Linkedstack & LinkedQueue

```
#include <iostream>
#include<conio.h>
using namespace std;
template <class T>
class linkedstack
{
private:
template <class T>
struct node
{
T data;
node <T> *link;
} ;
node <T> *head;
public:
linkedstack();
void push(T element);
T pop ();
void display();
T count();
~linkedstack();
};
template <class T>
linkedstack<T>::linkedstack()
{
head = NULL;
}
template <class T>
void linkedstack<T>::push(T element)
{
node <T>*q,*t;
if( head == NULL ) // insert into empty stack
{
head = new node<T>;
head->data = element;
head->link = NULL;
}
else // append
{
q = head;
while( q->link != NULL )
q = q->link;
t = new node<T>;
```

```
t->data = element;
t->link = NULL;
q->link = t;
}
}
template <class T>
T linkedstack<T>::pop ()
{
T x;
if( head == NULL ) // check if the stack is empty
{
cout<<"empty stack";
return 0;
}
else // delete from the end of the stack
{
node <T>*q,*r;
q = head;
r = q;
while( q->link!=NULL )
{
r = q;
q = q->link;
}
r->link=NULL;
x=q->data;
delete q;
return x;
}
}
template <class T>
void linkedstack<T>::display()
{
node <T>*q;
cout<<endl;
for( q = head ; q != NULL ; q = q->link )
cout<<endl<<q->data;
}
template <class T>
T linkedstack<T>::count()
{
node <T>*q;
int c=0;
for( q=head ; q != NULL ; q = q->link )
c++;
return c;
```

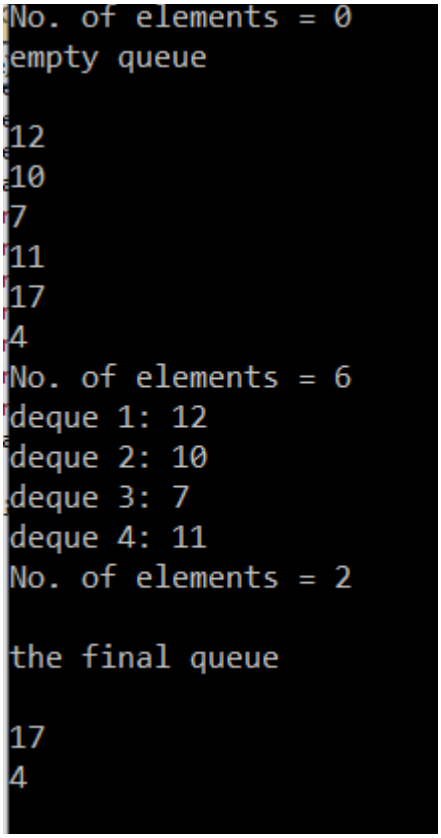
```
}
template <class T>
linkedstack<T>::~linkedstack()
{
node <T>*q;
if( head == NULL )
return;
while( head != NULL )
{
q = head->link;
delete head;
head = q;
}
}
int main()
{
linkedstack <int>ls;
cout<<"No. of elements = "<<ls.count()<<endl;
ls.pop();
ls.push(12);
ls.push(10);
ls.push(4);
ls.push(9);
ls.push(20);
ls.push(15);
ls.display();
cout<<"\nNo. of elements = "<<ls.count()<<endl;
cout<<"\npop 1:"<<ls.pop();
cout<<"\npop 2:"<<ls.pop();
cout<<"\npop 3:"<<ls.pop();
cout<<" \npop 4:"<<ls.pop();
cout<<"\nNo. of elements = "<<ls.count();
cout<<"\n\nthe final stack";
ls.display();
getch();
return 0;
}
```

```
No. of elements = 0
empty stack

12
10
4
9
20
15
No. of elements = 6

pop 1:15
pop 2:20
pop 3:9
pop 4:4
No. of elements = 2

the final stack

12
10
```

```
#include <iostream>
using namespace std;
#include<conio.h>
template <class T>
class LinkedQueue
{
private:
template <class T>
struct node
{
T data;
node <T> *link;
} ;
node <T> *head;
public:
LinkedQueue();
void enequeue(T element);
T dequeue();
void display();
T count();
~LinkedQueue();
};
template <class T>
LinkedQueue<T>::LinkedQueue()
{
head = NULL;
}
template <class T>
void LinkedQueue<T>::enequeue(T element)
{
node <T>*q,*t;
if( head == NULL ) // insert into empty queue
{
head = new node<T>;
head->data = element;
head->link = NULL;
}
else // append
{
q = head;
while( q->link != NULL )
q = q->link;
t = new node<T>;
t->data = element;
```

```
t->link = NULL;
q->link = t;
}
}
template <class T>
T LinkedQueue<T>::dequeue( )
{
node <T>*q;
T x;
q = head;
if(head==NULL) // check if the queue is empty
{
cout<<"empty queue";
return 0;
}
else
{
head = q->link; // delete from the beginning of the queue
x = q->data;
delete q;
return x;
}
}
template <class T>
void LinkedQueue<T>::display()
{
node <T>*q;
cout<<endl;
for( q = head ; q != NULL ; q = q->link )
cout<<endl<<q->data;
}
template <class T>
T LinkedQueue<T>::count()
{
node <T>*q;
int c=0;
for( q=head ; q != NULL ; q = q->link )
c++;
return c;
}
template <class T>
LinkedQueue<T>::~LinkedQueue()
{
node <T>*q;
if( head == NULL )
return;
```

```
while( head != NULL )
{
q = head->link;
delete head;
head = q;
}
}
int main()
{
LinkedQueue <int>lq;
cout<<"No. of elements = "<<lq.count()<<endl;
lq.dequeue();
lq.enequeue(12);
lq.enequeue(10);
lq.enequeue(7);
lq.enequeue(11);
lq.enequeue(17);
lq.enequeue(4);
lq.display();
cout<<"\nNo. of elements = "<<lq.count();
cout<<"\ndeque 1: "<<lq.dequeue();
cout<<"\ndeque 2: "<<lq.dequeue();
cout<<"\ndeque 3: "<<lq.dequeue();
cout<<"\ndeque 4: "<<lq.dequeue();
cout<<"\nNo. of elements = "<<lq.count();
cout<<"\n\nthe final queue";
lq.display();
getch();
return 0;

}
```


No. of elements = 0
empty queue
12
10
7
11
17
4
No. of elements = 6
deque 1: 12
deque 2: 10
deque 3: 7
deque 4: 11
No. of elements = 2
the final queue
17
4