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/*  
 * circualeQueue.cpp  
 *  
 * Created on: Sep 9, 2020  
 * Author: Megha Sonavane  
 */
```

```
#include<iostream>  
using namespace std;  
struct Patient  
{  
    int id;  
    string name,city,disease;  
};  
//class  
class Queue  
{  
private:  
    int front,rear;  
    Patient p[20];  
public:  
    Queue(){  
        front=-1;  
        rear=-1;  
    }  
    void enqueue(int);  
    void dequeue(int);  
    void display(int);  
    bool validation(int);
```

```

};
//definition to add new patient
void Queue::enqueue(int n)
{
    if(((front+1)%n)==((rear+1)%n)+1)
    {
        cout<<"Overflow condition!!!!"<<endl;
        return;
    }
    if(front==-1) //if it is first element to be inserted
        front=0;

    rear=(rear+1)%n; //increment rear pointer

    //Input details at rear position
    cout<<"Enter details:";
    bool validate; //to validate patient id
    do{
        cout<<"Id:";
        cin>>p[rear].id;
        validate=validation(rear); //validation of id
    }while(!validate);
    cin.ignore();
    cout<<"Name:";
    getline(cin,p[rear].name);
    cout<<"City:";
    getline(cin,p[rear].city);
    cout<<"Disease:";
    getline(cin,p[rear].disease);

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        cout<<"Record added....."<<endl;
    }
    //validation of patient id
    bool Queue::validation(int i)
    {
        for(int j=i-1;j>=front;j--)
        {
            if(p[rear].id==p[j].id)
            {
                cout<<"Id should be unique"<<endl;
                return false;
            }
        }
        return true;
    }
    //definition to discharge a patient
    void Queue::dequeue(int n)
    {
        if(front==-1)
        {
            cout<<"Underflow condition!!!"<<endl;
            return;
        }
        int temp=front;//to display record of discharged patient
        if(front==rear)
            front=rear=-1;//if queue has only 1 element
        //normal deletion
        else
            front=(front+1)%n;
    }

```

```

    cout<<"Patient discharged...."<<endl;
    //display details of discharged patient
    cout<<"Details of discharged patient:"<<endl;
    cout<<"Id:"<<p[temp].id<<endl<<"Name:"<<p[temp].name<<endl<<"City:"<<p[temp].city<<endl;
}
//definition for display
void Queue::display(int n)
{
    if(front==-1)
    {
        cout<<"No records available"<<endl;
        return;
    }

    else if(front>rear)
    {
        cout<<"Id\tName\t\tCity\tDisease"<<endl;
        for(int i=front;i<n;i++)
            cout<<p[i].id<<"\t"<<p[i].name<<"\t"<<p[i].city<<"\t"<<p[i].disease<<endl;
        for(int i=0;i<=rear;i++)
            cout<<p[i].id<<"\t"<<p[i].name<<"\t"<<p[i].city<<"\t"<<p[i].disease<<endl;
    }
    else
    {
        cout<<"Id\tName\t\tCity\tDisease"<<endl;
        for(int i=front;i<=rear;i++)
            cout<<p[i].id<<"\t"<<p[i].name<<"\t"<<p[i].city<<"\t"<<p[i].disease<<endl;
    }
}

```

//driver function

int main()

{

Queue queue;

int n;

do

{

cout<<"Enter valid number of patients:";

cin>>n;

} **while**(n<1||n>20);

int choice;

do

{

cout<<"-----"<<**endl**;

cout<<"1:Admit new Patient"<<**endl**<<"2:Discharge patient"<<**endl**<<"3:Display all patients"<<**endl**<<"4:Exit"<<**endl**;

cout<<"Enter choice:";

cin>>choice;

cout<<"-----"<<**endl**;

switch(choice)

{

case 1:

queue.enqueue(n);

break;

case 2:

queue.dequeue(n);

break;

case 3:

queue.display(n);

```
        break;
    case 4:
        cout<<"Thank you...";
        break;
    }
} while(choice!=4);
return 0;
}
```

Output:

Enter valid number of patients:-3

Enter valid number of patients:5

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:2

Underflow condition!!!

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

No records available

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:101

Name:abcd abcd abcd

City:abcd

Disease:abcd

Record added.....

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

Id Name City Disease
101 abcd abcd abcd abcd abcd

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:102

Name:pqrs pqrs pqrs

City:pqrs

Disease:pqrs

Record added.....

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:101

Id should be unique

Id:103

Name:xyz xyz xyz

City:xyz

Disease:xyz

Record added.....

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

Id	Name	City	Disease
101	abcd abcd abcd	abcd	abcd
102	pqrs pqrs pqrs	pqrs	pqrs
103	xyz xyz xyz xyz	xyz	

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:2

Patient discharged....

Details of discharged patient:

Id:101

Name:abcd abcd abcd

City:abcd

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

Id Name City Disease
102 pqrs pqrs pqrs pqrs pqrs
103 xyz xyz xyz xyz xyz

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:104

Name:wxyz wxyz wxyz

City:wxyz

Disease:wxyz

Record added.....

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:104

Id should be unique

Id:105

Name:sde sde sde

City:sde

Disease:sde

Record added.....

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

Id Name City Disease
102 pqrs pqrs pqrs pqrs pqrs
103 xyz xyz xyz xyz xyz
104 wxyz wxyz wxyz wxyz wxyz
105 sde sde sde sde sde

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:110
Name:asdf asdf asdf
City:asdf
Disease:asdf
Record added.....

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit
Enter choice:3

Id Name City Disease
102 pqrs pqrs pqrs pqrs pqrs
103 xyz xyz xyz xyz xyz
104 wxyz wxyz wxyz wxyz wxyz
105 sde sde sde sde
110 asdf asdf asdf asdf asdf

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit
Enter choice:1

Overflow condition!!!

1:Admit new Patient
2:Discharge patient

3:Display all patients

4:Exit

Enter choice:2

Patient discharged....

Details of discharged patient:

Id:102

Name:pqrs pqrs pqrs

City:pqrs

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

Id Name City Disease
103 xyz xyz xyz xyz xyz
104 wxyz wxyz wxyz wxyz wxyz
105 sde sde sde sde sde
110 asdf asdf asdf asdf asdf

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:1

Enter details:Id:111

Name:new new new

City:new

Disease:new

Record added.....

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:3

Id Name City Disease
103 xyz xyz xyz xyz xyz
104 wxyz wxyz wxyz wxyz wxyz
105 sde sde sde sde sde
110 asdf asdf asdf asdf asdf
111 new new new new new

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:2

Patient discharged....

Details of discharged patient:

Id:103

Name:xyz xyz xyz

City:xyz

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit
Enter choice:2

Patient discharged....
Details of discharged patient:
Id:104
Name:wxyz wxyz wxyz
City:wxyz

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit
Enter choice:2

Patient discharged....
Details of discharged patient:
Id:105
Name:sde sde sde
City:sde

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit

Enter choice:2

Patient discharged....

Details of discharged patient:

Id:110

Name:asdf asdf asdf

City:asdf

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:2

Patient discharged....

Details of discharged patient:

Id:111

Name:new new new

City:new

1:Admit new Patient

2:Discharge patient

3:Display all patients

4:Exit

Enter choice:2

Underflow condition!!!

1:Admit new Patient

2:Discharge patient
3:Display all patients
4:Exit

Enter choice:2

Underflow condition!!!

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit

Enter choice:3

No records available

1:Admit new Patient
2:Discharge patient
3:Display all patients
4:Exit

Enter choice:4

Thank you...