(p,head);
    cout<<"\nRemove Node At position " << p <<":";
    printLIST(head);

    cout<<"\nSearching Element in the Linked list: ";
        int n;
        cin >> n;
        cout <<"\nLocation of the Element is "<<search(head,n);

    cout<<"\nLength of the Node:"<< getLength(head)<<endl;

    return 0;
}
```

Output:


G:\MCA_SEM-I-DSA_CPP-mai
[11]
Length of the Node:1
[17 11]
Length of the Node:2
[8 17 11]
Length of the Node:3
[1 8 17 11]
Length of the Node:4
[1 8 17 11 25]
[88 1 8 17 11 25]
Length of the Node:6
[127 88 1 8 17 11 25]
Length of the Node:7
[83 127 88 1 8 17 11 25]
Length of the Node:8
Reversed Linked list: [25 11 17 8 1 88 127 83]
Remove Element at end :
[25 11]
Length of the Node:2
Length of the Node:2
Remove Element at begin :
[11]
Length of the Node:1
[11 77]
Length of the Node:2
Enter Position you want remove from the Linked List: