Assignment- E12

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Div :- A Roll No :- 43

Problem Statement: A double-ended queue (deque) is a linear list in which additions and deletions may be made at either end. Obtain a data representation mapping a deque into a one-dimensional array. Write C++ program to simulate deque with functions to add and delete elements from either end of the deque.

Program :-

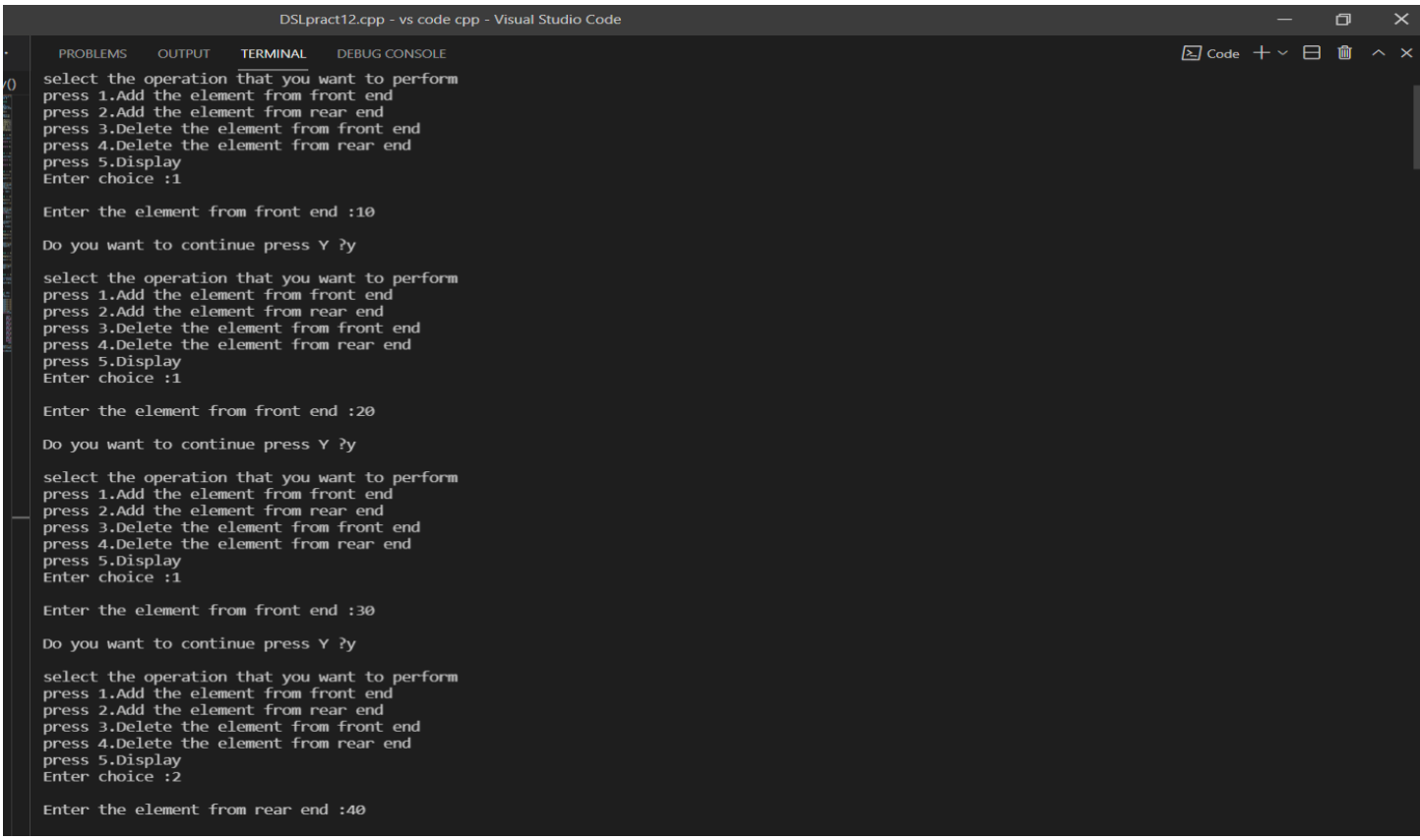
```
#include<iostream>
using namespace std;
#define MAX 8

class dequeue
{
   private:
    int Q[MAX];
    int rear,front,element,i;
   public:
   dequeue()
   {
      rear=-1;
      front=0;
   }
   int IsFull();
   int IsEmpty();
   int insert_f();
   int insert_r();
   void del_f();
   void del_r();
   void display();
};

int dequeue :: IsFull()
{
   if(rear==MAX-1)
   {
      return 1;
   }
   else{
```

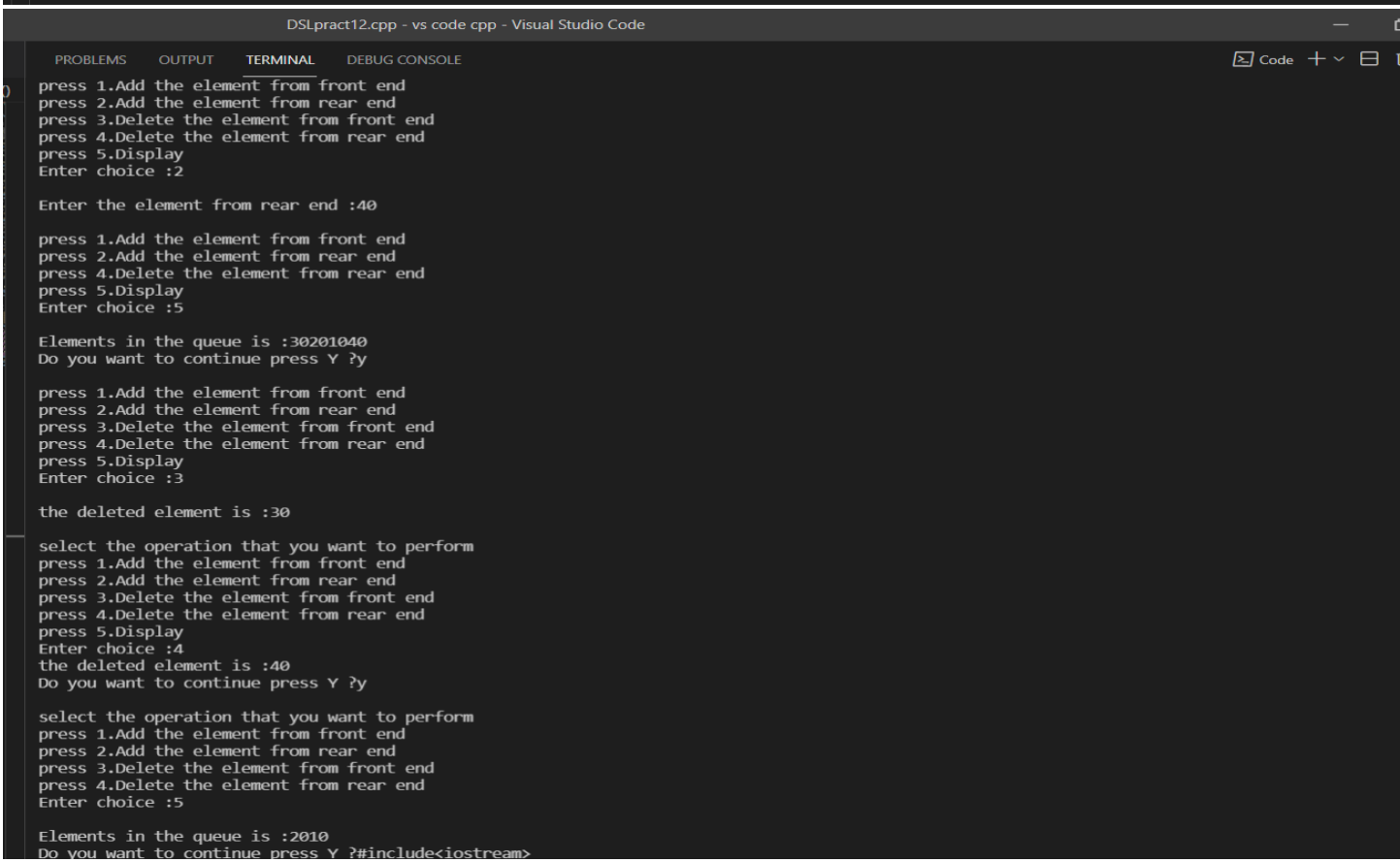
```
        return 0;
    }
}

int dequeue :: IsEmpty()
{
    if(front>rear)
    {
        return 1;
    }
    else{
        return 0;
    }
}

int dequeue :: insert_r()
{
    if(IsFull())
    {
        cout<<"\nqueue is Full";
    }
    else{
        cout<<"\nEnter the element from rear end :";
        cin>>element;
        rear++;
        Q[rear]=element;
    }
    return rear;
}

int dequeue :: insert_f()
{
    if(IsFull())
    {
        cout<<"\nqueue is Full";
    }
    else{
        cout<<"\nEnter the element from front end :";
        cin>>element;
        i=rear;
        while(i>=front)
        {
            Q[i+1]=Q[i];
            i--;
```

```
        }
        Q[front]=element;
        rear++;
    }
    return front;
}

void dequeue :: del_f()
{
    if(IsEmpty())
    {
        cout<<"\nqueue is empty";
    }
    else{
        cout<<"\nthe deleted element is :";
        cout<<Q[front];
        front++;
    }
}

void dequeue :: del_r()
{
    if(IsEmpty())
    {
        cout<<"\nqueue is empty";
    }
    else{
        cout<<"\nthe deleted element is :";
        cout<<Q[rear];
        rear--;
    }
}

void dequeue :: display()
{
    cout<<"\nElements in the queue is :";
    for(int i=front; i<=rear ;i++)
    {
        cout<<Q[i];
    }
}

int main()
{
```

```
    dequeue obj;
    int ch;
    char choice;
    do{
        cout<<"\nselect the operation that you want to perform ";
        cout<<"\npress 1.Add the element from front end ";
        cout<<"\npress 2.Add the element from rear end ";
        cout<<"\npress 3.Delete the element from front end ";
        cout<<"\npress 4.Delete the element from rear end ";
        cout<<"\npress 5.Display";
        cout<<"\nEnter choice :";
        cin>>ch;
        switch(ch)
        {
            case 1:
            obj.insert_f();
            break;
            case 2:
            obj.insert_r();
            break;
            case 3:
            obj.del_f();
            break;
            case 4:
            obj.del_r();
            break;
            case 5:
            obj.display();
            break;
            default:
              cout<<"\nInvalid choice";
        }
        cout<<"\nDo you want to continue press Y ?";
        cin>>choice;

    }while(choice=='Y' || choice=='y');
}
```

