Circular Linked List

```
// Aneesh Panchal
// 2K20/MC/21

#include<bits/stdc++.h>
using namespace std;

class Node {
public:
    int data;
    Node* next=NULL;
};

class CircularLinkedList {
    Node* head;
    Node* rear;

    public:
        CircularLinkedList(){head = NULL;}

    void insert(int data_){
        Node* newNode = new Node();
        newNode->data = data_;

        Node* temp=head;

        if(head == NULL){
            head = newNode;
            newNode->next = head;
            rear = newNode;
            return;
        }

        else if(head->data > data_){
            newNode->next = head;
            head = newNode;
            return;
        }

        while(temp->next != head && temp->next->data<data_){
            temp = temp->next;
        }
        if(temp->next == head){
            rear = newNode;
        }
        newNode->next = temp->next;
        temp->next = newNode;
    }

    void print(){
        Node* temp=head;
```

```
        if(head==NULL){
            cout<<"List Empty"<<endl<<endl;
            return;
        }

        while(temp!=rear){
            cout<< temp->data <<" -> ";
            temp = temp->next;
        }
        cout<<temp->data<<" and "<<rear->data<<endl<<endl;
    }

    void deleted(int data_){
        Node* temp=head;

        if(head==NULL){
            cout<<"List empty"<<endl<<endl;
            return;
        }

        else if(head->data == data_){
            if(head==rear){
                head=NULL;
                rear=NULL;
            }
            else{
                head = temp->next;
            }
            return;
        }

        while(temp->next->data!=data_){
            if(temp->next->next==head){
                cout<<data_<<" "<<"not present in the list"<<endl<<endl;
                return;
            }
            temp=temp->next;
        }
        if(temp->next==rear){
            rear = temp;
        }
        Node* del = temp->next;
        temp->next = temp->next->next;
        delete del;
    }
};

int main(){
    CircularLinkedList circularLL;
    cout<<endl;
    circularLL.deleted(10);
    circularLL.insert(1);
    circularLL.print();
    circularLL.deleted(1);
```

```
    circularLL.print();
    circularLL.insert(2);
    circularLL.print();
    circularLL.insert(3);
    circularLL.print();
    circularLL.insert(4);
    circularLL.print();
    circularLL.insert(5);
    circularLL.print();
    circularLL.insert(6);
    circularLL.print();
    circularLL.insert(7);
    circularLL.print();

    circularLL.deleted(2);
    circularLL.print();
    circularLL.deleted(7);
    circularLL.print();
    circularLL.deleted(100);
    circularLL.print();
    circularLL.deleted(4);
    circularLL.print();

    cout<<endl;

    return 0;
}
```

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```
Windows PowerShell
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PS E:\Codes> cd "e:\Codes\CS 251 DS\5. Linked List\" ; if ($?) { g++ CircularLL.cpp -o CircularLL } ; if ($?) { .\CircularLL }

List empty

1 and 1

List Empty

2 and 2

2 -> 3 and 3

2 -> 3 -> 4 and 4

2 -> 3 -> 4 -> 5 and 5

2 -> 3 -> 4 -> 5 -> 6 and 6

2 -> 3 -> 4 -> 5 -> 6 -> 7 and 7

3 -> 4 -> 5 -> 6 -> 7 and 7

3 -> 4 -> 5 -> 6 and 6

100 not present in the list

3 -> 4 -> 5 -> 6 and 6

3 -> 5 -> 6 and 6

PS E:\Codes\CS 251 DS\5. Linked List>
```

Queues using Linked List

```
// Aneesh Panchal
// 2K20/MC/21

#include<bits/stdc++.h>
using namespace std;

class Node {
public:
    int data;
    Node* next=NULL;
};

class QueueLinkedList {
    Node* head;
    Node* rear;

    public:
        QueueLinkedList(){head = NULL;}

    void enqueue(int data_){
        Node* newNode = new Node();
        newNode->data = data_;

        Node* temp=head;

        if(head == NULL){
            head = newNode;
            newNode->next = head;
            rear = newNode;
            return;
        }

        while(temp->next != head){
            temp = temp->next;
        }
        if(temp->next == head){
            rear = newNode;
        }
        newNode->next = temp->next;
        temp->next = newNode;
    }

    void show(){
        Node* temp=head;

        if(head==NULL){
            cout<<"List Empty"<<endl<<endl;
            return;
        }

        while(temp!=rear){
```

```
            cout<< temp->data <<" -> ";
            temp = temp->next;
        }
        cout<<temp->data<<" and "<<rear->data<<endl<<endl;
    }

    void dequeue(){
        Node* temp=head;

        if(head==NULL){
            cout<<"List empty"<<endl<<endl;
            return;
        }

        if(head==rear){
            head=NULL;
            rear=NULL;
        }
        else{
            head = temp->next;
        }
        return;
    }
};

int main()
{
    QueueLinkedList QLL;
    QLL.enqueue(1);
    QLL.show();
    QLL.enqueue(2);
    QLL.show();
    QLL.enqueue(3);
    QLL.show();
    QLL.enqueue(4);
    QLL.show();
    QLL.enqueue(5);
    QLL.show();
    QLL.enqueue(6);
    QLL.show();
    QLL.enqueue(7);
    QLL.show();
    QLL.enqueue(8);
    QLL.show();

    QLL.dequeue();
    QLL.show();
    QLL.dequeue();
    QLL.show();
    QLL.dequeue();
    QLL.show();
    QLL.dequeue();
    QLL.show();
    return 0;
```

```
}
```

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```
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PS E:\Codes> cd "e:\Codes\CS 251 DS\5. Linked List\" ; if ($?) { g++ QueueLL.cpp -o QueueLL } ; if ($?) { .\QueueLL }
1 and 1

1 -> 2 and 2

1 -> 2 -> 3 and 3

1 -> 2 -> 3 -> 4 and 4

1 -> 2 -> 3 -> 4 -> 5 and 5

1 -> 2 -> 3 -> 4 -> 5 -> 6 and 6

1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 and 7

1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 and 8

2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 and 8

3 -> 4 -> 5 -> 6 -> 7 -> 8 and 8

4 -> 5 -> 6 -> 7 -> 8 and 8

5 -> 6 -> 7 -> 8 and 8

PS E:\Codes\CS 251 DS\5. Linked List>
```

Stacks using Linked List

```
// Aneesh Panchal
// 2K20/MC/21

#include<bits/stdc++.h>
using namespace std;

class Node {
public:
    int data;
    Node* next=NULL;
};

class StackLinkedList {
    Node* head;
    Node* rear;

    public:
        StackLinkedList(){head = NULL;}

    void push(int data_){
        Node* newNode = new Node();
        newNode->data = data_;

        Node* temp=head;

        if(head == NULL){
            head = newNode;
            newNode->next = head;
            rear = newNode;
            return;
        }

        newNode->next = head;
        head = newNode;
        return;
    }

    void show(){
        Node* temp=head;

        if(head==NULL){
            cout<<"List Empty"<<endl<<endl;
            return;
        }

        while(temp!=rear){
            cout<< temp->data <<" -> ";
            temp = temp->next;
        }
        cout<<temp->data<<" and "<<rear->data<<endl<<endl;
    }
```

```
    void top(){
        cout<<head->data<<endl<<endl;
    }

    void pop(){
        Node* temp=head;

        if(head==NULL){
            cout<<"List empty"<<endl<<endl;
            return;
        }

        if(head==rear){
            head=NULL;
            rear=NULL;
        }
        else{
            head = temp->next;
        }
        return;
    }

    bool isempty(){
        if(head==NULL){
            return true;
        }
        else{
            return false;
        }
    }
};

int main()
{
    StackLinkedList stackLL;
    stackLL.push(1);
    stackLL.show();
    stackLL.push(2);
    stackLL.show();
    stackLL.push(3);
    stackLL.show();
    stackLL.push(4);
    stackLL.show();
    stackLL.push(5);
    stackLL.show();
    stackLL.push(6);
    stackLL.show();
    stackLL.push(7);
    stackLL.show();
    stackLL.push(8);
    stackLL.show();

    stackLL.top();
```

```
    stackLL.pop();
    stackLL.show();
    stackLL.pop();
    stackLL.show();
    stackLL.pop();
    stackLL.show();
    stackLL.pop();
    stackLL.show();
    return 0;
}
```

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```
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PS E:\Codes> cd "e:\Codes\CS 251 DS\5. Linked List\" ; if ($?) { g++ StackLL.cpp -o StackLL } ; if ($?) { .\StackLL }
1 and 1

2 -> 1 and 1

3 -> 2 -> 1 and 1

4 -> 3 -> 2 -> 1 and 1

5 -> 4 -> 3 -> 2 -> 1 and 1

6 -> 5 -> 4 -> 3 -> 2 -> 1 and 1

7 -> 6 -> 5 -> 4 -> 3 -> 2 -> 1 and 1

8 -> 7 -> 6 -> 5 -> 4 -> 3 -> 2 -> 1 and 1

8

7 -> 6 -> 5 -> 4 -> 3 -> 2 -> 1 and 1

6 -> 5 -> 4 -> 3 -> 2 -> 1 and 1

5 -> 4 -> 3 -> 2 -> 1 and 1

4 -> 3 -> 2 -> 1 and 1

PS E:\Codes\CS 251 DS\5. Linked List>
```