

STUDENT ID:	19DCS098	STUDENT NAME:	Parth N Patel
SUBJECT CODE:	CE245	SUBJECT NAME:	DSA
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DEFINITION:

Write a menu driven program to implement following operations using double ended queue.

- Insertion at Front
- Insertion at Rear
- Deletion from Rear
- Display

SOLUTION:

```
#include<iostream>

using namespace std;

void line()
{
    for(int i=0;i<50;i++)
        cout<<"- ";
    cout<<endl;
}

class dequeue
{

private:
    int size,front,rear;
    int *arr;

public:
```

```
void initialize()
{
    cout<<"Enter the size of double ended Queue : ";
    cin>>size;
    arr=new int[size];
    front=rear=-1;
    line();
    cout<<"The double ended queue created"<<endl;
    line();
}
```

```
void enqueueFront(int x)
{
    if((front==0 && rear==size-1) || front==rear+1)
    {
        cout<<"Overflow happened!!!"<<endl;
        line();
        return;
    }

    else if(front==-1 && rear==-1)
    {
        front=0;
        rear=0;
        arr[front]=x;
    }
}
```

```
else
{
    front--;
    arr[front]=x;
}

cout<<"Element "<<arr[front]<<" inserted in front "<<endl;
line();
}

void enqueueRear(int x)
{
    if((front==0 && rear==size-1) || front==rear+1)
    {
        cout<<"Overflow happened!!!"<<endl;
        line();
        return;
    }
    else if(front==-1 && rear==-1)
    {
        front=0;
        rear=0;
        arr[rear]=x;
    }
    else if(rear==size-1)
    {
        rear=0;
```

```
    arr[rear]=x;
    }
    else
    {
        rear++;
        arr[rear]=x;
    }

    cout<<"Element "<<arr[rear]<<" inserted at rear"<<endl;
    line();
}

void dequeueRear()
{
    if(front==-1 && rear==-1)
    {
        cout<<"Underflow Happened!!"<<endl;
        line();
        return;
    }
    else if(front==rear)
    {
        cout<<"Element "<<arr[rear]<<" deleted from rear"<<endl;
        front=-1;
        rear=-1;
    }
    else if(rear==0)
```

```
{
    cout<<"Element "<<arr[rear]<<" deleted from rear"<<endl;
    rear=size-1;
}
else
{
    cout<<"Element "<<arr[rear]<<" deleted from rear"<<endl;
    rear--;
}
line();
}

void display()
{
    int temp=front;
    cout<<"Elements in the double ended queue : "<<endl;
    while(temp!=rear)
    {
        cout<<arr[temp]<<" ";
        temp=(temp+1)%size;
    }

    cout<<arr[rear]<<endl;
    line();
}

};
```

```
int main()
{
    int c,tmp;
    dequeue dq;
    dq.initialize();
    do
    {
        cout<<"Select the appropriate option : "<<endl;
        cout<<"1. Insertion at Front"<<endl;
        cout<<"2. Insertion at Rear"<<endl;
        cout<<"3. Deletion from Rear"<<endl;
        cout<<"4. Display"<<endl;
        line();
        cout<<"Enter your choice : "<<endl;
        cin>>c;
        line();
        if(c==1)
        {
            cout<<"Enter the value : ";
            cin>>tmp;
            line();
            dq.enqueueFront(tmp);
        }
        else if(c==2)
        {
            cout<<"Enter the value : ";
            cin>>tmp;
```

```
        line();
        dq.enqueueRear(tmp);
    }
    else if(c==3)
    {
        line();
        dq.dequeueRear();

    }
    else if(c==4)
    {
        line();
        dq.display();
    }

} while(c!=0);
cout<<"PARTH PATEL\n19DCS098"<<endl;
return 0;

}
```

INPUT and OUTPUT SCREENSHOTS:

```
Enter the size of double ended Queue : 10
-----
The double ended queue created
-----
```

DEQUEUE Created of Size 10

```
-----
Select the appropriate option :
1. Insertion at Front
2. Insertion at Rear
3. Deletion from Rear
4. Display
-----
Enter your choice : █
```

Menu Driven Program Running

```
-----
Enter your choice :
1
-----
Enter the value : 10
-----
Element 10 inserted in front
-----
```

Element added at front


```
-----  
Enter your choice :  
2  
-----  
Enter the value : 50  
-----  
Element 50 inserted at rear  
-----
```

Element Added at rear

After inserting various elements in the dequeue

```
-----  
Enter your choice :  
3  
-----  
-----  
Element 60 deleted from rear  
-----
```

Deletion from rear end

```
-----  
Elements in the double ended queue :  
30 20 10 50  
-----
```

Display Elements

```
-----  
Select the appropriate option :  
1. Insertion at Front  
2. Insertion at Rear  
3. Deletion from Rear  
4. Display  
-----  
Enter your choice :  
0  
-----  
PARTH PATEL  
19DCS098
```

Exiting from Menu