Output:-


DSLpract12.cpp - vs code cpp - Visual Studio Code
PROBLEMS
OUTPUT
TERMINAL
DEBUG CONSOLE
Code
select the operation that you want to perform
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :1
Enter the element from front end :10
Do you want to continue press Y ?y
select the operation that you want to perform
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :1
Enter the element from front end :20
Do you want to continue press Y ?y
select the operation that you want to perform
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :1
Enter the element from front end :30
Do you want to continue press Y ?y
select the operation that you want to perform
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :2
Enter the element from rear end :40


DSLpract12.cpp - vs code cpp - Visual Studio Code
PROBLEMS
OUTPUT
TERMINAL
DEBUG CONSOLE
Code
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :2
Enter the element from rear end :40
press 1.Add the element from front end
press 2.Add the element from rear end
press 4.Delete the element from rear end
press 5.Display
Enter choice :5
Elements in the queue is :30201040
Do you want to continue press Y ?y
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :3
the deleted element is :30
select the operation that you want to perform
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
press 5.Display
Enter choice :4
the deleted element is :40
Do you want to continue press Y ?y
select the operation that you want to perform
press 1.Add the element from front end
press 2.Add the element from rear end
press 3.Delete the element from front end
press 4.Delete the element from rear end
Enter choice :5
Elements in the queue is :2010
Do you want to continue press Y ?#include<iostream>