Computer Networking Systems Department

DATA STRUCTURE

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Lecture 8

First course

Over view

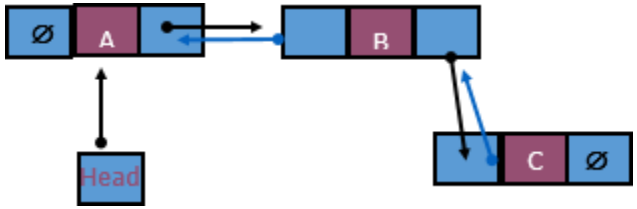
- Doubly linked lists
- General definition type
- Create first node
- Add new nodes
- Display double linked list by different manners
- Compute no. of odd number in D.L.L.

Doubly linked lists

Each node points to not only successor but the predecessor. There

are two NULL: at the first and last nodes in the list

Advantage: given a node, it is easy to visit its predecessor. Convenient to traverse lists backwards



General definition type

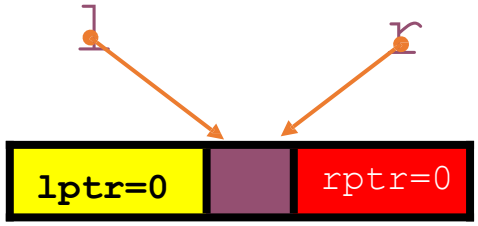
```
#include<iostream.h> #define n 5
struct nod{
i
n
t
 nod *r,*l,*p,*q;
*
l
p
t
r
```

```
;
};
```

Create first node

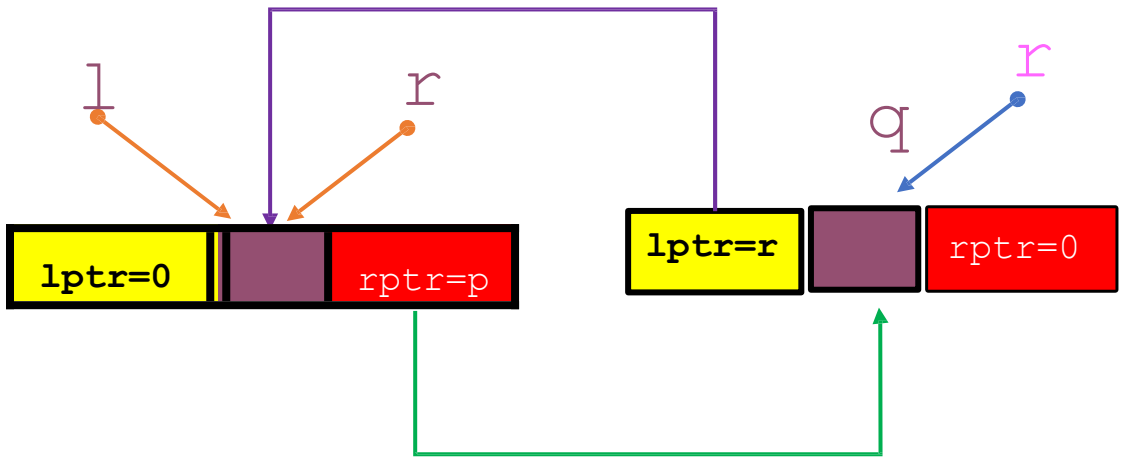
```
q=new nod;

cout<<" enter the information :";
cin>>q->info;
q->rptr  = q->lptr =0;
l=r=q;
```



Add new nodes

```
for(int i=1;i<n;i++)
 { q=new nod;
  cin>>q->info;
  q->lptr=r;
  q->rptr=0;
  r->rptr=q;
  r=q;
 }
```



Display double linked list by different manners

```
p=l;
cout<<"\n The DLL from left to right : "; while(p!
=0)
{ cout<<p->info;       p=p->rptr;    }
p=r;
cout<<"\n The DLL from right to left: "; while(p!
=0)
 { cout<<p->info;   p=p->lptr; }
```

Compute no. of odd number in d.L.L.

```
p=l;
int od=0;
 while(p!=0)
 {
        if(p->info%2!=0) od++;
        p=p->rptr;
 }
 cout<<"\n the no. of odd =  "<<od;
```

Compute no. of prime number in d.L.L.

```
p=l; int prime=0; while(p!
=0)
{ f=0;
 for(int j=2;j<p->info;j++)
        if(p->info%j==0) f=1;
        if(f==0) prime++;
        p=p->rptr;
}
cout<<"\n the no. of prime =  "<<prime;
```

References

- Introduction to Algorithms, 3rd Edition by *Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein*
- Introduction to Algorithms, 3rd Edition by *Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein*
- Elements of Programming Interviews in Java: The Insiders' Guide, by *Adnan Aziz, Tsung-Hsien Lee, Amit Prakash*
- https://github.com/careermonk/DataStructuresAndAlgorithmsMadeEasy